

# Awareness, Attitude and Practices Regarding Eye Health and Common Eye Problems in Urban Indian Population: A Community-based Cross-sectional Study

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## ABSTRACT

**Introduction:** India has large share of global blindness and visual impairment. Major factor reported is lack of awareness about eye conditions associated with poorer outcomes in terms of seeking medical help, treatment and prevention. Therefore, increase in awareness and knowledge about eye health will result in improved practices towards eye health and decrease in burden of visual impairment.

**Aim:** To assess Knowledge, Attitude and Practice (KAP) about eye health and common eye problems in urban Indian population.

**Materials and Methods:** A cross-sectional community based online survey was done for six months, from July 2020 till December 2020. A self-designed questionnaire was sent via Google forms to people aged 18 years and above. Knowledge, attitude and practice towards eye health and eye diseases i.e., cataract, glaucoma, Diabetic Retinopathy (DR) and dry eye, were assessed with respect to age, gender, education, and spectacle usage. Statistical analysis was done using descriptive statistics

to summarise the data and inferential statistics Chi-square test was used to find association by Statistical Package for the Social Sciences (SPSS) version 20.0.

**Results:** Of the total 417 participants, 177 (42.4%) were males and 240 (57.6%) females. Mean age was 32.49 years. All the participants were literates, 226 (54.1%) were graduates and 161 (38.6%) were postgraduates. A total of 370 (88.7%) of them believed eye diseases can be prevented by regular check-ups from ophthalmologists but only 15 (16.48%) of the population aged above 40 years underwent glaucoma screening. A total of 10 diabetic patients underwent DR screening.

**Conclusion:** Most participants were aware and had good knowledge about common eye diseases. This does not correlate with their self-care practices. There is a need for robust health education to increase the level of awareness and to understand the importance of routine eye examinations which help in early detection and treatment, thereby reducing visual impairment in the public.

**Keywords:** Awareness, Cataract, Diabetic retinopathy, Dry eye, Eye health, Glaucoma

## INTRODUCTION

Vision of the "Universal Eye Health: Global action plan 2014-2019" is that nobody is needlessly visually impaired, and anybody with unavoidable vision loss can achieve their full potential [1]. India has larger share of global blindness and visual impairment. The major reasons behind not reducing blindness prevalence are increasing aging population with improved life expectancy, population growth and lack of a comprehensive eye care approach [2]. Global data represented changing trends in blindness causes and visual impairment with time i.e., decreasing prevalence of diseases like trachoma and onchocerciasis, whereas increasing Non Communicable Eye Diseases (NCD) prevalence like DR, age related macular degeneration and glaucoma [3]. The Visual Impairment and National Blindness Survey 2015 to 2019 provided evidence regarding current status visual impairment and blindness in India.

Principle cause was found to be cataract. Other causes were glaucoma, DR, cataract surgical complications and corneal opacity [4]. Major factor delaying in the present public health plans is lack of awareness of eye conditions which has been reported to be associated with poorer outcomes in terms of eye care prevention, seeking medical help and treatment [5]. In developing countries like India, health education and promotion plays significant role in reducing burden of avoidable causes of blindness and visual impairment [6]. As increase in awareness and knowledge about eye health will result in more frequent visits to eye care professionals i.e., improved practices towards eye health. This will result in early

diagnosis and management of preventable blindness and hence decrease in burden of visual impairment. With this thought, the need of this study was to assess the level of awareness, attitude and self-care practices regarding eye health and common eye problems like cataract, glaucoma, dry eye and DR among urban Indian population.

## MATERIALS AND METHODS

A cross-sectional community-based online survey was conducted nationwide, over a period of six months, from July 2020 to December 2020, among Indian population aged 18 years and above, who agreed to participate in this public research. Approval of Institutional Ethical Committee (approval number- RRMCH-IEC/16/2020) was taken then tenets of Declaration of Helsinki were followed.

**Inclusion and Exclusion criteria:** Participants aged 18 years and above were included in the study. Healthcare/Medical professionals were excluded from the study.

**Sample size calculation:** Purposive sampling by formula for infinite population:

$$S = \frac{Z^2 \times P(1-P)}{M^2}$$

$$= \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2} = 384.16 \approx 400$$

Where, Z=Z Score (1.96)

P=Population Proportion (assumed to be 50%=0.5)

M=Margin of error (5%)

## Questionnaire

A semi-structured questionnaire was initially developed, and designed considering previous published studies [3,7,8], in English and all the questions were then translated into the two languages i.e., Hindi and Kannada (regional language) to adapt the questionnaire for use in the target population. Terms used for eye diseases under study were identified from patient counsellors, eye-care personnel and internet-based translating software in local languages. Online platform used was Google forms and was circulated using social media like e-mail and WhatsApp. Questionnaire was closed after one month. Questionnaire had four sections.

1. First section consisted of purpose of the study and electronic consent for participation in the survey.
2. Second section consisted of demographic questions.
3. Third section had questions to assess the awareness, knowledge and attitude regarding eye health and common eye conditions.
4. Last section included questions on self-care practices regarding eye health and specific eye diseases which are cataract, glaucoma, DR and dry eye disease.

The reliability Cronbach's alpha value was 0.74. Scoring was done based on percentage of KAP subjects had i.e.,

- <40%- poor,
- 40-80%- moderate and
- above 80%- good.

Pilot study was done and 40 responses were collected in one week and based on the results, the questionnaire was modified. The questionnaire was sent to participants via e-mail and social media platform. Pilot phase results were not used in the final data analysis. Questionnaire were sent to 600 participants with 183 dropout. The reminder was sent only once to the participant to fill the questionnaire.

**Operational definitions:** "Awareness" is having heard of the disease in question and "knowledge" is having some understanding of the disease. "Attitude" is the way a person behaves and thinks regarding health. "Practice" is the preventive measures undertaken to maintain health [8].

## STATISTICAL ANALYSIS

Analysis was done by Statistical Package of Social Sciences (SPSS) software version 20.0. The association among KAP of various eye diseases (cataract, glaucoma, dry eye and DR) with respect to demographic variable was analysed by using Chi-square test. A p-value  $\leq 0.05$  was considered as statistically significant.

## RESULTS

**Socio-demographics of participants:** A total of 417 subjects participated in the survey. A total of 177 (42.4%) were males and 240 (57.6%) females. Age of the respondents was ranging from 18-75 years. Total 403 were 18-60 years and 14 were above 60 years. Mean age was  $32.49 \pm 12.43$  years.

Postgraduate subjects were most aware (91.3%) and least aware were preuniversity subjects (83.3%) [Table/Fig-1].

**Awareness of common ocular diseases and attitude regarding eye health:** In the study, 212,50.8% were aware of all 4 common eye problems under study. An 346,82.9% were aware of cataract, 274,65.7% glaucoma, 272,65.2% dry eye and 284,68.1% DR. Main source of information of the knowledge, i.e., for 301,72.2%, was doctor/eye care professionals. (Internet/television/radio/newspaper- 108/417, community/family/friends was 85/417 and others was 10/417).

Losing eyesight have the greatest effect on day-to-day life was described as attitude by 243 (58.3%) respondents, shown in [Table/Fig-2].

**Cataract awareness:** [Table/Fig-3] represents the number (%) of responses of cataract questions. A 346 (83%) of the total participants, were aware about cataract.

**Glaucoma Awareness:** [Table/Fig-4] represents the number (%) of responses of glaucoma questions. A total of 274 (65.7%) of the total

Variables	Awareness		Total
	Aware (n, %)	Not aware (n, %)	
Gender			
Female	223 (92.9%)	17 (7.1%)	240
Male	153 (86.4%)	24 (13.6%)	177
Age (years)			
18-30	215 (93.5%)	15 (6.5%)	230
31-45	96 (88.1%)	13 (11.9%)	109
46-60	26 (40.6%)	38 (59.3%)	64
61-75	10 (76.9%)	4 (28.57%)	14
Education			
Preuniversity	25 (83.3%)	5 (16.7%)	30
University (Graduate)	204 (90.2%)	22 (9.8%)	226
Postgraduate	147 (91.3%)	14 (8.7%)	161
Total	376	41	417

[Table/Fig-1]: Awareness about eye disease with respect to gender, age and education.

Conditions	No. of responses	Aware %
Losing eyesight	243	58.3%
Losing memory	123	29.5%
Losing limb	17	4.1%
Losing hearing	8	1.9%
Losing speech	15	3.6%
All equal	6	1.4%
None	5	1.2%

[Table/Fig-2]: Attitude towards effect on day-to-day activity (N=417).

S. No.	Questions (multiple choice questions)	Response n (%)
1.	What is Cataract?	
	a. A white spot in the eye	7.67% (32)
	b. Lens changes where it becomes opaque	55.15% (230)
	c. A white membrane growing in eye	30.69% (128)
2.	d. Age-related process leading to diminution of vision	26.85% (112)
	Treatment of cataract can be?	
	a. Eye drops	11.75% (49)
	b. Spectacles	8.36% (36)
	c. Surgery	87.52% (365)
	d. Not sure/Don't know	8.63% (36)

[Table/Fig-3]: Cataract questions responses (n=417).

Total of (n)s is not equal to n=417, as questions were multiple choice and subjects had chosen more than 1 options

S. No.	Questions (multiple choice questions)	Response n (%)
1.	What is Glaucoma?	
	a. High pressures in the body and eye	10.79% (45)
	b. Damage to the eye nerve due to high pressure in the eye	65.70% (274)
	c. Age-related diminution of vision	5.51% (23)
2.	d. Not sure/Don't know	18.22% (76)
	Vision loss in Glaucoma is:	
	a. Reversible	23.50% (98)
	b. Permanent	41.72% (174)
	c. Correctable with use of spectacles	2.63% (11)
3.	d. Not sure/Don't know	32.37% (135)
	Have you undergone Glaucoma screening? (n=91)	
	a. Yes	16.48% (15)
	b. No	74.72% (68)
	c. Need information about the condition	8.79% (8)

[Table/Fig-4]: Glaucoma questions responses (n=417).

Total of (n)s is not equal to n=417; as questions were multiple choice and subjects had chosen more than 1 options

participants, were aware about glaucoma. Overall, 15 (16.48%) have undergone glaucoma screening.

**Dry eye awareness:** [Table/Fig-5] represents the number (%) of responses of dry eye questions.

Question (multiple choice question)	Response n (%)
What is dry eye?	
a. Grittiness of eye	47.48% (198)
b. Burning sensation in eye	34.77% (145)
c. Tiredness of eye or eyelid sticking together	22.06% (92)
d. Not sure/Don't know	21.34% (89)

**[Table/Fig-5]:** Dry eye question responses (n=417).

Total of (n)s is not equal to n=417, as questions were multiple choice and subjects had chosen more than 1 options

**Diabetic Retinopathy (DR) awareness:** [Table/Fig-6] represents the number (%) of responses of DR questions. A 284 (68.10%) of the total participants aware about DR.

S. No.	Questions (multiple choice questions)	Responses
1.	What is Diabetic Retinopathy?	
	a. Pain and redness in eye in diabetes	2.63% (11)
	b. Mild discomfort in eyes in diabetes not causing diminution of vision	2.15% (9)
	c. Complication of uncontrolled diabetes causing retinal damage leading to diminution of vision	68.10% (284)
	d. Not sure/Don't know	27.09% (113)
2.	Is Diabetic Retinopathy:	
	a. Treatable and Reversible	22.30% (93)
	b. Treatable but Irreversible	42.44% (177)
	c. Not treatable	1.43% (6)
	d. Not sure/Don't know	33.81% (141)
3.	Have you undergone Diabetic Retinopathy screening?	
	a. Yes	2.39% (10)
	b. No, but I am a diabetic	5.99% (25)
	c. No, because I am not a diabetic	91.36% (381)

**[Table/Fig-6]:** Diabetic Retinopathy (DR) questions responses (n=417).

Total of (n)s is not equal to n=417; as questions were multiple choice and subjects had chosen more than 1 options

**Association of ocular diseases awareness with demographic characteristics:** Only significant association was noted with age. Rest no significant association was noted among any of categories [Table/Fig-7].

**Association with attitude towards eye health:** No significant association was noted among any of the categories [Table/Fig-8].

Variables	Aware about 4 or more eye diseases	Aware about 3 or less eye diseases	N	Chi-square	p-value
Sex					
Female	129	111	240	1.92 (df=1)	0.166
Male	83	94	177		
Age (years)					
18-30	139	91	230	19.21 (df=3)	0.000247
31-45	46	63	109		
46-60	26	38	64		
61-75	3	11	14		
Education					
Preuniversity	11	19	30	2.71 (df=2)	0.258
Graduate	119	107	226		
Postgraduate	82	79	-		

<b>Religion</b>					
Hindu	189	189	378	12.29 (df=5)	0.031010
Muslim	4	10	14		
Christian	11	1	12		
Sikh	1	0	1		
Others	4	5	9		
Not mentioned	2	1	3		

<b>Occupation</b>					
Student	108	50	158	42.1 (df=4)	<0.00001
Employed	69	96	165		
Self-employed	24	22	46		
Unemployed	11	28	39		
Retired	0	9	9		
Spectacle users (n=228)	124	88	212		
Proportion by Z test	0.58	0.512	-	0.009 (df=1)	0.9251

**[Table/Fig-7]:** Awareness data.

Among 417 (total) participants, 228 were using spectacles. But amongst 228, 212 participants have answered the awareness questions, as this question was not compulsory to answer.

Q: Losing eyesight affecting day-to-day activity worst?				
Demographic parameters	Positive response	Negative response	Chi-square	p-value
	(n=249)	(n=168)		
Sex				
Female	143	97	0.00389 (df=1)	0.950
Male	106	71		
Age (years)				
18-30	133	97	0.8255 (df=3)	0.843347
31-45	68	41		
46-60	39	25		
61-75	9	5		
Education				
Preuniversity	17	13	0.3973 (df= 2)	0.819853
Graduate	133	93		
Postgraduate	99	62		
Spectacle users	134	94		
Proportion by Z test	0.538	0.559	0.0004 (df=1)	0.984003

**[Table/Fig-8]:** Attitude significance table.

**Association of practice with demographic details:** Practice question responses i.e., when to visit an ophthalmologist in case of eye problem are shown in [Table/Fig-9]. Out of 417, 197 visited ophthalmologist the same day of any eye problem. Responses to question related to glaucoma screening practice are presented in [Table/Fig-10]. Responses to question related to DR screening practice are presented in [Table/Fig-11]. Out of 417, 35 participants were known case of diabetes. Amongst them only 10 had undergone DR screening.

## DISCUSSION

Awareness studies about ocular diseases among general population around the world have shown variations [9]. The present study represents the awareness and knowledge of common eye diseases and eye health among Indian urban population. Half of the study population (50.8%) was aware of all the four ocular diseases under study. A majority of the participants (82.9%) in the present study were aware of cataract. Good awareness of cataract (74.6%) was also reported by study done in Nepal in 2018, by Shrestha GS et al., but knowledge about cataract was present in only 39.1%

Variables	Never	Same day	Self-medicate using ayurvedic preparations/ home remedies/over the counter medication	Wait for 2-3 days	Wait for more than 1 week	p-value
Age (years)						
18-30	3	106	11	110	0	0.12631
31-45	1	58	6	44	0	
46-60	0	30	0	33	1	
61-75	0	3	0	11	0	
	$\chi^2=16.827$ , df=12					
Sex						
Female	0	114	9	116	1	0.171
Male	4	83	8	82	0	
	$\chi^2=6.404$ , df=4					
Religion						
Atheist	0	2	0	1	0	0.999
Buddhist	0	1	0	0	0	
Christain	0	6	0	6	0	
Hindu	3	180	16	178	1	
Jain	0	1	0	2	0	
Lingayat	0	0	0	1	0	
Muslim	1	6	0	7	0	
Sikh	0	1	0	0	0	
	$\chi^2=12.681$ , df=32					
Education						
Postgraduation	1	77	8	75	0	0.89
Preuniversity	1	15	1	13	0	
University (Graduate)	2	105	8	110	1	
	$\chi^2=3.62$ , df=8					
Occupation						
Employed	2	79	8	75	1	0.075
Retired	0	4	0	5	0	
Self-employed	0	19	2	25	0	
Student	2	79	7	70	0	
Unemployed	0	16	0	23	0	
	$\chi^2=9.467$ , df=20					
Spectacle usage						
No	4	87	11	87	0	0.075
Yes	0	110	6	111	1	
	$\chi^2=8.492$ , df=4					
[Table/Fig-9]: Association of demographic character with practice, when do they visit ophthalmologist. p-value <0.05 considered significant						

Variables	Need for information about the condition	No	Yes	p-value
Age (years)				
18-30 (N=230)	17	193	20	0.000105
31-45 (N=109)	11	95	3	
46-60 (N=64)	3	48	13	
61-75 (N=14)	5	7	2	
$\chi^2=27.749$ , df=6				
Sex				
Female (n=240)	17	206	17	0.76
Male (n=177)	18	137	22	
$\chi^2=5.15$ , df=2				

Religion					
Atheist (n=3)	0	1	2	0.022	
Buddhist (n=1)	0	1	0		
Christian (n=12)	1	8	3		
Hindu (n=378)	31	318	29		
Jain (n=3)	1	2	0		
Lingayat (n=1)	0	1	0		
Muslim (n=14)	2	11	1		
Sikh (n=1)	0	0	1		
	$\chi^2=29.233$ , df=16				
Education					
Postgraduation (n=161)	15	126	20	0.007	
Preuniversity (n=30)	7	21	2		
University (Graduate) (n=226)	13	196	17		
	$\chi^2=14.092$ , df=4				
Occupation					
Employed (n=165)	18	134	13	0.007	
Retired (n=9)	2	6	1		
Self-employed (n=46)	2	36	8		
Student (n=158)	9	136	13		
Unemployed (n=39)	4	31	4		
	$\chi^2=10.668$ , df=10				
Spectacle usage					
No (n=189)	21	163	5	0.000038	
Yes (n=228)	14	180	34		
	$\chi^2=20.337$ , df=2				

**[Table/Fig-10]:** Glaucoma screening.  
p-value <0.05 considered significant

Variables	No, because I am not a diabetic	No, but I am a diabetic	Yes	p-value
Age (years)				
18-30 (N=230)	222	7	1	<0.001
31-45 (N=109)	104	4	1	
46-60 (N=64)	46	11	7	
61-75 (N=14)	10	3	1	
	$\chi^2=52.939$ , df=6			
Sex				
Female (n=240)	226	14	3	0.067
Male (n=177)	156	11	7	
	$\chi^2=5.392$ , df=2			
Religion				
Atheist (n=3)	2	0	1	0.481
Buddhist (n=1)	1	0	0	
Christian (n=12)	12	0	0	
Hindu (n=378)	344	25	9	
Jain (n=3)	3	0	0	
Lingayat (n=1)	1	0	0	
Muslim (n=14)	14	0	0	
Sikh (n=1)	1	0	0	
	$\chi^2=15.597$ , df=16			
Education				
Postgraduation (n=161)	145	9	7	0.003
Pre-university (n=30)	24	6	0	
University (Graduate) (n=226)	213	10	3	
	$\chi^2=15.795$ , df=4			



Occupation				
Employed (n=165)	153	8	4	0.003
Retired (n= 9)	5	4	0	
Self-employed (n=46)	40	3	3	
Student (n=158)	152	5	1	
Unemployed (n=39)	32	5	2	
$\chi^2=36.895$ , df=10				
Spectacle usage				
No (n=189)	182	6	1	0.005
Yes (n=228)	200	19	9	
$\chi^2=10.452$ , df=2				

**[Table/Fig-11]:** Diabetic Retinopathy (DR) screening.  
p-value <0.05 considered significant

participants and is comparable to our results [7]. A study from Hong Kong done in 2020 by Wong PW et al., showed that cataract, followed by glaucoma, have the highest awareness among the common eye diseases [10].

Glaucoma awareness is found to be good in the present study. Two-thirds (65.7%) of the study population had heard about glaucoma. Amongst them, 227 participants (82%) had an understanding about what is glaucoma, maybe due to simpler definition of the condition but only half of them knew that vision loss in glaucoma is permanent. Though western countries had better awareness as seen in the 2005 KAP survey conducted in the US [9] related to eye health and disease, knowledge about the condition was poor. A south Indian survey done in 2001 by Dandona R et al., had reported awareness of glaucoma to be 2% [8]. Twenty years later, the present study results showed glaucoma awareness of 66% looks encouraging.

More than half of the present study population had heard about dry eye disease but had poor knowledge regarding the condition. Similar results were published by Haddad MF et al., in their study done in Jordan, 55% of their subject were aware of dry eye which is similar to our study (65%) but 61% for their participants had knowledge which is much better than ours (7%) [11]. This could be attributed due to high prevalence of dry eye in Jordan according to recent report showed 59% prevalence of dry eye is selected population. Therefore, higher prevalence means more individuals are experienced of dry eye symptoms atleast once in their lives [11]. Younger people were significantly more aware in our study. It could be explained by the lifestyle adapted by them and excessive digital device usage e.g., tablets, smart phones and consistent use of computers, they experience these symptoms more. Knowledge about dry eye disease should be imparted to the public as dry eye is an under reported eye disease which can cause serious discomfort and can lead to severe visual impairment [11].

Awareness of DR in the present study is acceptable (68.1%) and comparable with a study done by Al Rashed WA et al., in Saudi Arabia in 2016 [12]. A 2018 KAP study from Hyderabad, by Lingam S et al., showed diabetic status was an associated factor and significantly found to influence positive knowledge and attitude which was comparable to the present study results as majority of diabetic individuals among study population have awareness regarding DR but association is insignificant [13].

A majority of the study participants reported systemic conditions like hypertension and diabetes to be a risk factor for eye diseases, followed by age and family history. Main source of knowledge for our respondents was found to be doctor/eye care professionals, followed by internet, television and community, whereas in Riyadh city, main source of information about eye health was community and social media [12].

Attitude towards eye health is comparable to a 2016 study by Scott AW et al., in the US [3]. Most of the participants ranked losing

eye sight to have worst impact on their daily living amongst other disabilities such as losing limb, hearing, speech and memory.

Self-care practices amongst our participants were average. In case of eye problem, only around half of the present study participants stated they visit ophthalmologist on the same day, less than half prefer to wait for 2-3 days and few self-medicate or never visit. Out of 91 participants that were above the age of 40, only 15 had undergone screening for glaucoma, reflecting huge gap between awareness and practice. Out of 35 participants who were diagnosed diabetics, 10 had undergone screening for DR. There is lack of mass awareness program for glaucoma and DR which results in poor uptake of eye care. Currently, India has no national screening program for DR. Currently, screening in the country is carried out on an ad hoc or project basis or opportunistic screening is done at the hospital by ophthalmologists [14].

Study has indicated that knowledge of condition or disease can positively influence self-care practices [15]. Increasing the awareness and knowledge of common eye diseases could lead to an increase in understanding and acceptance of the importance of routine eye examination for early detection and treatment, thereby reducing visual impairment and eye care cost. These data could help to develop effective health education and information programs to achieve the same.

### Limitation(s)

This survey was conducted online using Google forms. The respondents are those who had access to the internet and were reasonably tech-savvy, thus not comparable with the general population. To extrapolate the data, authors would want to continue the survey in the community encompassing the population that is generalisable. The data of present study was from urban population.

### CONCLUSION(S)

There is need for health education in our country in order to increase their level of awareness and knowledge about common eye diseases. Eye health education influences people to seek ophthalmologist consultation, which is single most important step to prevent visual impairment which is by screening, early diagnosis, timely treatment, compliance and prevention.

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