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Glaucoma knowledge and attitudes among diagnosed participants at a Vhembe clinic, South Africa

Authors:
Masilo C. Mathiba[1]
Lerato K. Landela[1]
Thokozile I. Metsing[1]

Affiliations:
[1]Department of Optometry, Faculty of Health Sciences, University of Johannesburg, Johannesburg, South Africa

Corresponding author:
Thokozile Metsing,
ingridm@uj.ac.za

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Background: Glaucoma remains a major public health concern worldwide. Most patients are dropping out of care, oblivious to the symptomless nature of glaucoma disease.

Aim: This study aimed to investigate glaucoma knowledge and attitudes among those diagnosed with the condition in the Limpopo province (South Africa).

Setting: The study was conducted at Elim Hospital in the Vhembe District of the Limpopo province, South Africa.

Methods: The design of this study was cross-sectional and quantitative in approach. Those diagnosed with glaucoma and receiving eye care treatment at a district hospital in Limpopo province were purposively selected to participate in the study. Quantitative data on knowledge and attitudes towards glaucoma was collected and analysed using a self-administered questionnaire.

Results: Eighty-nine purposively selected glaucoma patients, with an average age of 61.20 ± 14.77 years, participated in the study. Participants had an average knowledge score of 43 ± 20.87, with over 50% demonstrating an understanding of the importance of follow-up care, that treatment can slow the condition, and that the condition can progress rapidly if left untreated. The socio-demographic factors found to be statistically significant in relation to glaucoma knowledge were education and the duration of the condition, with p-values of 0.000 and 0.002, respectively. Concerns regarding the condition were expressed by the majority of participants, totalling 82% (n = 73).

Conclusion: Awareness programmes need to be implemented to spread knowledge about the nature of glaucoma and the importance of adherence to treatment among those with low levels of education and newly diagnosed patients.

Contribution: Awareness and knowledge regarding glaucoma can assist patients in treatment adherence, alleviation of the disease burden and concerns related to the eventuality of becoming blind.

Keywords: glaucoma treatment; knowledge; attitudes; optic neuropathy; blindness.

Introduction

Glaucoma is defined as a collection of ocular disorders with multiple causal factors characterised by optic neuropathy.[1] This disease is regarded as the second leading cause of blindness after cataracts, with 1.1 billion individuals affected by this preventable condition globally.[2] Meanwhile, the proper diagnosis of glaucoma is often made late when extensive damage to the optic nerve has ensued.[3] Thus, public awareness and knowledge of glaucoma is one of the effective measures for early detection and proper management. It was expected that by 2020, approximately 76 million people will suffer from glaucoma, estimated to reach 111.8m by 2040.[4] Evidently, because of a lack of public knowledge and awareness of glaucoma, the diagnosis of this condition is usually made when it is at the advanced stage, with significant visual loss realised.[5]

Studies of Swiss and Iranian sample populations on glaucoma knowledge investigated the ability of their participants to provide a simple, accurate definition of the disease.[5,6] Knowledge in a study conducted in Ghana was measured by participants indicating clinical presentations and risk factors of glaucoma.[7] However, in studies conducted in Ethiopia and Nigeria, glaucoma knowledge and awareness were probed by asking participants to describe their understanding of glaucoma in their own words.[8,9] Furthermore, participants were classified as being aware of

glaucoma based on having heard about the condition, stating if high intraocular eye pressures caused the condition and if the condition could lead to blindness. Nevertheless, in all the above-mentioned studies, glaucoma knowledge was found to be poor, with misconceptions about the condition articulated.[5,6,7,8,9,10,11]

Lower knowledge levels of glaucoma, associated with poor follow-up among those diagnosed with the condition, were found in Nigeria.[12] In an observational study conducted in the KwaZulu Natal province in South Africa, despite poor follow-up found to be because of limited knowledge, 62% of participants displayed a good understanding of the disease.[13] Tshivhase and Khoza's study conducted in South Africa found that 79% of their participants missed follow-up appointments more than once in 12 months, with 27% attributing lack of follow-up to inadequate knowledge which could contribute to non-adherence to treatment.[14] Previous studies on glaucoma focussed their data collection solely on individuals who missed at least one appointment in the past 12 months and attributed lack of knowledge to non-adherence to glaucoma treatment.[14,15] The limitation to the generalisation of the findings of the Vhembe study is attributed to the limited number (n = 18) of participants, and that the focus of the study was on only those who missed treatment appointments, instead of the general population of patients diagnosed with glaucoma. In contrast, the present study aimed to explore the current knowledge and attitudes towards glaucoma among individuals diagnosed with the disease and receiving treatment.

Research methods and design

Study setting

The data for this study were collected at the Elim Hospital in Vhembe district. The Elim district hospital catering to a population of approximately 22 000 is in the Limpopo province of South Africa, on the R578, Elim Village. The Vhembe population is predominantly rural, with Xitsonga being the common first language used in the district. Elim Hospital is the region's only speciality ophthalmology hospital and the Vhembe District's central referral facility. The hospital offers comprehensive eye care services such as significant operations, glaucoma follow-up, primary outpatient and inpatient eye care.

Study design

The design of this study was cross-sectional and quantitative. This study was hospital-based, and self-administered questionnaires were used to collect quantitative data.

Study population and sampling

The purposive sampling method was used to select a total of 89 female and male participants aged between 18 and 60 years old. A minimum of 132 participants was determined using Slovin's formula where n is the number of samples, N stands for total population and e is the margin of error for this study.[16] However, because data were collected during the coronavirus disease 2019 (COVID-19) pandemic, data could only be collected from 89 participants. Permission to collect data from Elim Hospital in Limpopo province (South Africa) was sought from the hospital management. Data collected for this study were for a postgraduate qualification with the study approved by the Higher Degrees and Research Ethics Committees of a University. Therefore, the data collector was not known to the participants. The participants were invited because they were receiving glaucoma treatment from the Vhembe hospital. The sampling method used in this study enabled the recruitment of participants diagnosed with glaucoma and already accessing eye care services at Elim Hospital's ophthalmology outpatient department. The sampling method was influenced by the lack of precise information on the total number of patients attending the hospital's ophthalmology outpatient department over specific timeframes from the management of the facility.

Data collection

Data were collected using a self-administered, self-developed questionnaire. The questionnaire was self-developed using the existing literature.[1,2,7,8] The self-developed questionnaire included questions that were aligned with the study objectives. Furthermore, the self-developed questionnaire was piloted, and content validation was verified by the supervisors. The questionnaire was translated into Venda and xiTsonga languages and back to English. A 75% agreement between the two raters suggested a reasonably good level of inter-rater reliability.[17] The questionnaire was further pre-tested by conducting a pilot study on five participants at Vhembe Hospital before data collection to ensure its clarity and reliability. Participants on which the questionnaire was piloted were excluded from the study. Printed copies of the questionnaire were handed to participants by the researcher. Participants were anonymised for the analysed data. The questionnaire comprised three main sections: demographics, knowledge and attitudes towards glaucoma, and treatment compliance. Data for this study were collected during the COVID-19 pandemic from 01 March to 31 September 2022 when walk-in visits to South African hospital outpatient departments from 2020 to 2022 were restricted. The researcher adhered to the COVID-19 infection control protocols, by ensuring the availability of hand sanitisers for the participants, as well as sanitising the pens used. Furthermore, participants were requested to wear their masks, and those without masks were provided with disposable masks by the researcher. Participants were provided with a consent form by the researcher to complete in their preferred language before data collection. Participants who could not see were asked to give their verbal agreement, which was recorded. Completed questionnaires were deposited anonymously in an unmarked box, and participants were instructed not to include personal information to maintain anonymity.

Data analysis

Collected data were organised, coded and tabulated using Microsoft Excel version 2016 for statistical analysis. Excel 2016 was chosen for its familiarity, robust features and compatibility with existing workflows.[18] Frequencies related to the demographic data of the participant's age and gender, systemic diseases, religious affiliations, duration of the disease, employment status, educational background, living arrangements and the number of eyedrops used were determined. The significance level was set at $P < 0.05$ using single-factor ANOVA to evaluate significant statistical differences in participants' knowledge related to their socio-demographic characteristics.

Ethical considerations

An application for full ethical approval was made to the University of Johannesburg, Faculty of Health Sciences Research Ethics Committee, and ethics clearance was received on 23/02/2022. The ethics approval number is REC-1391-2022. Written informed consent was obtained from all individual participants involved in the study. The researcher and research assistants supported illiterate individuals by vocally stating in their preferred languages the importance of signing consent forms and statements to respond to in the questionnaire as approved by the research ethics committee.

Results

Demographic information

A total of 89 participants completed the survey, comprising 46 females and 43 males. The mean age of participants was 61.20 ± 14.77 years old, with 73% (n = 65) > 55 years old, with 38% (n = 34) being pensioners and 35% (n = 31) unemployed (Table 1).

Most participants (67%, n = 60) reported no systemic illnesses. Sixteen (18%) participants reported being diagnosed with hypertension reported, while 7% (n = 6) reported diabetes mellitus. Additionally, 7% (n = 6) reported the presence of both hypertension and diabetes mellitus. Only one participant reported having both hypertension and diabetes mellitus along with other illnesses. Thirty-five per cent (n = 31) reported having primary education, 28% (n = 25) had secondary education and 19% (n = 17) held tertiary education with 18% (n = 16) reporting having never attended school.

The religious affiliations of participants were predominantly Christian, 68% (n = 73), with 26% (n = 14) adhering to traditional African religion and 6% (n = 2) affiliated with other religious groups. The average duration of glaucoma diagnosis among participants was 6.91 ± 5.62 years, ranging from 1 to 24 years. Most participants (84%) (n = 75) reported living with their families, while the minority (16%, n = 14), reported living alone. Among the total of 89 participants, 71% (n = 63) were administering two eye drops, 17% (n = 15) were using three eye drops, and only 12% (n = 11) were using a single eye drop per day.

TABLE 1: Socio-demographics of glaucoma participants (N = 89).

Variable	*n*	%
Age (years)		
15–24	3	3
35–44	7	8
45–54	14	16
55–64	28	32
64–74	21	24
75–84	12	13
85–94	4	4
Gender		
Male	43	48
Female	46	52
Employment status		
Students	1	1
Employed	23	26
Unemployed	31	35
Pension	34	38
Educational background		
Never attended school	16	18
Primary education	31	35
Secondary school	25	28
Tertiary	17	19
Systemic illnesses		
None	60	67
Hypertension	16	18
Diabetes mellitus	6	7
Diabetes mellitus and hypertension	6	7
Diabetes mellitus, hypertension and other illnesses	1	1
Religion		
Christian	73	68
Traditional African religion	28	26
Other religions	6	6
Duration of glaucoma diagnosis (years)		
1–4	40	45
> 4–9	24	27
> 9–14	16	18
> 14–19	4	4
> 19–24	5	6
Living arrangements		
Living alone	14	16
Residing with family	75	84
Number of glaucoma eyedrops administered		
1	11	12
2	63	71
3	15	17

Participants' knowledge of the glaucoma disease

In this study, the 'not sure' and the incorrect responses were regarded as lack of knowledge.[18] The mean knowledge demonstrated by participants was 43 ± 20, 87% showing a high variation of the data collected with a kurtosis of –0.76 indicating a relatively flat platykurtic distribution with lighter tails compared to a normal distribution and the skewness of -0.10 suggesting a very slight left skew.

Knowledge > 50% on glaucoma causing a reduction in vision, the effect of lack of treatment adherence, and the importance of follow-up care (Table 2) in the management of glaucoma was demonstrated by most participants 88% (n = 78), 79% (n = 70) and 78% (n = 69),

respectively. Furthermore, most participants 78% (n = 69), 66% (n = 59) and 63% (n = 56) (Table 2) knew that follow-up care is important in the management of glaucoma, the course of the disease could be slowed down by treatment, and that it is a fast-progressing condition, respectively (Table 2).

Individuals with less than 50% knowledge were unaware that early detection and treatment can slow the progression of glaucoma, lacked awareness of early symptoms of the condition, did not know that certain eye drops should be avoided by patients with cardiac problems or asthma, and were unaware that having a family history of glaucoma increases the risk of developing the disease. The proportions of these knowledge gaps were 89% (n = 79), 89% (n = 79) and 74% (n = 66), respectively. However, most participants (n = 79, 89%) did not know about early detection, awareness of early glaucoma symptoms and nutrition influences on glaucoma (Table 2). Furthermore, 74% (n = 66) of participants did not know that some eye drops should not be used by patients with cardiac problems or asthma and that the chance of developing glaucoma is higher if a family member has the condition (Table 2). Thus, their responses contributed to the skewness of the data on knowledge. Therefore, 55% (n = 49) of participants demonstrated < 50% knowledge of glaucoma, while 45% (n = 40) had knowledge > 50% ranging from 53% to 80%. However, the knowledge average was found to be 43% indicating poor performance overall.

TABLE 2: Participants' knowledge of glaucoma.

Question numbers	Knowledge questions	Yes		No		Not sure	
		n	%	*n*	%	*n*	%
1.	Is the chance of developing glaucoma higher if a family member has glaucoma?	22	25	11	12	56	63
2.	Does nutrition influence glaucoma?	10	11	15	17	64	72
3.	Do young people have more glaucoma than older people?	1	1	477	53	41	46
4.	Does early detection and treatment of glaucoma not slow down the course of glaucoma?	49	55	10	11	30	34
5.	Is vision loss caused by glaucoma permanent?	52	59	27	30	10	11
6.	Is glaucoma treatment lifelong?	61	69	4	4	24	27
7.	Does glaucoma lead to blindness if not treated?	70	79	1	1	18	20
8.	Do glaucoma patients show any symptoms?	15	17	20	22	54	61
9.	Do glaucoma patients require follow-up care?	69	78	3	3	17	19
10.	Do eye drops slow down the course of glaucoma?	59	66	9	10	21	24
11.	Can glaucoma only be treated by lowering the intraocular pressure?	46	52	1	1	42	47
12.	Should a patient always inform the ophthalmologist about any other diseases they have?	42	47	3	3	44	50
13.	Should some eye drops be avoided if you have cardiac problems or asthma?	12	14	9	10	68	76
14.	Is glaucoma a progressing condition without treatment?	56	63	10	11	23	26
15.	Does glaucoma cause tunnel vision?	76	85	0	0	13	15

Socio-demographics of glaucoma participants vs knowledge

Significant statistical differences using the single factor ANOVA test were found between the knowledge of participants and the duration glaucoma was diagnosed (≤ 5 and > 5 years, P = 0.002).[19] Even though more participants (35%) with poor glaucoma knowledge were found compared to the other participants with a longer duration of being diagnosed with the condition. Similarly, no statistically significant differences were found for age, religion, gender, presenting systemic diseases, employment status and the number of eyedrops used by participants (P > 0.05). Conversely, a statistically significant difference in the knowledge of glaucoma among participants with education status and duration of glaucoma was found (P < 0.000). Thus, indicating that people with a longer duration of glaucoma with tertiary education had good knowledge about glaucoma (Table 3).

TABLE 3: Socio-demographics of glaucoma participants vs knowledge.

Socio-demographics	Knowledge < 50%		*P*
	n	%	
Age (years)	-	-	0.222
< 50	24	27	-
> 50	65	73	-
Religion	-	-	0.391
Christianity	40	45	-
Traditional African religion	7	14	-
Other religions	0	0	-
Gender	-	-	0.072
Female	43	48	-
Males	46	52	-
Duration of glaucoma diagnosis (years)	-	-	0.002
≤ 5	31	35	-
≤ 10	9	10	-
≤ 15	3	3	-
> 15	5	6	-
Educational background	-	-	0.0002
Never attended school	11	12	-
Primary	21	24	-
Secondary	14	16	-
Tertiary	3	3	-
Employment status	-	-	0.842
Students	0	0	-
Employed	13	15	-
Non-employed	17	19	-
Pensioners	18	20	-
Systemic diseases	-	-	0.146
No systemic diseases	35	39	-
Hypertension	1	10	-
Diabetes	1	10	-
Other	0	0	-
Diabetes and hypertension	3	3	-
Hypertension and other illnesses	1	1	-
Both hypertension and diabetes including other systemic illnesses	41	46	-
Number of glaucoma eyedrops administered	-	-	0.428
1	5	5	-
2	39	39	-
3	10	10	-

Participants' attitudes towards glaucoma disease

Most participants (90%, *n* = 80) displayed a positive attitude towards the benefits of the utilisation of glaucoma medication. However, a small proportion of participants held negative views on the benefits of medication usage (8%, *n* = 7), while 2% (*n* = 2) were uncertain about its efficacy. A positive attitude towards daily usage of eye drops was observed (70%, *n* = 62). Additionally, the study revealed that most participants (82%, *n* = 73) were concerned about their glaucoma diagnosis. However, most of the participants understood their condition (72%, *n* = 64) and reported no frustration with the requirement to administer eye drops daily (70%, *n* = 62) (Table 4).

TABLE 4: The distribution of participants' attitudes towards glaucoma.

Question numbers	Attitudes of participants	Yes		No		Not sure	
		n	%	*n*	%	*n*	%
1.	Do you think there is any benefit in using glaucoma medication?	80	90	7	8	2	2
2.	Do you want people to realise that you have glaucoma?	59	66	29	33	1	1
3.	Are you concerned about your glaucoma?	73	82	15	17	1	1
4.	Do you feel you understand your glaucoma?	64	72	17	19	8	9
5.	Does using eye drops daily frustrate you?	23	26	62	70	4	4
6.	Does having glaucoma frustrate you?	25	28	63	71	1	1

Discussion

The average glaucoma knowledge of this study participants was found to be 42.96 ± 20.87%. More than 50% of participants (55%, *n* = 49) were found to have poor knowledge, and only 45% (*n* = 40) demonstrated good knowledge of the disease. In contrast to the results of a South African study conducted in the KwaZulu-Natal province by Aghedo et al.[13] which found more than 50% (62%) of participants to have good knowledge of glaucoma. The good knowledge of glaucoma participants in their study could be attributed to obtaining more information about glaucoma than patients in other health settings because data were also collected from a private ophthalmology practice located in the same district. Other studies with lower levels of knowledge of glaucoma among their participants were conducted in general populations.[6,9,20] Thus, the disparities in study findings could be attributed to differences in populations, methodologies and beliefs regarding diseases, as well as sociocultural and religious practices.[21]

A statistical significance was found between knowledge and level of education including the duration of the diagnosis in this study. Therefore, this finding indicates that those with secondary and higher levels of education are more likely to have good knowledge about glaucoma compared to those with lower standards of education, consistent with the findings of the studies conducted by Kizor-Akaraiwe et al.[22] and Nkum et al.[9] In addition, statistical significance was found in this study between increased levels of knowledge of participants with longer duration (> 5 years) of glaucoma, consistent with the findings of other studies.[12,13,14] This correlates with the findings of the Saudi Arabian study on knowledge, attitude and practices which determined a positive attitude towards glaucoma displayed by participants with a longer duration of the condition.[23] Thus, we can conclude that participants with a longer duration of glaucoma have better knowledge (> 50%) of the condition, compared to those newly diagnosed (< 5 years). This finding can be attributed to the fact that exposure to glaucoma treatment for a longer duration, provides opportunities related to follow-up visits which creates a platform for participants to learn more about their condition. However, our findings were found not to be consistent with the findings of an Australian study that found poor glaucoma knowledge in long-term sufferers. Nonetheless, in their study, poor glaucoma knowledge was attributed to forgetfulness because of noncompliance with the dosing regimen, associated with age.[5]

More females in this study were found to have good knowledge about glaucoma compared to males. However, no statistical significance was determined related to the knowledge of glaucoma between both males and females (*P* = 0.072). Thus, indicating that the high number of female participants could have happened by chance. Contrary to the findings of the other studies stating that females are more likely to exercise health-seeking behaviours compared to males.[9,12] Overall, 73% (*n* = 65) ≥ 55 years old were found to have poor knowledge compared to the younger age group < 55 years old. Consistent with the findings of the study conducted by Tshivhase and Khoza[14] and Mansouri,[24] which attributed a lack of knowledge of this condition to possible forgetfulness of information compared to the younger generations because of senility. An association between poor knowledge of the effect of cardiac and asthma medication on glaucoma was found in this study. However, this is expected because a lack of knowledge on glaucoma among hospital personnel was determined in a study conducted in India.[2] Lack of knowledge related to the contraindications of some eye drops not to be used for cardiac problems or asthma was demonstrated by more than 50% of the study participants (77%, *n* = 86). Thus, healthcare providers must be well-informed about the association between cardiac and asthma medications and glaucoma, for them to be able to share correct information with glaucoma patients, to avoid the risk of misinformation.[25]

Despite generally positive attitudes, participants experienced frustration in specific areas. Eighty-eight per cent (*n* = 78) of participants using more than one type of eyedrop demonstrated poor knowledge compared to the others. In agreement with other studies that have concluded that the more complex a treatment regimen, with patients receiving multiple medications (e.g. more than one eyedrop), the higher the risk of non-adherence.[26,27,28] However, because of a lack of

appropriate measures ensuring adherence to multiple medications, this remains a challenge. Addressing these concerns and exploring alternative treatment modalities or strategies to simplify eye drop administration could improve patient compliance and overall satisfaction with glaucoma management.

In this study, most participants displayed a positive attitude towards the benefits of the utilisation of glaucoma medication (90%, $n = 80$), and daily usage of eye drops was noticed in 70% ($n = 62$) of participants. However, most participants (82%, $n = 73$) expressed their concern related to being diagnosed with glaucoma. Concerns related to being diagnosed with glaucoma vary widely, which could include lack of information related to the condition, becoming blind despite adherence to treatment and financial concerns including adjusting aspirations, lifestyles and employment because glaucoma is a chronic and progressive disease.[29] Therefore, healthcare providers must be trained to recognise and address the diverse emotional responses associated with glaucoma to provide effective support and management.

Limitations

The low response rate for this study is considered a limitation, as the uptake was lower than expected. This shortfall may have been influenced by factors such as limited use of public eye care services, COVID-19 restrictions affecting hospital access, and decreased awareness of the study. Self-selection bias may have affected participation, as individuals with a prior interest in glaucoma could have been more inclined to take part. The hospital-based nature of the study may have restricted the sample size, affected result precision, and limited generalisability to other populations. Additionally, reliance on subjective responses could have introduced social desirability bias, possibly leading to over- or underestimation of results. Moreover, recall bias might have affected the accuracy of participants' recollections of experiences or knowledge.

Conclusion

The findings of this study shed light on both the knowledge base and attitudes prevalent among patients grappling with glaucoma. Longer duration of the disease and secondary to tertiary education determined good knowledge of glaucoma. It is important that the young, newly diagnosed and uneducated receive education and counselling on glaucoma to facilitate improved disease management and compliance.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

The main article text was written by M.C.M., the MHSc student, under the guidance of T.I.M. (supervisor) and L.K.L. (co-supervisor). The conceptualisation of the study was carried out by M.C.M., T.I.M. and L.K.L. All tables were created by M.C.M. Data analysis was conducted by M.C.M. with guidance from T.I.M. and L.K.L. M.C.M., L.K.L. and T.I.M. approved the final submitted version of the article.

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Data availability

The data that support the findings of this study are available upon reasonable request from the corresponding author, T.I.M.

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