EVALUATION OF AWARENESS AND KNOWLEDGE ABOUT GLAUCOMA AMONG PEOPLE ATTENDING TERTIARY HEALTHCARE REFERRAL CENTRE

Dr. Purvi R. Bhagat[1], Dr. Chirag R. Banker[2], Dr. Kinjal Y. Trivedi[3*]

[1]Associate professor, Head of Glaucoma Unit, M & J Western Regional Institute of Ophthalmology, Civil hospital, Ahmedabad.
[2]Consultant at Gandhi Lincon hospital, Bhansali trust, Deesa, Gujarat
[3]Assistant professor, M & J Western Regional Institute of Ophthalmology, Civil hospital, Ahmedabad.

Abstract:

Background: Awareness regarding glaucoma is essential as it is a silent disease which can result in irreversible vision loss. Our objective is to evaluate level of awareness and to find the reasons for poor awareness in population and thereby aid in appropriate policy making to diagnosis early to decrease the burden of blindness. **Materials and Methods**: In this cross-sectional study, we interviewed 350 subjects above 15 years with the help of a structured validated questionnaire at a tertiary eye care centre in western India. Collected data was analysed and a conclusive table was derived by giving 1 mark each for selected questions, thus dividing awareness into 3 grades-poor (0-5 points), moderate (6-10 points) and excellent (11-14 points). **Results**: Among the interviewed, only 3.15% were found to have excellent awareness regarding glaucoma and 22.28 % and 74.57% of them had moderate and poor knowledge respectively. Awareness was directly associated with better education and higher socioeconomic class. Only 30% participants knew about the blinding nature of the disease. The main sources of information were family, friends, relatives and handouts. **Conclusion:** The study has indicated poor level of glaucoma awareness and knowledge among people visiting a tertiary centre. It has also identified a higher level of education to be associated with better level of awareness. The present level of glaucoma awareness and knowledge needs to be enhanced through application of these inferences in various policy decisions such as provision of health education and by incorporating glaucoma education into curriculums.

Keywords: Glaucoma, Awareness, Knowledge, Health-education Drugs.

***Corresponding Author:**
Dr Kinjal Y Trivedi
E-mail:
kinjaltrivedi30@gmail.com

QR Code:

Introduction

Glaucoma is a major public health problem and is the second major cause of blindness after cataract. More importantly, it is the most common cause of irreversible blindness globally. It has been estimated by World Health Organization that around 4.5 million people are blind worldwide due to glaucoma.[1,2,3] It is also estimated that

there are approximately 80 million cases of glaucoma globally by end of 2020.[1,2,3] By the end of year 2021, India will perhaps rank second in the number of glaucoma patients worldwide. The estimated number of cases of glaucoma in India is 12 million, around one fifth of the global burden of glaucoma.[4,5]

Glaucoma can be broadly divided into open angle and closed angle variety. Each can again be subdivided into primary and secondary as per the etiology. Closed angle glaucoma presents usually at some point of the natural history of the disease as the patient is more likely to be symptomatic during episodes of raised intraocular pressure. On the other hand, open angle glaucomas are usually the main culprits of irreversible vision loss diagnosed at a very late stage as majority of them are painless in nature. Glaucoma also has a serious impact on the quality of life of the affected people because apart from vision loss, these patients require lifelong follow-ups and good compliance to preserve the residual vision. The visual acuity and the visual field loss associated with the disease influence all daily activities such as walking, driving, reading, household activities like cooking, sewing and others. Moreover, these losses are frequently associated with other serious consequences such as falls and road accidents. The impact further varies widely according to the stage of disease and the patient.[6] Hence, treatment should be sought early in the course of the disease to prevent further vision loss as well as to preserve the quality of life as the vision loss is irreversible.

There are multiple options available for treatment of glaucoma such as anti-glaucoma drugs of various classes, laser procedures and surgical modalities. The preferred first line of management is in the form of topical medications which are usually successful in controlling IOP in most patients but have to be used lifelong which might be a cause of concern in terms of cost and compliance for some patients.[6,7,8]

Awareness of the patients and population in general is crucial to enable early diagnosis, prompt treatment and ensure compliance in order to prevent the visual morbidity and handicap.

Our objective is to explore the level of awareness and knowledge in population attending a major tertiary healthcare centre of western India and to find the reasons for poor awareness in population. We also intend to identify the source of their knowledge regarding glaucoma which will in turn guide us to raise and strengthen community awareness regarding the disease via different public awareness programmes.

Materials and Methods

Ethical measures were adhered to throughout all phases of the research. The study was conducted through 1.5 years. We included patients who were either newly diagnosed or known cases of glaucoma under management, above the age of 15 years, attending our tertiary healthcare referral centre and who were willing to participate in the study. We excluded patients unwilling to give consent for the study, patients less than 15 years of age and patients who were not diagnosed with glaucoma. Through simple random sampling, a sample size of 350 subjects was gathered.

A structured validated questionnaire was administered as an interview to collect the data. Glaucoma risk factors questionnaire and determinants of glaucoma awareness and knowledge in urban Chennai questionnaire were used as reference to compile the instrument.[9,10] For validation of our questionnaire, a pilot test was conducted on 30 eligible patients whose data was not included in study analysis.

Sample size calculation:

$n=[z^2p(1-p)]/d^2$

z= Considering that the values are normally distributed, 95% of the values will fall within 2 standard errors of the mean. The value of z corresponding to this is 1.96 (from the standard normal variate tables).

P= prevalence of glaucoma in the population of the actual study. This value was found to be 35% from a pilot study done at our speciality clinic at tertiary care centre data of which is not included in statistical analysis of actual study.

1-p=100-p; 100-35= 65 in our study

d= precision of the study; this is taken 5% in our study.

After putting all the values in the equation, the sample size for our study comes to 350 subjects.

Informed consent was obtained from all the respondents before taking the interviews, with the purpose of the study explained, with emphasis on the fact that refusal to participate would not affect their future treatment. Respondents were also assured of confidentiality and privacy. We asked the same questions to all the participants in a precise manner, offering each individual the same set of possible responses. The questionnaire was also translated into Hindi and Gujarati and interviews were conducted in the language which the patients could understand.

The data was entered into Microsoft Excel sheet for further analysis. In this study we have used descriptive statistics and percentage calculation wherever applicable. We have derived a conclusive table by giving 1 mark each for selected questions which helps us to divide the level of awareness regarding glaucoma into 3 grades for simple understanding and identifying implications which were participants having poorest knowledge (0-5 points), moderate knowledge (6-10 points) and excellent knowledge (11-14 points) regarding glaucoma.

Results

The study included 350 participants out of which 213 (60.90%) were males and rest 137 (39.10%) were females. Two hundred and forty (68.5%) subjects were between the age of 26-60 years. Only 20 (5.80%) participants were above the age of 60 years, while 90 (25.7%) participants were between the age of 15-25 years.

Fifty-seven (16.30%) subjects were illiterate while 185 participants (52.80%) had taken either primary, secondary or higher secondary education. One hundred eight participants (30.90%) were graduates.

On analysis of socio-economic distribution of study population, we found that most of them, 126 participants (36%) belonged to class 3. Class 1 and 2 had 71 (20.29%) and 96 (27.43%) participants respectively. Fifty-seven (16.28%) participants belonged to class 4 and 5.

In our study more than half population (180 participants- 51.40%) were urban residents and only 94 (26.9%) participants were village residents. While remaining 76 (21.70%) subjects were residing in semi-urban areas. Two hundred seventy-two (77.70%) participants were married and remaining 78 (22.30%) participants were unmarried. Our study had a population with different occupational backgrounds, with 104 participants (29.7%) doing labor work and 94 (27.1%) participants being office-workers. Fifty (14.3%) participants were doing outdoor work, 43 (12.3%) participants were students and rest 59 (16.6%) subjects were homemakers.

Most participants, 258 participants (73.7%) were financially independent while the rest were economically dependent on other family members.

Regarding awareness about the term "glaucoma", 112 (32%) participants were familiar with the term whereas rest 238 (68%) participants had never heard the term in their lifetime.
Out of 350 participants, only 105 (30.00%) participants knew that glaucoma is a potentially blinding disease. The rest 245 (70.00%) participants were either unaware or unsure about the same.
Out of the 350 subjects, 330 (94.30%) participants were not aware of the normal range of intraocular pressure (IOP) of human eye, while the rest had some idea of the normal values of IOP.
We tried to find out the source of study population's knowledge about glaucoma. We considered the possibility of multiple answers by the same participant and counted it accordingly. The sources of information for others are shown in table 1, the most common being family, friends, relatives and handouts.

Table 1 shows the awareness about risk factors of glaucoma. Since 238 participants were not aware of the term 'glaucoma' itself, they were considered not eligible for answering this question (Table 1).

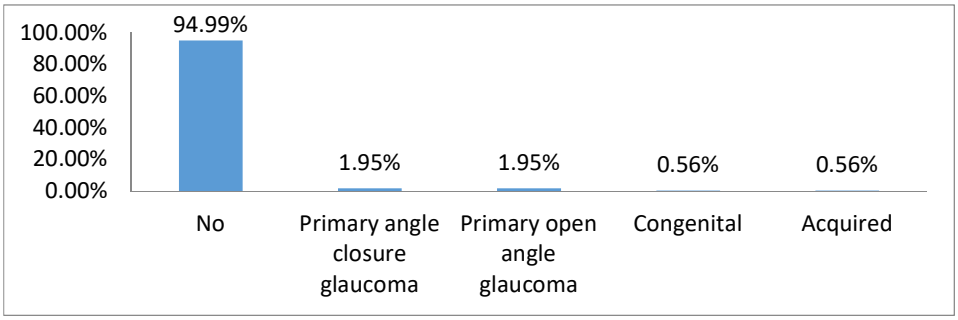
Table 1: Awareness regarding risk factors for glaucoma

Risk factor	Frequency
Family History	89
Old Age	49
Diabetes	38
High IOP	81
Cataract	9
Obesity	11
High BP	3
Smoking/ Alcohol	1
Steroids or any other drug	1
Injury	21

*Multiple answers are counted

Out of 350, 341 (94.99%) participants were not aware about the different types of glaucoma. (Figure 1)

Figure1: Awareness about different types of glaucoma



When inquired about symptoms of glaucoma, 271 (77.4%) participants had not noticed whether their vision was deteriorating or not while 72 (20.60%) participants could notice a deterioration

of their vision. Majority participants (277 participants- 79.10%) had also never noticed whether parts of their visual field were missing. Only 64 (18.30%) participants had noticed this.
Out of 350 participants, 247 (70.60%) participants did not know whether glaucoma was curable or not.
Following responses were gathered from 112 eligible participants when asked about the treatment options available for glaucoma. (Table 2)

Table 2: Awareness regarding treatment options of glaucoma*

Treatment options	Frequency	Percentage
Don't Know	60	17.14
Drugs	36	10.28
Surgery	7	2.00
Laser	9	2.57

*Multiple answers are counted

Two hundred sixty-three (75.14%) participants were not sure whether early treatment would slow down the progression of glaucoma or not, rest 87 (24.85%) participants knew that early treatment helps. Most of the responders (300 participants- 85.71%) did not know about the cost of treatments. Thirteen (3.71%) participants said that treatment of glaucoma was cheap, while 37 (10.57%) participants stated that glaucoma treatment was very costly. Two hundred sixty-nine (76.85%) participants were not knowing about duration of treatment of glaucoma. Fifteen (4.28%) subjects said it was not lifelong but remaining 66 (18.85%) participants were well versed with the life-long nature of treatment. When asked specifically whether after stopping treatment in between would it be still effective or not, majority 332 (94.85%) participants did not know the answer. Only18 (5.14%) participants knew about the non-effectiveness of the treatment after its discontinuation. Out of 350 participants, 54 (15.42%) participants knew the importance of frequent follow-up in management of glaucoma while 296 (84.57%) participants were unaware of importance of follow-up.
We formulated a final conclusive table correlating number of people with awareness in point format.
Unfortunately, group 1, with the poorest knowledge of glaucoma had the highest number of participants 261 (74.57%). The third group included participants having excellent awareness about glaucoma but they were only 11 (3.15%) (Table 3).

Table 3: Conclusive table regarding awareness of glaucoma

Group	**Points**	**No. of responders**	**Percentage**
1	0-5	261	74.57%
2	6-10	78	22.28%
3	11-14	11	3.15%

Discussion

Population-based studies suggest that more than 90% of glaucoma cases in the country remain undiagnosed.[11-17] This is in contrast to more developed countries where the amount of undiagnosed disease burden is 40-60%.[18-20] High rates of undiagnosed glaucoma translates into significant glaucoma blindness. An important cause of decreased diagnosis and increased glaucoma associated visual handicap is lack of awareness about the disease and its consequences among people.

In our study, awareness and knowledge was better among individuals with higher elementary education which has been reported by other awareness prevalence studies also.[9,21-23] This observation signified the importance of education for awareness about the disease, as educated people were more likely to come across the source of information.

In our study, only 30% of the respondents knew that glaucoma is a blinding disease, which is a matter of great concern. Another big concern is large magnitude of unawareness about the irreversible nature of vision loss in glaucoma. Similar trends were noted in many previous studies.[9] [21,22,23] We believe that, if individuals are aware about these two facts, it would favourably affect their overall attitude towards glaucoma.

The major difference among other studies and our study is the definition of awareness. Although 'having heard of glaucoma' has been defined as awareness in most of these studies, we have used a set of questions to define awareness.

A group-administered, questionnaire-based survey, involving 5000 rural residents (aged 20 and above) was conducted by Parveen Rewri and Mukesh Kakkar et al in north India.[21] In their study, 3602 (73%) participants had heard about glaucoma, 409 (8.3%) were aware, and 93 (1.89%) had some knowledge about glaucoma. In our study, 261 (74.57%) participants had very poor knowledge about glaucoma, 78 (22.28%) participants had some knowledge and 11 (3.15%) participants had excellent knowledge. In both studies, awareness of glaucoma was not related to age and gender. In their study also, literate participants were four times more likely to be aware and seven times more likely to be knowledgeable than illiterate participants. Only 34 (0.7%) participants knew about the asymptomatic course of glaucoma, whereas in our study 48 (13.71%) participants knew about asymptomatic course of disease. In their study, awareness about the irreversible nature of vision loss in glaucoma was noted in 226 (4.6%) responses while in our study 29 persons (8.2%) knew that glaucoma could cause irreversible vision loss. In their study, 689 (14%) participants responded that glaucoma could be treated, while in our study 102 (29.1%) participants said so. In both studies, sources of information were family/friends/relatives and handouts.

Chennai glaucoma study (CGS) was a population-based prevalence study to estimate the prevalence of glaucoma in a rural and urban south Indian population.[9] According to their study, 13.5% were aware of glaucoma and 8.7% had some knowledge about glaucoma. Among those who had knowledge, 0.5% had good knowledge, 4% had fair and 4.2% had poor knowledge. In their study, only 10.95% of the subjects felt that glaucoma was treatable while in our study, 102 (29.1%) participants knew that it was a treatable condition.

A total of 7775 subjects of all ages, representative of the rural population of Andhra Pradesh, participated in the Andhra Pradesh Eye Disease Study- Rural, out of which 5573 were eligible responses.[22] They found that awareness of glaucoma was very poor in 18 (0.32%) participants and females were significantly less aware ($p = 0.007$). While in our study, females were little more aware about glaucoma amounting to 39.41% compared to 33.80% males. Similar in both studies, awareness of glaucoma was significantly less among illiterate and lower

socioeconomic class population. The major source of awareness in this population was TV/magazines and other media followed by information from relatives or acquaintances suffering from the disease.

Awareness of eye diseases in an urban population was studied in Andhra Pradesh Eye Disease Study involving 1843 respondents.[23] Awareness of glaucoma (2.3%) was found to be very poor with 45 (2.4%) subjects being aware of glaucoma and 39 (86.7%) having knowledge of it. In their study, 18 (40.9%) subjects reported a family member/ friend/ relative suffering from glaucoma as the source of awareness and 21 (47.7%) participants were aware that vision loss due to glaucoma was permanent while in our study, only 29 (8.2%) participants knew that glaucoma causes irreversible vision loss.

A study from Turkey included 34 patients of glaucoma and their 57 first degree relatives as their subjects. [24] Twenty-six (76%) participants in the glaucoma group and 47 (82%) participants in the relatives' group had heard about glaucoma in their study. In our study, 112 (32%) participants were familiar with the term whereas rest 238 (68%) participants were not.

Here majority of the above studies had general population as their subjects. The study with patients of glaucoma along with their relatives as their subject was from outside of India. Whereas our study specifically is designed to find out awareness in patients of glaucoma only. Patients are more likely to know about their disease compared to general population, and if their knowledge is lacking to this great extent, we can anticipate the need of strong policies to increase awareness in general population. This study shall guide in that. Also it will encourage patients to know more about their disease which will help them and to the society as they become a medium of spreading awareness.

Conclusion

Majority of our participants were not even aware of the term 'glaucoma' and those that were aware were not very well-educated regarding details of the disease and its treatment. Majority of the participants that were aware stated handouts and people around as their primary source of information. From this we firmly believe and recommend strategy formations to educate masses so that awareness regarding this potentially 'blinding' disease can improve and success and outcomes of therapy can improve so that economic and social burden of irreversible blindness related to glaucoma can be reduced in life of an individual and in the society to a larger extent.

References

1. Quigley HA, Broman A. The number of persons with glaucoma worldwide in 2010 and 2020. Br J Ophthalmol 2006; 90:151-6.
2. Resnikoff S, Pascolini D, Etya'ale D, Kocur I, Pararajasegaram R, Pokharel GP *et al*. Global data on visual impairment in the year 2002. Bull World Health Organ 2004; 82(11):844–51.
3. Gonzalez P. Glaucoma Epidemiology and Worldwide. Health.JGlaucoma 2007;18(2):124.
4. George R, Ve RS, Vijaya L. Glaucoma in India: Estimated burden of disease. J Glaucoma 2010;19:391–7.

5. Tielsch JM, Sommer A, Katz J, Royall RM, Quigley HA, Javitt J. Racial variations in the prevalence of primary open-angle glaucoma. The Baltimore eye survey. JAMA 1991;266:369–74.
6. Allingham R, Damji K, Freedman S, Sayoko M, Rhee D. Principles of medical therapy and management. In: Allingham R, editor. Shields textbook of glaucoma, 6th ed. Philadelphia: Wolters Kluwer;2011.p.389-402.
7. Bowling B. Medical treatment of glaucoma. In: Bowling B, editor. Kanski's Clinical Ophthalmology a systemic approach, 8th ed. China: Elsevier;2016.p.330-34.
8. Stamper R, Lieberman M, Drake M, Becker B. Introduction to patient management. In: Stamper R, editor. Becker-Shaffer's diagnosis and therapy of the glaucomas, 8th ed. China: Mosby Elsevier;2009.p.339-44.
9. Sathyamangalam R.V., Paul P.G, George R., Baskaran M., Hemamalini, A., Augustian J *et al*. Determinants of glaucoma awareness and knowledge in urban Chennai. Indian Journal of ophthalmology 2009;57(5):355-60.
10. Medical NewToday.com [Internet]. Glaucoma risk questionnaire. [updated on 2008 March 6]. Available from www.snezha.com/blog/?p=537
11. Dandona L, Dandona R, Mandal P, Srinivas M, John RK, McCarty CA *et al*. Angle-closure glaucoma in an urban population in southern India: The Andhra Pradesh eye disease study. Ophthalmology 2000;107:1710–16.
12. Dandona L, Dandona R, Srinivas M, Mandal P, John RK, McCarty CA *et al*. Open-angle glaucoma in an urban population in southern India: The Andhra Pradesh eye disease study. Ophthalmology 2000;107:1702–09.
13. Ramakrishnan R, Nirmalan PK, Krishnadas R, Thulasiraj RD, Tielsch JM, Katz J *et al.* Glaucoma in a rural population of southern India: The Aravind Comprehensive Eye Survey. Ophthalmology 2003;110:1484–90.
14. Vijaya L, George R, Arvind H, Baskaran M, Paul PG, Ramesh SV *et al*. Prevalence of angle-closure disease in a rural southern Indian population. Arch Ophthalmol 2006;124:403–9.
15. Vijaya L, George R, Paul PG, Baskaran M, Arvind H, Raju P *et al*. Prevalence of open-angle glaucoma in a rural south Indian population. Invest Ophthalmol Vis Sci 2005;46:4461–67.
16. Vijaya L, George R, Baskaran M, Arvind H, Raju P, Ramesh SV *et al*. Prevalence of Primary Open-angle Glaucoma in an Urban South Indian Population and Comparison with a Rural Population The Chennai Glaucoma Study. Ophthalmology 2008;115(4):648-54.
17. Vijaya L, George R, Arvind H, Baskaran M, Ve Ramesh S, Raju P *et al*. Prevalence of Primary Angle-Closure Disease in an Urban South Indian Population and Comparison with a Rural Population The Chennai Glaucoma Study. Ophthalmology 2008;115(4):655-60.
18. Sommer A, Tielsch JM, Katz J, Quigley HA, Gottsch JD, Javitt J *et al*. Relationship between intraocular pressure and primary open angle glaucoma among white and black Americans. The Baltimore Eye Survey. *Arch Ophthalmol* 1991;109:1090–95.
19. Quigley HA, West SK, Rodriguez J, Munoz B, Klein R, Snyder R. The prevalence of glaucoma in a population-based study of Hispanic subjects: Proyecto VER. *Arch Ophthalmol* 2001;119:1819–26.
20. Shaikh Y, Yu F, Coleman AL. Burden of undetected and untreated glaucoma in the United States. *Am J Ophthalmol* 2014;158:1121-29.

21. Rewri P, Kakkar M. Awareness, knowledge, and practice: a survey of glaucoma in north Indian rural residents. Indian J Ophthalmol 2014;62(4):482-86.
22. Krishnaiah S, Kovai V, Srinivas M, Shamanna BR, Rao GN, Thomas R. Awareness of glaucoma in the rural population of Southern India. Indian J Ophthalmol 2005;53:205-8.
23. Dandona R ,Dandona L, John R, McCarty C, Rao G. Awareness of eye diseases in an urban population in Southern India. Bulletin of the World Health Organization 2001;79(2): 96-102.
24. Celebi ARC. Knowledge and Awareness of Glaucoma in Subjects with Glaucoma and their Normal First-Degree Relatives. Med Hypothesis Discov Innov Ophthalmol. 2018;7(1):40-47