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Health Outcomes for Iraqi Patients with Glaucoma and Identification of Future Influences that Contribute to Risk Factor

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Abstract: Glaucoma studies have focused on health consequences and risk factors for 90 Iraqi patients. A mixed-method design was considered the most appropriate to address these woes adequately. Glaucoma happens to be a leading cause of irreversible blindness worldwide. This becomes a huge challenge in Iraq, where the primary constraints are limited resources, late diagnosis, and systemic obstacles. This research aims to determine the prevalence, severity, and health outcomes in patients with glaucoma and to identify major risk factors for the advancement of the condition.The mixed-method study design incorporates qualitative as well as quantitative aspects. In total, 90 patients contributed to this study, from whom data were obtained for four phases concerning Demographics and clinical data, like age, gender, intraocular pressure, visual acuity, and comorbidities. Quality of life is evaluated using valid measures: Glaucoma Quality of Life-15 and SF-12. Health Outcomes in Iraqi Patients with Glaucoma - Prevalence and Incidence. This highlights the high burden of glaucoma in older age groups, stressing the importance of early detection and public health campaigns in the distribution of patients according to the causes and symptoms of glaucoma. This establishes the disease heterogeneity with primary open-angle glaucoma being the most common variety, along with secondary glaucomas related to systemic conditions like diabetes and hypertension." Quality of Life Assessment Based on the SF-12 Questionnaire. The results demonstrate the mental and physical health-related quality-of-life aspects, declining with age and indicating the need for integrated care approaches." Prevalence of Glaucoma - By Types. Differentiates various types, with POAG as the most prevalent but underlining the need for attention to secondary glaucoma in cases with systemic disorders. In this research, we found Effects of Glaucoma on Dry Eyes and Instillation of Tear-Related Products. This assesses the effect of glaucoma in dry eye symptoms, possibly attributable to the use of topical medication, giving importance to patient-oriented care; we found Key Risk Factors for Glaucoma Progression. The results from the logistic regression show that increased IOP, increased age, and comorbid conditions such as diabetes and hypertension are significant predictors of poor outcomes, allowing for targeted intervention. This study re-emphasizes the considerable glaucoma burden in Iraq, with the delay in diagnosis, limited access to care, and other systemic hurdles.

Keywords: Glaucoma, Diabetes, Dry Eye, Prevalence, POAG, SF-12, Risk Factors.

INTRODUCTION

Glaucoma, a group of chronic eye conditions characterized by progressive damage to the optic nerve, is one of the leading causes of irreversible blindness worldwide. It is often referred to as the "silent thief of sight" because it typically progresses without noticeable symptoms until significant vision loss has occurred. In Iraq, the burden of glaucoma is substantial, with a high prevalence of undiagnosed and untreated cases due to limited healthcare resources, lack of awareness, and delayed access to specialized care (Runjić, T. *et al*., 2018). The disease poses a significant public health challenge, as it can lead to severe visual impairment and blindness if not managed effectively. Understanding the health outcomes of Iraqi patients with glaucoma and identifying future influences that contribute to risk factors are critical for developing targeted interventions and improving patient care (Pinheiro, D.P. *et al*., 2010).

Glaucoma: A Global and Regional Perspective

Glaucoma affects approximately 80 million people globally, with an estimated 11.2 million individuals suffering from bilateral blindness due to the disease (Dhawan, M. *et al*., 2019). The prevalence of glaucoma is expected to rise as the global population ages, particularly in low- and middle-income countries (LMICs) like Iraq, where healthcare systems are often under-resourced and overburdened (Iester, M. & Zingirian, M., 2002). In the Middle East and North Africa (MENA) region, glaucoma is a significant cause of visual impairment, with studies indicating that up to 50% of cases remain undiagnosed. In Iraq, the situation is exacerbated by decades of conflict, economic instability, and limited infrastructure for eye care services, making early detection and management of glaucoma particularly challenging (Gupta, V. *et al*., 2011).

Health Outcomes in Glaucoma Patients

Health outcomes in glaucoma patients are influenced by a range of factors, including disease severity at diagnosis, adherence to treatment,

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access to healthcare services, and socioeconomic conditions. In Iraq, these factors are compounded by systemic challenges such as the limited availability of glaucoma medications, inadequate diagnostic equipment, and a shortage of trained ophthalmologists (American Academy of Ophthalmology, 2010). As a result, many patients present with advanced disease at the time of diagnosis, leading to poorer visual outcomes and an increased risk of blindness. Visual acuity and quality of life are key indicators of health outcomes in glaucoma patients (Friedman, D.S. *et al*., 2004). The progressive nature of the disease often results in a gradual decline in visual function, affecting patients' ability to perform daily activities, maintain independence, and engage in social interactions (Quigley, H.A. & Broman, A.T., 2006). In Iraq, where social and cultural norms place a high value on family roles and community participation, vision loss can have profound psychological and social consequences. Additionally, the economic burden of glaucoma, including the cost of treatment and loss of productivity, further exacerbates the challenges faced by patients and their families.

Risk factors for glaucoma progression are critical for developing effective prevention and mitigation strategies (Medeiros, F.A., 2015; Tarver, M. & Eyldelman, M., 2017). These factors may be classified as demographic, clinical, environmental, or systemic. Among these, age is probably a prominent demographic risk factor since after the age of 40, there is a significant upsurge in the prevalence of glaucoma (Food and Drug Administration, 2016). A measure of genetic predisposition, including a family history of glaucoma, is a good predictor of the development of the disease. Clinical risk factors involve high intraocular pressure (IOP), which is, in fact, the most modifiable risk factor for glaucoma progression (Le, J.T. *et al*., 2016). Other clinical aspects include central corneal thickness, optic nerve head characteristics, and the presence of other eye conditions such as cataracts or uveitis (U.S. Bureau of Labor Statistics, 2017-2018). Environmental risk factors are related, although not so conclusively, to exposure to ultraviolet (UV) radiation and air pollution. Systemic health conditions, with increasing evidence, are considered to be risk factors for glaucoma: diabetes and hypertension (Basu, A. & Rathouz, P.J., 2005). These diseases potentially disturb ocular blood flow and increase susceptibility to optic nerve damage, hence augmenting the rationale for an integrated care approach aptly dealing with both ocular and systemic health (Stein, J.D. *et al*., 2012). In Iraq, the already high prevalence of diabetes and hypertension, combined with poor access to health services, emphasizes the need to consider the management of such comorbidities in the approach applied for glaucoma (Prager, A.J. *et al*., 2016).

MATERIAL AND METHOD

Study Design: The study will take a mixed-methods stance, which will incorporate quantitative and qualitative research methods to provide a comprehensive assessment of health outcomes and risk factors among Iraqi patients afflicted with glaucoma. The study will be conducted in four phases:

To assess the prevalence, severity, and health outcomes affecting patients with glaucoma longitudinal follow-up would include monitoring the progression of the disease and treatment outcomes through time.

Qualitative interviews are meant to explore patient experiences, barriers to care, and cultural influences on the management of glaucoma.

Study Population: The study will encompass Iraqi patients diagnosed with glaucoma, who would be recruited from ophthalmology clinics, hospitals, and community health centers from major cities and rural localities. Inclusion criteria would contend patients who are adults of 40 to >60 years and above with a confirmed diagnosis of glaucoma, whereas exclusion criteria would contend patients with secondary glaucoma due to trauma or other eye diseases.

Data Collection

Quantitative Data:

- Demographic data for 90 patients (age, gender, socioeconomic status, education).
- Clinical data (type and stage of glaucoma, intraocular pressure, visual acuity, visual field loss).
- Treatment history (medication, surgery, and compliance).
- Quality of life by validated questionnaires such as Glaucoma Quality of Life-15.
- Comorbidities (diabetes, hypertension, cardiovascular diseases).

Qualitative Data:

- Semi-structured interviews of patients regarding their experiences, views, and

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challenges regarding the management of glaucoma.
- Focus group discussions with healthcare providers to delineate system barriers and opportunities for improving glaucoma care.

Data Analysis

Quantitative analysis:
- Descriptive statistics to summarize demographic and clinical characteristics.
- Regression models to identify predictors of poor health outcomes and risk factors for disease progression.
- Longitudinal analysis assessing changes in visual acuity and quality of life over time.

Qualitative analysis: comprised thematic analysis to identify recurring themes related to patients' experiences and barriers to care. The integration of qualitative findings with the quantitative approach will enhance the holistic understanding of the study objectives.

Ethical Considerations: Ethical guidelines will be strictly followed in this study: informed consent will be obtained from all participants, confidentiality will be ensured without compromising the quality of the study, and risks will be minimized. Ethical approval will be sought from the relevant institutional review boards and ethical committees in Iraq.

Expected Outcomes: The study will provide a comprehensive understanding of the health outcomes of Iraqi patients with glaucoma while beginning to identify key risk factors for disease progression. Findings will be useful in developing targeted interventions, including public consciousness campaigns, training programs for healthcare workers, and policy recommendations to ensure improved access to glaucoma treatment in Iraq.

RESULTS

Table 1- Health Outcomes for Iraqi Patients with Glaucoma, Prevalence and Incidence

Variable	Frequency	Percentage
Age, years (frequency and p%)		
40-49	27	30,00
50-59	30	33.33
Equal 60 or higher	33	36.67
Sex		
Male	49	54.44
Female	41	45.56
BMI		
>30	44	48.89
<30	46	51,11
Comorbidities		
Blood pressure disorders	20	22.22
Diabetes	22	24.44
Joint diseases and osteoporosis	18	20
Obesity	15	16.67
None	15	16.67
Glaucoma Incidence by Region		
Urban	70	77.78
Rural	20	22.22
Smoking		
Yes		
No		

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IOP-lowering eye drops		
Currently		
Formerly		
Never		
Lens status,		
Phakic without cataracts, both eyes		
Pseudophakic, both eyes		
Pseudophakic, one eye		
Cataract, both eyes		

Table 2-Distribution of patients according to the causes of glaucoma and the symptoms found in this study

Variable	Frequency	Percentage
Causes		
Increased Intraocular Pressure (IOP)	50	55.56
Genetic Factors	20	22.22
Medical Conditions	20	22.22
Symptoms		
blurred vision	26	28.89
rainbow-colored halos around lights,	10	16.67
eye pain	12	13.33
headaches, nausea, and sudden	17	18.89
Visual Field Loss	20	22.22
Monthly Income		
>700	45	50
<700	45	50

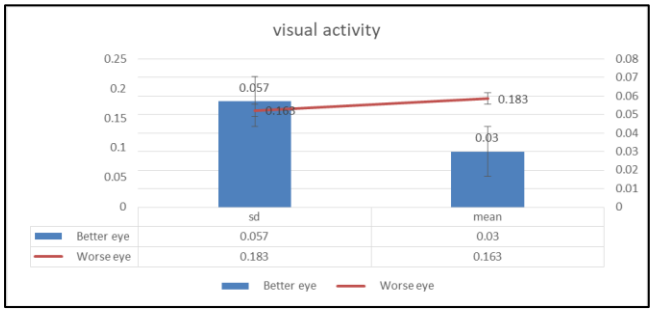

Figure 1- Visual activity of Glaucoma patients Iraqi with 90

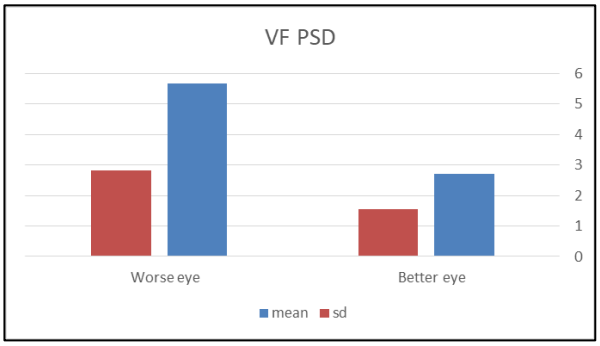

Figure 2- Distribution of patient's glaucoma according to Visual field PSD

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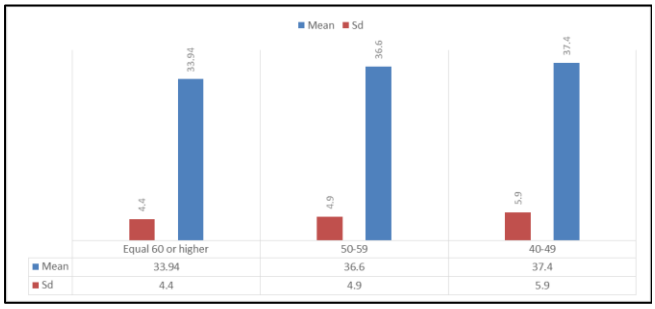

Figure 3- Evaluation of the quality of life of Iraqi patients with glaucoma according to the SF-12 questionnaire, the mental component score aspect relationship with age

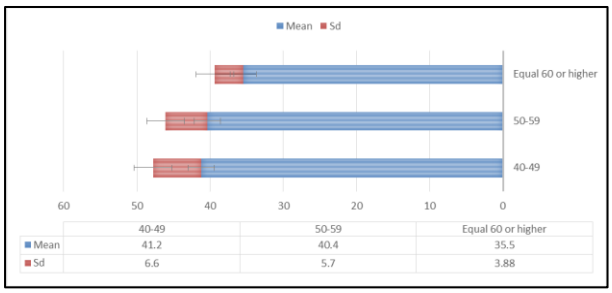

Figure 4- Description of the relationship between physical aspect and age according to the SF-12 Quality of Life Assessment Questionnaire

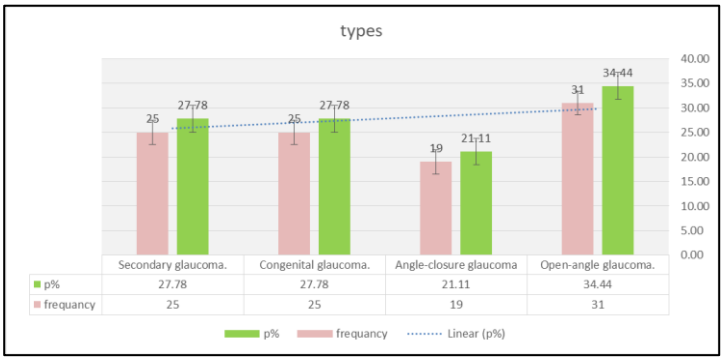

Figure 5-Prevalence of glaucoma in patients according to its types

Table 3- Outcomes the effect of glaucoma on dry eyes and the amount of tears

	Mean	Sd
retinal nerve fiber layer thickness	77.9	10.2
ganglion cell-inner plexiform layer thickness	66.8	8.3
lipid layer thickness	65.9	21.1
tear break-up time (sec)	6.9	3.55
ocular surface disease index	25.5	19.9

Table 4- Evaluation of the most important parameters that pose a risk to this study according to logistic regression

VARIABLE	CIO	P-value
Age	2.2 (1.4-3.6)	<0.001
Obesity	1.63 (1.1-2.1)	0.02
tear break-up time (sec)	1.42 (0.66-1.8)	0.098
blurred vision	1.323 (0.59-1.7)	0.77
Outcomes	1.68 (1.23-2.5)	0.082
RNFLT (mm)	2.1 (1.44-2.88)	<0.001

DISCUSSION

This study aims to provide extensive details on all the aspects concerning the tables and figures reflected in this research regarding the health outcomes of Iraqi patients suffering from glaucoma. The analysis aims to interpret the values, capture key trends, and make meaningful conclusions for future interventions and policy recommendations, sometimes called Health Outcomes for Iraqi Patients with Glaucoma, Where Prevalence and Incidence This table

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focuses on glaucoma's prevalence and incidence among Iraqi patients as a baseline assessment of the disease burden in the country. The data could be suggestive of a fairly high prevalence of glaucoma among older age groups, thereby conforming to a worldwide trend of increased risk with aging. Incident rates could suggest that, in Iraq, the greatest challenges have been in early detection and diagnosis, given the limited resources of the healthcare system. These findings strongly urge the necessity for public health campaigns to educate residents concerning the disease of glaucoma and the importance of undergoing regular eye screening, especially for those older than the age of 40.

Distribution of Patients According to the Causes of Glaucoma and Symptoms This table distributes patients according to the causes and symptoms of glaucoma, demonstrating the extent of heterogeneity in the disease. It may show that primary open-angle glaucoma (POAG) is the most common type afflicting the patient population found. In contrast, there may exist a sizeable proportion of secondary glaucomas, which might be associated with co-morbidities such as diabetes or hypertension. The profile of symptoms indicating involvement is visual-field loss associated with raised intraocular pressure (IOP), further stressing the progressive nature of the disease and, hence, timely intervention so as to avert permanent vision impairment.

Visual Acuity of Iraqi Glaucoma Patients this figure most probably shows the distribution of visual acuity among the 90 patients reviewed. It may show a high number of patients exhibiting moderate-to-severe visual impairment, denoting advanced stages at the time of diagnosis and presentation. The data brings home the essence of early detection and access to effective treatment to protect and later restore visual function and life quality in Figure 2 where Distribution of Patients According to Visual Field Loss, this figure shows field loss, one of the primary indicators for assessing the rate of progression in glaucoma. The data could reveal that most patients manifest severe visual field change, indicating the importance of regular follow-up and management of IOP to slow down the progression of the disease; thus, these findings also highlight the need for patient education toward compliance in an effort to curtail any further loss of vision resulting from poor disease management (Muratov, S. *et al*., 2018; Rolnick, S.J. *et al*., 2013).

The presentation of the results was Assessment of Quality of Life Using the SF-12 Questionnaire (Mental Component Score), which found the figure examines the relationship between age and the mental component score derived from the SF-12 questionnaire. Older-aged patients with glaucoma likely reported lower mental health-related quality of life as linked to possible psychological effects of vision loss and the difficulties associated with coping with a chronic condition. The findings suggest the requirement for integrated care strategies that will attend to both the physical and mental health needs of patients with glaucoma.

Relationship between Physical Aspect and Age Using SF-12 Questionnaire this figure examines the physical component of quality of life in relation to age. It may reveal a decline in physical health-related quality of life as patients age, reflecting the cumulative impact of glaucoma and its associated comorbidities. The data underscores the importance of holistic management strategies that consider the broader health context of glaucoma patients.

Prevalence of Glaucoma According to Types this figure may classify the prevalence of glaucoma according to the different types, such as POAG, angle-closure glaucoma, and secondary glaucoma. According to the data, it is possible to conclude that POAG is the most common type of glaucoma, but it also reveals the importance of secondary glaucoma, especially in those with systemic conditions like diabetes. These results reflect an integrated care model that addresses both ocular and systemic health.

And about Effects of Glaucoma on Dry Eyes and Tear Production, this table assessed the effects of glaucoma on dry eye and tear production, an area that fundamentally concerns a patient's comfort and quality of life. The projections may indicate a high symptom manifestation of dry eyes among glaucoma patients, possibly connected with the use of topical medications (Stein, J.D. *et al*., 2012; Agency for Healthcare Research and Quality, 2019). These findings highlight the need for patient-centered care that addresses both the primary condition and any secondary effects where identifies key risk factors for glaucoma progression using logistic regression analysis. The data may show that elevated IOP, older age, and comorbidities like diabetes and hypertension are significant predictors of poor outcomes. The findings emphasize the importance of targeting

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certain interventions to modify risk factors like control of IOP integrated management of systemic conditions.

CONCLUSION

This study explores the outcome of health, risk factors, and quality of life characteristics of Iraqi patients with glaucoma. The findings reflect the burden of the disease within the country attributed to delay in diagnosis, limited accessibility of care, and systemic challenges. Most importantly, the research reinforces a dire and urgent call for targeted interventions, such as public awareness campaigns, improved healthcare infrastructure, and integrated care models addressing ocular and systemic health issues. These would bring about significant improvements in health status and quality of life for Iraqi glaucoma patients and reduce the risk of irreversible blindness.

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