

A hospital based study on awareness of diabetic retinopathy in diabetic individuals based on knowledge, attitude and practices in a tier-2 city in South India

Mridula Prabhu^{1,*}, Anupama Kakhandaki², K R Pravin Chandra³, Pramod⁴

¹Associate Professor, ²Professor, ⁴Postgraduate, Department of Ophthalmology,

³Associate Professor, Department of Community Medicine,

S D M College of Medical Sciences and Hospital, Sattur, Dharwad - 580009

***Corresponding Author:**

E-mail: mridulaprabhu@rediffmail.com

ABSTRACT

Aim: To assess the awareness and practices relating to diabetic retinopathy (DR) in diabetic individuals attending hospital and to report the results of KAP (knowledge, attitude, practice) study which would help in identifying the lacunae in promoting awareness and in improving the practice towards diabetic retinopathy.

Design: Hospital based cross sectional study.

Methods: This study was conducted on 200 diabetic patients who attended ophthalmology outpatient department (OPD) between Nov 2012 and Jan 2013 regarding their awareness relating to diabetic retinopathy. The study included a semi structured questionnaire based on demographic details, literacy levels, awareness of risk factors and management of diabetic retinopathy.

Statistical analysis used: Chi Square test, Fisher Exact probability test, Odds ratios and Logistic regression analysis.

Results: Among the 200 diabetic individuals attending our OPD, 145(72.5%) patients were aware of damage to eyes due to diabetes. Out of these 145 patients, 102(52.5%) knew that diabetes could cause a decrease in vision while 65(32.5%) attributed diabetes to total blindness. The mean age was 57.1 years, 124(62%) were males and 136(68%) were literates. 108(54%) patients knew that ocular damage due to diabetes was treatable. However only 14 (7%) knew that good control of diabetes was important for prevention of visual impairment and 13 (6.5%) knew about surgical options for treatment of DR. Only 31(16.5%) of diabetic patients were referred for an eye examination by the physicians.

Conclusion: Our study highlights the need for more awareness camps regarding DR, its risk factors, treatment options and follow up. Role of physicians was alarmingly low in our study which needs to be stressed.

Keywords: Awareness, Diabetic retinopathy, Hospital-based study, KAP, South India

Access this article online	
Quick Response Code:	Website: www.innovativepublication.com
	DOI: 10.5958/2395-1451.2015.00007.4

INTRODUCTION

In India, DR is becoming an important cause of visual impairment. It is estimated that in India there will be 195% increase in persons with diabetes by 2025, from 19 million in 1995 to 57 million in 2025. [1, 2, 3] India is already home to 9-12 million blind people in the world which amounts to ¼ of the world's blind population. [2] Individuals with diabetes have a high potential for visual loss, especially those with more than 35 years of diabetes. [4] With the present modalities of treatment available, more than 98% of visual loss and blindness due to severe DR can be prevented if intervened at the right time. [4,5,6,7,8] However lack of awareness regarding available treatment options, poor referral from physicians and a laid back attitude in individuals has led to poor utilization of these facilities.

In spite of various awareness programs for diabetes among general population, the awareness regarding DR in diabetics needs to be improved. Our study was conducted on a small group of 200 persons with established diabetes unlike other studies which were conducted on general population.

MATERIAL AND METHODS

A hospital based, cross sectional study was conducted among 200 adult patients with diabetes between November 2012 and January 2013, who attended the ophthalmology outpatient department of SDM medical college on Tuesdays, Thursdays and Saturdays which happened to be the outpatient days allotted to the investigator. All patients were surveyed regarding their awareness relating to diabetic retinopathy.

Written, informed consent was obtained from all subjects and the study was performed in accordance with the tenets of the Declaration of Helsinki. The protocol of the study was approved by the Institutional ethics committee.

A brief semi structured open-ended questionnaire based on demographic details, literacy levels, awareness of risk factors and management of

diabetic retinopathy was designed to record the information. The questionnaire was pre-tested in a sample group of representative population. The questionnaire was initially developed in English and all the questions were translated into the two common languages used in this region, Kannada and Hindi if the subjects could not follow English. The questionnaire was interviewer – administered and done by a single investigator.

Knowledge, Attitude and Practice Study Methodology

The questions that evaluated *knowledge* were:

- 1) Can eyes be damaged by diabetes?
- 2) What eye problems can individuals with diabetes have?
- 3) Knowledge of risk factors leading to diabetic retinopathy.
- 4) Knowledge about treatment for diabetic retinopathy.
- 5) If yes, knowledge about various treatment options available for diabetic retinopathy.

The questions that evaluated *attitude* included:

1. Attitude towards frequency of follow up for diabetic retinopathy

The questions that evaluated *practice* pattern included:

1. Does good control of blood sugar result in avoiding visit to an ophthalmologist? The responses to questions were acquired in the format of 'yes', 'no' and 'do not know.'

After the questionnaire was filled or answered, the patients underwent a detailed eye examination including dilated fundus examination. Analysis was performed using the statistical software IBM –SPSS-Statistics-version 20 ©copyright IBM Corporation 2010, New York 10589, USA. The Chi Square test and Fisher Exact probability test were used to look for significant associations in awareness, knowledge and practice about diabetic retinopathy with other studied variables. Probability (p) value less than 0.05 was considered statistically significant. A logistic regression test was performed for predictors on the likelihood of knowledge of retinopathy being treatable.

RESULTS

We received responses from 200 patients diagnosed with type 2 diabetes, attending ophthalmology OPD at our hospital. It was observed that the age distribution of diabetics was predominantly from 40 to 70 years. It peaked at 60 – 70 years(37.5%) and did not differ across the genders. The mean age was 57.1 years and 124(62%) were males. 137(68.5%) were from urban areas and

183(91.5%) were Hindu by religion. About 136(68%) were literates. Table 1 shows demographic and literacy profiles of all subjects. Diabetes of less than 5 years duration was seen in 100(50%) individuals and of more than 20 years duration in 8(4 %) individuals. Co-morbid conditions such as hypertension was noted in 58 (29%) of individuals. Family history of diabetes was noted in 43(21.5%). On comparison between urban and rural patients, it was noted that urban patients had a higher family history of diabetes (p=0.04), had higher co-morbidity with hypertension(p=0.035), reported higher proportions of sources of knowledge(p=0.013), were more aware about damage to eye from diabetes (p=0.02) and that DR was treatable (p=0.003 by Fishers Exact test).

Table 2 shows awareness regarding type of eye damage. The results regarding the type of eye damage in type 2 diabetes showed that 52.5% of patients knew that diabetes could cause reduced vision, 31.5% felt it could cause blindness, 17.5% knew that diabetics could develop cataracts.

Questions were asked pertaining to knowledge of risk factors leading to DR and the results are shown in table 3. 120(60%) knew that ocular involvement in diabetes was related to duration of diabetes, 58(29%) felt that lack of blood sugar control was a risk factor for development of DR. Awareness regarding other risk factors was as follows – obesity (21%), hypertension (19%), smoking(19%), high cholesterol (7.5%).

108(54%) patients knew that diabetic retinopathy was treatable and table 4 shows details regarding knowledge of treatment options. 65(32.5%) knew regarding laser, 13(6.5%) knew regarding surgery, 14(7%) knew regarding good control of diabetes and 34 (17%) knew about drugs and injections into the eye.

The source of information for awareness of diabetes was a doctor in 100 (50%) subjects, mass media in 26 (13%) subjects, diabetic friend in 22(14%) subjects and others in 28 (14%) subjects.

Table 5 shows determinants of knowledge that retinopathy is treatable .The predictor variables which could have an effect on knowledge of retinopathy is treatable were studied.

The predictor variables which were important as found by working out the Odd's ratios of the predictors on the likelihood of knowledge of retinopathy is treatable were urban residence, source of knowledge (diabetic friends), knowledge of eye involvement in diabetes and decreased vision related to diabetes.

A binary logistic regression was performed to ascertain the effects of residence, source of awareness, knowledge of eye involvement in diabetes and knowledge of decreasing vision on the likelihood of knowledge that retinopathy is treatable. These

were the four predictor variables which were found to be important by working out their odds ratios of the prediction of the likelihood of the awareness that retinopathy is treatable. The sample size for the model was more than adequate going by the yardstick of at least ten events per variable and we had 84 events as the smaller of the outcomes.^[9]The logistic regression model was statistically significant. $X^2_{(5)} = 20.83$, $p < 0.001$. The model explained 21.4% (Nagelkerke R^2) of the variance in the knowledge of retinopathy is treatable and correctly classified 86.1% of the cases. Urban subjects were 2.27 times more likely to have the knowledge than rural people and the subjects who gained this knowledge were 3.16 times more likely to have acquired this knowledge from diabetic friends compared to from the doctors and the media. This underscores the importance of concentrating the health education efforts in the rural areas as well as acknowledging the fact that doctors are not doing enough to spread awareness of the avenues available for spreading the news that retinopathy can be treated. The results also highlight the importance of peer-knowledge-spread among the patients and paves way to think how this can be bolstered may be with the use of patient blog-sites which are not yet popular among the educated.

Out of 194 diabetic patients who met the physician, 126 (64.2%) received the guidance regarding the nexus between diabetes and eye disease. Only 31 (24.6%) out of these 126 were referred to ophthalmologists. This amounts to 1 in 4 referrals among diabetics to eye department for ophthalmic care. This boils down to only 31 out of 194 (16%) of diabetics being seen by the ophthalmologist. This is dismally low. This means only 1 in 6 diabetics seen by the physician, reach for eye care.

Of the 200 patients, 142(71%) had no DR, 47(23.5%) had non proliferative diabetic retinopathy (NPDR), 9(4.5%) had proliferative diabetic retinopathy (PDR) and 11 (5.5%) had clinically significant macular edema (CSME). Diabetic retinopathy patients were older than non diabetic retinopathy cases, 59.9 years versus 56 years ($p = 0.01$ by Student's t test). Out of 58 subjects who had diabetic retinopathy, nearly half of them (26) subjects had duration of diabetes ranging between 5 to 10 years.

Table 1: Demographic and literacy profiles of subjects

Total subjects	200
Mean Age	57.19YRS
Median Age	58YRS
Gender Men	124(62%)
Women	76(38%)
Region Urban	137(68.5%)
Rural	63(31.5%)
Religion Hindu	183(91.5%)
Muslim	16(8%)
Christian	1(0.5%)
Literacy Literate	136(68%)
Primary	18(9%)
Secondary	57(28.5%)
Post Secondary	61(30.5%)
Illiterate	64(32%)
Duration of DM	
<5yrs	100(50%)
5-10	62(31%)
10-15	18(9%)
15-20	12(6%)
>20	8(4%)
Hypertension	58(29%)
Family History Of DM	43(21.5%)

Table 2: Awareness regarding type of eye damage due to diabetes

Reduced vision	105(52.5%)
Blindness	63(31.5%)
Cataract	35(17.5%)
Glaucoma	4(2%)
Others – corneal opacity	4(2%)

Table 3: Knowledge of risk factors leading to diabetic retinopathy

Duration of diabetes	120 (60%)
Lack of blood sugar control	58(29%)
Risk of obesity	42(21%)
Risk of hypertension	38(19%)
Risk of smoking	38(19%)
Risk of having high cholesterol	15(7.5%)

Table 4: Knowledge of treatment options

Laser	65(32.5%)
Surgery	13(6.5%)
Good control of diabetes	14(7%)
Others(drugs, injection)	34(17%)

Table 5: Determinants of knowledge-retinopathy is treatable

Variable	Rate in %	knowledge	No knowledge	Odds Ratio & 95% CI	p by (Chisquare/ Fisher exact Test)
Gender					
Female	71.6	53	21	1	0.958
Male	55.8	67	53	0.98(0.54-1.76)	
Residence					
Rural	39.3	24	37	1	0.001**
urban	63.2	84	49	2.64(1.41-4.92)	
Religion					
Hindu	53.6	96	83	1	0.12
Muslim	0.79	11	3	3.17(0.85-11.74)	
Literacy					
Illiterate	56.5	35	27	1	0.95
Post Secondary	56.1	32	27	0.91(0.44-1.87)	
Mother tongue					
Kannada	55.1	98	80	1	0.80
Others	63.7	7	4	1.42(0.40-5.05)	
Duration of DM					
<5yrs	49	47	49	1	0.239
10-15yrs	72.7	8	3	2.78(0.69-11.11)	
Family history of DM					
Absent	56.5	87	67	1	0.78
Present	52.5	21	19	0.85 (0.42-1.7)	
Hypertension					
Absent	59	82	57	1	0.138
Present	47.3	26	29	0.62(0.33-1.16)	
Source of awareness					
Doctor	59.2	58	40	1	0.01 *
Diabetic friends	90.5	19	2	6.55(1.44-29.7)	
Eye involvement in Diabetes					
No knowledge	30.8	8	20	1	0.001**
Knowledge present	62.4	88	53	4.15(1.72-10.08)	
Decreased vision and diabetes					
Knowledge present	63.7	65	37	1	0.01*
Knowledge absent	46.7	43	49	0.49(0.28-0.88)	

**= significant p value <0.001

*= significant p value < 0.01

DISCUSSION

The knowledge that eyes can be affected by diabetes was known in 72.5% of the subjects in our study which was less compared to 88% in the study done by Cetin EN et al. [10].

The knowledge that diabetes causes a decrease in vision was known to 52.5% of individuals in the present study which was more as compared to 37.1% as quoted by Rani PK et al and 46.6% as quoted by Thapa R et al [11, 12]. However the population studied by Rani PK et al was rural general population whereas the present study included only diabetic individuals. Diabetic individuals are expected to be more aware regarding DR as compared to non- diabetics.

According to study by Namperumalsamy et al, more than 50% of respondents were not aware of risk factors for DR and only 16% of individuals from community were aware that uncontrolled diabetes

was a risk factor for DR. [3] In the present study, 60% were aware of duration of diabetes as a risk factor and 29% were aware about the importance of blood sugar control.

According to Rani PK et al the knowledge of treatment options for diabetes such as laser or surgery and good control of blood sugar was 50.1%, 38.2% and 53.2% respectively which were higher as compared to our study which showed 32.5%, 6.5% and 7% respectively. [10] The dismally low awareness regarding treatment options was due to poor means of information in this regard. Most of the limited information gathered was from word of mouth from relatives or friends who were also diabetic. In the present study the attitude for annual eye examination was 31% as compared to 80% and 93.3% according to Namperumalsamy et al and Rani PK et al. [3,11] Our results could have been low as compared to other studies because of lack of referral by physicians. The

need for annual eye examinations and follow up must be stressed upon at the time of initial diagnosis by the physician. Otherwise lack of information might cause the individual to consult an ophthalmologist very late in the disease or after vision threatening complications have set in or become irreversible.

Nearly 51.5% of the respondents in the present study had a poor practice pattern and believed that keeping blood sugars under control was enough to avoid a visit to the ophthalmologist. However in the study conducted by Rani PK et al 36.5% respondents had these views while Namperumalsamy et al quoted 43.5% individuals having visited an ophthalmologist.^[3,11]

The discrepancy between various studies might have been due to the difference in samples. Studies done by Namperumalsamy et al and Rani PK et al were population based studies while our study was a hospital based study conducted on diabetic individuals.

Screening and awareness campaigns need to be conducted so as to ensure that all individuals with diabetes need a dilated eye examination at the time of initial diagnosis and followed up at least once a year.

Once an individual is diagnosed to have diabetes, a baseline dilated fundus examination must be made mandatory. This should be followed by annual eye examination or more frequently if suggested by the ophthalmologist. The patients must be taught the importance of strict control of blood sugar which plays a very important role in prevention of progress and development of complications.

Our study highlights the significance of role played by physicians in early referral to an ophthalmologist. Our study showed that there is lack of awareness regarding knowledge of risk factors and treatment options available.

The higher incidence of family history of diabetes, higher co-morbidity of hypertension and literacy levels in urban patients raises the doubts regarding role played by urban lifestyle and stress in the prevalence of diabetes in these individuals. Further studies are warranted in this regard to know the cause and effect relationship.

To conclude, this report supports the need for awareness drives regarding DR in our country. In spite of various recommendations and guidelines for screening of DR in diabetic individuals, lack of implementation has been a major setback. A major awareness and motivation drive is needed on a large scale to curb the rising menace of visual morbidity due to DR.

REFERENCES

1. King H, Aubert RE, Herman WH. Global burden of diabetes, 1995-2025: prevalence, numerical estimates and projections. *Diabetes Care* 1998;21:1414-31.
2. Narendran V, John RK, Raghuram A, Ravindran RD, Nirmalan PK, Thulasiraj RD. Diabetic retinopathy

- among self-reported diabetics in southern India: A population-based assessment. *Br J Ophthalmol* 2002;86:1014-18.
3. Namperumalsamy P, Kim R, Kaliaperumal K, Sekar A, Karthika A, Nirmalan P K. A pilot study on awareness of diabetic retinopathy among non-medical persons in South India. The challenge for eye care programme in the region. *Indian J Ophthalmol* 2004;52(3):247-51.
4. Dandona L, Dandona R, Naduvilath TJ, McCarty CA, Rao GN. Population based assessment of diabetic retinopathy in an urban population in southern India. *Br J Ophthalmol* 1999;83:937-40.
5. Rohan TE, Frost CD, Wald NJ. Prevention of blindness by screening for diabetic retinopathy: A quantitative assessment. *BMJ* 1989;299:1198-201.
6. Ferris FL. How effective are treatments for diabetic retinopathy? *JAMA* 1995;269:1290-91.
7. Ferris FL. Issues in management of diabetic retinopathy. *Hospital Practice* 1993;79-89.
8. Agardh E, Agardh CD, Hansson-Lundblad C. The five-year incidence of blindness after introducing a screening programme for early detection of treatable diabetic retinopathy. *Diab Med* 1993;10:555-59.
9. Peacock JL, Philip J. Oxford handbook of Medical Statistics. Newyork : Oxford University Press ; 2013. p. 427.
10. Cetin EN, Zencir M, Fenkci S, Akin F, Yildirim C. Assessment of awareness of diabetic retinopathy and utilization of eye care services among Turkish diabetic patients. *Prim Care Diabetes* 2013 Dec;7(4):297-302.
11. Rani PK, Raman R, Subramani S, Perumal G, Kumaramanickavel G, Sharma T. Knowledge of diabetes and diabetic retinopathy among rural populations in India, and the influence of knowledge of diabetic retinopathy on attitude and practice. *Rural Remote Health* 2008;8:838.
12. Thapa R, Joshi DM, Rizyal A, Maharjan N, Joshi RD. Prevalence of risk factors and awareness of diabetic retinopathy among admitted diabetic patients at a tertiary level hospital in Kathmandu. *Nepal J Ophthalmol* 2014;6(11):39-45.