Glaucoma Awareness ; Where Do We Stand ?

Rekha Khandelwal*, Sejal Chandak**

*Professor & Head, Ophthalmology Department, **Undergraduate Student, NKP Salve Institute of Medical Sciences, Digdoh Hills, Hingna Road, Nagpur 440019, Maharashtra, INDIA.

Abstracts: Introduction: Glaucoma is group of ocular disorders resulting in damage to optic nerve and loss of visual field. If not managed at the required stage it may lead to irreversible form of blindness. Purpose : To assess the awareness and knowledge of glaucoma in rural verses urban patients visiting eye-care center attached to an academic institute of Central India. Materials and Methods: Observational cross-sectional study was conducted for a period of two months. By random sampling method, 300 subjects each from urban and rural settings were selected out of 1486 consecutive adults aged ≥ 40 years. Pre-validated, two separate brief structured questionnaires (urban and rural participants) were used to assess the subject's glaucoma awareness and knowledge. All known primary/ secondary glaucoma or congenital/ juvenile glaucoma participants were excluded. The demographic data, socio-economic information, medical and ophthalmic history and examination was recorded. Results: Out of 600 participants , 34% glaucoma awareness was recorded in urban participants while 21% awareness in rural participants. The difference in the proportion was statistically significant, as indicated by p-value of 0.0005 ($p < 0.05$). As regards age, significant association ($p=0.006$) was found across age distribution and levels of glaucoma awareness. Education level and socio-economic background also showed statistically significant association with glaucoma awareness. Conclusion: The present study revealed that the level of awareness and knowledge about glaucoma in our study population was very low. Major contributing factors for low glaucoma awareness were background of population cohort, education and socio-economic background. There is a need to educate masses for glaucoma to prevent blindness. [Kumar R Natl J Integr Res Med, 2018; 9(6):1-7]

Key Words: Glaucoma, blindness, awareness, knowledge

Author for correspondence: Dr.Rekha Khandelwal, Professor & Head, Ophthalmology Department, NKP Salve Institute of Medical Sciences, Digdoh Hills, Hingna Road, Nagpur 440019, Maharashtra, INDIA., Email:dr_rekhangp@hotmail.com. M:9823261794

Introduction: Glaucoma is a progressive optic neuropathy caused by a group of ocular conditions, which lead to damage of the optic nerve with loss of visual function. It occurs mainly due to increase in the intraocular pressure (IOP) of aqueous humor present in the anterior chamber of the eye. Over 65 million people worldwide are estimated to be affected by glaucoma. It leads to irreversible form of blindness and as many as 50% of the affected people are not aware of their condition.[1] It is the second leading cause of blindness in the world. About 12 million people are determined to be blind because of glaucoma globally.[2]

In India, glaucoma is determined to affect over 11 million people [3] and it is the third most common cause of blindness in the country after cataract and corneal blindness.[4] It accounts for about 12.8% of the total blindness in the country.[5]

Of the estimated 309 million people aged 40 years or older in the country, nearly 40 million or every eighth individual have glaucoma or are at a risk of developing the disease.3 By the year 2020 it has been projected that India would be the second largest home of glaucoma cases.[6]

Early diagnosis of glaucoma plays a vital role in its efficient management and prevention of blindness. Because of its relatively asymptomatic course, a large number of cases remain undiagnosed. Previous study has indicated that late diagnosis was an important risk factor for subsequent blindness which was also associated with poor knowledge about the condition.[7]

Awareness about glaucoma plays an important role as only when the patients are aware will they seek a screening procedure which will lead to early diagnosis and interruption of consequential blindness. Hence, many studies have been performed globally, to understand the awareness and knowledge among the masses. In Australia, Attebo et al reported an awareness of 93% [8]; in Germany, Pfeiffer et al reported an awareness of 75% [9]; in the United States, Gash et al recorded an awareness of 72% [10], Saw et al noted an awareness of 23% in Singapore [7] and Nkum et al reported an awareness of 74% in Ghana.[11]

In India, the awareness levels are far too less when compared to the rest of the world. Dandona et al in a population based study in an urban community recorded an awareness of 2.3% [12], while an awareness of just 0.32% was revealed by Krishnaiah et al in a rural population of South India.[13] Since then studies have been performed by Sathyamangalam et al in urban Chennai (13.5% awareness) [14], Rewri and Kakkar in rural North India (8.3% awareness) [15] and Maharana et al in Central India (27% awareness) [16].

Since glaucoma has asymptomatic clinical course awareness about its nature and risk factors plays a pivotal role in its management. Educating the masses about the condition will not only facilitate in controlling the blindness but will also persuade at risk individuals to participate in regular ophthalmic monitoring.[17]

The purpose of this article is to assess the awareness and knowledge of glaucoma in urban verses rural residents visiting a tertiary care hospital in Central India.

Material And Methods: A questionnaire-based, cross-sectional study was performedto assess awareness and knowledge about glaucoma in non-glaucomatous patients attending a rural-based tertiary care hospital of a single academic institute in Central India for a period of two months. After the institutional ethics committee approval, written informed consent was obtained from all patients.Adults aged ≥ 40 years, either sex who were referred from the peripheral outreach camps for cataract surgery and/or diagnosis and management of other ocular diseases were included. Patients with known cases of primary (Open angle and narrow angle glaucoma) or secondary glaucoma (lens induced, pseudoexfoliation, pigmentary, neovascular, uveitic, steroid induced, angle recession glaucoma) were excluded from the study.Patients on antiglaucoma medications were excluded too. Before starting this study, all patient education material pertaining to glaucoma displayed in the study area was concealed.By random sampling method, 300 patients each from urban and rural settings were selected to be included in this study.For the participants from urban settings socioeconomic class was noted referring to the modified Kuppuswamy's Socioeconomic Status Scale. For the participants from rural settings socio-economic class was recorded referring to the BG Prasad Scale. All patient sunder went detailed ophthalmic examination to rule out glaucoma.

Two separate brief structured questionnaires (one for the urban participants and one for the rural participants) which were validated and pre-tested were used to assess the subject's awareness and knowledge about glaucoma. These questionnaires were presented to the participants in their vernacular languages i.e Hindi or Marathi.

Definitions: "Awareness" was defined as 'having heard of glaucoma' while "Knowledge" was defined as 'having some understanding about the disease' [13,14] The participants who were unaware of glaucoma were not evaluated for their knowledge.

The questions intended to test the awareness about glaucoma were same for both urban as well as rural setting , while the subsequent questions regarding knowledge were distinct in the two.

The questionnaire for urban participants had questions pertaining to risk factors for glaucoma, description of symptoms and treatment aspects. The following risk factor options were presented in the questionnaire such as obesity, increased IOP, smoking and alcohol use, steroid use, family history, etc. Treatment options presented in the questionnaire were eye drops, surgery, laser and no treatment.

Knowledge was graded as good, fair or poor based on the subject's collective responses to the questions on the description of symptoms, pathophysiological risk factors and treatment aspects.[14]

Defining knowledge levels of glaucoma (urban settings): A subject was considered to have good knowledge, if he/she was able to correctly identify the risk factors for glaucoma such as increased Intraocular Pressure (IOP), family history and steroid use and was further able to describe the condition and identify therapies for glaucoma, like eye drops, laser peripheral iridectomy and surgery. Fair knowledge was deciphered if at least two of the risk factors and a description of one of the treatment option were provided correctly. Subjects were labelled to have poor knowledge if they were unable to

identify even a single risk factor or treatment option for glaucoma.[14]

If the subject could not answer even one question, he/she was labelled to have no knowledge. The questionnaire for rural participants had questions pertaining to what glaucoma is, is visual loss permanent or reversible and how did he/she come to know about it. The questionnaire contained a list of responses out of which the responses provided by the subjects that most closely could be related to the given responses were marked.

Defining "knowledge" of glaucoma (rural settings): A subject was considered to have good knowledge, if he/she was able to correctly identify more than three facts about glaucoma. Fair knowledge was deciphered if at least two to three facts were provided correctly. Subjects were labelled to have poor knowledge if they were unable to identify even two facts about glaucoma. If the subject could not answer even one question, he/she was labelled to have no knowledge.

All the participants were given a patient education leaflet in their vernacular language explaining about glaucoma, in what way it is different from cataract, the risk factors associated, signs and symptoms, importance of regular eye check-up and treatment options. He/ She was also explained the same, stressing the importance of early diagnosis to prevent subsequent blindness.

Statistical analysis: The distribution of participants according to levels of different characteristics was obtained in terms of frequencies and percentage. Pearson's Chi-square test was used to compare the association of characteristics like age, gender, socioeconomic class and education with the awareness status. The socio-economic status for urban category was obtained using modified Kuppuswamy scale, while for rural category was obtained using BJ Prasad scale. Also, the knowledge level of participants from urban and rural sector was obtained in terms of frequencies and percentage. A p-value of <0.05 was considered statistically significant and all the analyses were performed using SPSS version 20.0 (IBM Corp, Armonk USA).

Results: Out of 1486 adults aged ≥ 40 years, a total of 600 subjects participated in the study during the two months of study period.300 participants each from rural and 300 from urban setup with equal number of males and females were included. The distribution of participants according to age, education and socioeconomic status is summarized in Table 1.

There were 32% participants in the age range of 40-49 and 50-59 years. 39% of the participants had education below 10th standard, followed by 36% who had under-graduation. Illiterate participants were 15% in the study.

As regard socio-economic status, in urban category, 38% were in grade III , followed by 30% in grade IV and 23% in grade II. In the rural category, 37% had grade IV, followed by 31% with grade III and 22% with grade V.

Table 1: Demographic profile

Characteristic	Level	No. (%)
Population	*Urban*	300 (50)
	Rural	300 (50)
Gender	*Male*	300 (50)
	Female	300 (50)
Age in years	*40-49*	192 (32)
	50-59	195 (32.5)
	60-69	135 (22.5)
	>70	78 (13)
Education	*Illiterate*	90 (15)
	Below 10th Std	234 (39)
	Under Graduation	216 (36)
	Graduation and above	60 (10)
Socioeconomic Status	*Urban* / Rural***	
	I	6 (2) / 3 (1)
	II	69 (23) / 27 (9)
	III	114 (38) / 93 (31)
	IV	90 (30) / 111 (37)
	V	21 (7) / 66 (22)

*Modified Kuppuswamy scale,.**BG Prasad scale

The association of different characteristics with awareness about glaucoma was studied using Pearson's Chi-square test as shown in Table 2. Out of 300 urban participants, 102 (34%) were aware about glaucoma, while in rural category, 63 (21%) had awareness about the same. The difference in the proportion was statistically

significant, as indicated by *p*-value of 0.0005 (*p*< 0.05). As regards gender, the awareness was observed in 84 (28%) males and 81 (27%) females. This difference was statistically insignificant (*p*-value: 0.855). The proportion of subjects with awareness in the different age groups was studied. The difference in the proportion across categories was statistically significant with *p*-value of 0.006 (*p*< 0.05).Education level also showed statistically significant association with awareness (*p*< 0.0001).The proportion of under-graduate subjects with awareness was 41.7%, while in illiterates, the proportion was 13.3%. This difference mainly contributed to significant association (*p* = 0.0001). Further, socio-economic status in urban as well as rural sector had significant association with the awareness as indicated by *p*-values 0.0001 and 0.019 respectively.

Table 2: Association of different characteristics and level of awareness

Characteristic	Level	Aware No. (%)	Not Aware No. (%)	P-value*
Population	Urban (300)	102 (34)	198 (66)	0.0005 (S)
	Rural (300)	63 (21)	237 (79)	
Gender	Male (300)	84 (28)	216 (72)	0.855 (NS)
	Female (300)	81 (27)	219 (73)	
Age in years	40-49 (192)	39 (20.3)	153 (79.7)	
	50-59 (195)	54 (27.7)	141 (72.3)	0.006 (S)
	60-69 (135)	51 (37.8)	84 (62.2)	
	>=70 (78)	21 (26.9)	57 (73.1)	
Education	Illiterate (90)	12 (13.3)	78 (86.7)	
	Below 10th Std. (234)	48 (20.5)	186 (79.5)	< 0.0001 (HS)
	Under Graduation (216)	90 (41.7)	126 (58.3)	
	Graduation and above (60)	15 (25)	45 (75)	
Socioeconomic Status Urban	I (6)	3 (50)	3 (50)	0.0001 (S)
	II (69)	21 (30.4)	48 (69.6)	
	III (114)	54 (47.4)	60 (52.6)	
	IV (90)	24 (26.7)	66 (73.3)	
	V (21)	0	21 (100)	
Rural	I (3)	0	3 (100)	
	II (27)	6 (22.2)	21 (77.8)	
	III (93)	18 (19.4)	75 (80.6)	0.019 (S)
	IV (111)	33 (29.7)	78 (70.3)	
	V (66)	6 (9.1)	60 (90.9)	

*Using Pearson's Chi-square test

Participants with awareness were further evaluated for their knowledge about the disease as shown in Table 3. A separate grading scale was used for both urban and rural participants. Accordingly, among the urban participants, only 6 (5.9%) had good knowledge, 6 (5.2%) had fair knowledge and as high as 90 (88.2%) individuals had no knowledge.In the rural settings, only 3 (4.75%) individual had good knowledge and 3 (4.75%) had poor knowledge. Majority of the

Table 3: Knowledge about glaucoma in urban verses rural residents

Population	Level	No. (%)
Urban	Good	6 (5.9%)
	Fair	6 (5.9%)
	No knowledge	90 (88.2%)
Rural	Good	3 (4.75%)
	Fair	3 (4.75%)
	No knowledge	57 (90.5%)

participants (90.5%) had no knowledge about glaucoma in spite of being aware.

Discussion: Glaucoma is one of the leading causes of irreversible blindness, especially in the developing nations. Since it is an irreversible and relatively asymptomatic condition until the advanced stages, early diagnosis and treatment play a critical role in control of blindness due to glaucoma. The current study explores the awareness and knowledge about glaucoma among rural as well as urban residents visiting a tertiary care hospital attached to a medical institute in Central India.

Glaucoma is being considered as a major cause of ocular morbidity requiring urgent attention.18A study performed by Grant and Burke reported that as many as one third of the patients had become blind from glaucoma even before seeking any medical attention.[19] Hence awareness and knowledge about glaucoma plays a pivotal role for efficient management of the disease.

In our current study, a total of 600 participants were randomly selected and interviewed to obtain a data regarding awareness and knowledge of glaucoma; 300 each from rural and urban background. To facilitate appropriate comparison between the participants, equal number of male and female individuals from each background were approached.

As regards the age distribution of our study population, the mean age was55.33 years. The level of education of the participants was also noted and more than 50% of them were either illiterate or had an education below 10th Std. The awareness about glaucoma even in urban participants was only 34%. Similar results were obtained in a study performed in Central India by Maharana et al where the awareness was found to be 27%. [16] An awareness of 2.3% was observed in Andhra Pradesh Eye Disease Study (APEDS) by Dandona et al in a population based study for urban residents [12] and 13.5% awareness was recorded by Sathyamangalam et al in Chennai Glaucoma Study (CGS) for urban population in South India.[14] The awareness among rural residents in our study was 21% and 0.32% reported in APEDS by Krishnaiah et al for rural population [13].Another study reported 8.3% awareness in rural population of NorthIndia by Rewri and Kakkar.[15]

Although, as our study was a cross sectional study, direct comparison with other population based studies is not possible, still it gives a valuable information about level of awareness about glaucoma in urban and rural participants.
We found that the awareness among the urban residents was greater than awareness among their rural counterparts which goes in accordance with the studies performed by Dandona et al and Krishnaiah et al. [12,13] This difference in the level of awareness between urban and rural residents may be attributed to the limited access to medical and diagnostic care in rural areas which may have contributed to the poor awareness.

The level of awareness of glaucoma in developed countries was reported to be very high as compared to India. Population based studies done in Australia, Germany, United States of America and Hong Kong published an awareness of more than 70%. [8,9,10,20] Such differences could well be due to increased literacy rate and better standard of living in these countries along with easy access to health care, leading to better utilization of such services. A study performed in Ghana, a developing country, revealed that the awareness among the participants was as high as 74%. Since it had a small sample size, the actual situation may not be represented by the results.[11]

We found a significant association of level of awareness across different age groups but not with gender similar to earlier published studies [12,13,14] . However in contrast, Rewri and Kakkar in North India, Maharana et al in Central India, Attebo et al in Australia and Pfeiffer in Germany did not find any relation between age and level of glaucoma awareness. [15,16,8,9]

As regards, association between socio-economic status and awareness, appreciable difference was noted across different levels of socio-economic class and level of awareness in our study.

Similarly, the level of education was significantly associated with glaucoma awareness, similar to the study published earlier[15,16,12,7]. This indicated that level of education played a significant role in the level of awareness among people about the disease.

We found, residents from urban settings had better knowledge than those from rural settings, similar to the result obtained in the studies performed in Andhra Pradesh.[12,13] Majority of the participants who had heard about glaucoma had no understanding of the disease in both urban (88.2%) and rural (90.5%) groups.

Of the four urban participant who had some knowledge, only two of them had 'good knowledge' as they could identify the risk factors for glaucoma such as increased intraocular Pressure (IOP), family history and steroid use along with the treatment modalities available; while two of them had 'fair knowledge' as they identified two risk factors and could describe one treatment option correctly.

Of the two rural participants who had some knowledge, one had 'good knowledge' since she could correctly identify all facts about glaucoma, while one identified only one fact correctly and hence had 'poor knowledge'. Due to small sample size of our study, it was not possible to compare knowledge about glaucoma with previous population based studies.[13,14,15]

Lack of awareness and knowledge about the disease is the major reason for late presentation of glaucoma cases.[20] Glaucoma patients can themselves serve as an important source of awareness and knowledge to the society as put forward by Tenkir et al.[21] Vashist et al gave a concept of 'opportunistic screening' which allows for glaucoma screening in patients presenting to health care providers with other illnesses unrelated to glaucoma.[22] Apart from this, health care personnel, health related agencies and mass media can help propagate understanding of the disease on a larger scale. Previous study performed in United Kingdom demonstrated the successful role of media in increasing glaucoma awareness.[23]Since increased awareness can lead to early detection and prompt management, this can act as an important step in preventing glaucoma related irreversible form of blindness.

Limitations: The limitations of our study are due to small sample size. It was a hospital based cross sectional study designed for a short duration with the aim of assessing awareness and level of knowledge about glaucoma in a sample of urban and rural population. However, it definitely point towards the significantly low levels of glaucoma awareness in the society. We strongly recommend a population based study to know the determinants of glaucoma awareness in this region.

Conclusion: Awareness and knowledge of glaucoma is very poor as compared to cataract awareness. There is a need to take major steps to overcome the deficit of awareness as well as knowledge among the masses. This can be done by means of an efficient Information, Education and Communication (IEC) strategy like use of mass media, health education camps and inclusion of basic knowledge material for eye health care into the course curriculum.

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