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Original Research Article

Knowledge attitude practice study of diabetic retinopathy

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ABSTRACT

Background: Diabetic retinopathy (DR) is an important cause of visual impairment. It is preventable with proper screening and treatment of diabetes. Therefore, it is necessary to assess awareness of the disease in the population and educate them. Our study aimed to assess the knowledge, attitude and practices regarding diabetes and DR in India.
Methods: We conducted a knowledge, attitude, and practice study of 1152 participants belonging to various economic backgrounds across India, using a validated questionnaire from Shri C. H. Nagri Eye Institute, Ahmedabad. We divided the study population into diabetics and non-diabetics. Statistical analysis was done using SPSS version 20.
Results: Out of 1152, 121 (10.5%) were diabetics and 1031 (89.5%) were nondiabetics. Mean age of diabetics (55.71) was higher than non-diabetics (37.55) ($p<0.001$). Only 34% of non-diabetics and 55% of diabetics knew about DR. There was a positive co-relation between knowledge of diabetes ($r=0.262$, $p<0.001$) and DR ($r=0.096$, $p=0.031$) with the level of education. Only 20% admitted that diabetics were at a higher risk for eye problems. A significant portion of participants (40%) said they were never counselled for DR and 54% never had a fundus examination.
Conclusions: The There is a clear lack of knowledge regarding diabetes and diabetic retinopathy. An alarming percentage of patients were never told about the complications and need for regular fundus examinations. There is an urgent need to increase its awareness. A collaborative approach of general-practitioners, ophthalmologists, diabetologist as well as health-policy makers is required to provide needs-based, context-specific comprehensive diabetic care in India.

Keywords: Diabetes, Diabetic retinopathy, KAP study, Awareness

INTRODUCTION

Diabetes is one of the most prevalent non-communicable diseases in India. It has become a growing concern for health care professionals worldwide.[1] It is characterized by insulin resistance and positive feedback loop that eventually leads to hyperglycemia and end organ damage. Increased physical inactivity and unhealthy diets in the younger as well as older population has led to an increased incidence and prevalence of the disease. Its complications are mainly divided into micro and macro

vascular complications. Among micro-vascular complications, diabetic retinopathy (DR) is the most common one followed by neuropathy and nephropathy. Diabetic retinopathy is a term that refers to the retinal changes induced by diabetes. Mainly diabetic retinopathy is of two types: non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR). The hallmark of PDR is occurrence of neovascularization in the retina. Later, condensation of connective tissue around the new vessels results in formation of fibro-vascular epiretinal membrane. Retinal detachment and vitreous haemorrhage may occur at this stage.

In India, 18% of diabetic patients are suffering from diabetic retinopathy. The prevalence of blindness due to diabetic retinopathy was found to be 1.5% in India.[2] WHO has estimated that diabetic retinopathy is responsible for 1% of the 39 million cases of blindness throughout the world.[3] It develops in nearly all persons with type 1 diabetes and in more than 77% of those with type-2 who survive over 20 years with the disease. Even though diabetic retinopathy is so prevalent in India, general community still lacks awareness regarding the same. If diagnosed and treated at an early stage, it can not only prevent vision impairment but also its psycho-social impact can be prevented.

Screening for DR is an important part of diabetes mellitus (DM) management worldwide to prevent its complications. Current practice guidelines state that there is a need to conduct screening at or shortly after the diagnosis of T2DM.[4] Given that early detection is possible with T1DM, it is not necessary to start screening immediately after diagnosis.[5] In addition, guidelines are generally vague on what a session should entail and how to conduct such sessions.[6,7] Even if an adequate number of ophthalmologists are available, using ophthalmologists or retinal subspecialists to screen every person with DM is an inefficient use of resources. Minimum referral guidelines are also provided by International Council of Ophthalmology.[4] Despite facing similar rates of DR and even higher rates of sight-threatening diabetic retinopathy (STDR) than the West, fewer than a quarter of Asian countries have available DR screening guidelines without having national guidelines specific to DR screening. This increases vulnerability of Asian population to DR related blindness.[8] Existing guidelines need to be evidence-based and more comprehensive to provide a basis for screening programmes to be established.

Few studies have been carried out to show the knowledge and awareness about DR in different parts of India. In such studies, amongst those who had knowledge about diabetic retinopathy, most of them believed that they had to go for regular eye examinations (93.3%). Also, out of those who had knowledge of the disease, only 36.5% people believed that if they controlled their sugar levels, they do not need to visit an ophthalmologist. This depicts prevalence of poor knowledge, attitude and practices towards diabetic retinopathy in people of India. The leading cause of this is their unawareness of the disease.[9,10] Educating people about the illness and raising awareness can help in timely detection and treatment of patients.

Our main objective for carrying out this study and awareness campaign was to know about the current knowledge among the community in terms of diabetic retinopathy, their attitude towards it and the practices they follow for the same. Also, we carried out an awareness campaign to educate everyone about this condition. Awareness campaign included showing them PowerPoint presentation about diabetic retinopathy and informing them that regular eye check-ups are important so that the disease can be diagnosed at an early stage.

METHODS

A knowledge attitude and practice study of total 1152 participants residing in 9 different states (Gujarat, Maharashtra, Goa, Punjab, Haryana, West Bengal, Karnataka, Uttar Pradesh, Tamil Nadu) was conducted from November 2015 to April 2016. A validated questionnaire was used which was prepared and standardized at Shri C H Nagri Eye Institute, Ahmedabad 11. Online e-resources were used in framing the questionnaire. 11 The participants belonged to all kinds of economic backgrounds. The study population was divided into two different groups of diabetics and non-diabetics.

Inclusion criteria

Everyone above age of 18 years was included in this study. Participants were required to be literate enough for filling up the form.

Exclusion criteria

We only excluded the patients who did not give their consent. As this study was a KAP study with objective to increase awareness, our goal was to include individuals from all different socio-demographic, economic as well as geographical background of the country.

To conduct the form filling process, camps were established in all kinds of industrial as well as residential areas of 15 different cities of 9 different states all over India. The survey was conducted with the assistance of 80 volunteers. These volunteers were medical students from different medical colleges of the states. Informed consent was taken from all the participants before their participation. We also collected data from various socio-economic background and literacy including engineers, doctors, teachers, clerks, sweepers. PowerPoint presentation about diabetic retinopathy and information about regular eye-checkups was shown to all the participants after they filled out the survey.

The questionnaire contained three sections as follows

Knowledge section

Basic questions assessing knowledge of cause, symptoms and complications of diabetes were included.

Attitude section

General attitude of the individuals that can lead to increased chances of causing diabetes as well as attitude that general population should take to prevent complications.

Practice section

Practice section was divided into diabetic and non-diabetics.

The diabetic section involved what diabetic individuals mainly do as a treatment for their diabetes as well steps that they may have taken or are currently taking to prevent complications caused by diabetes. The non-diabetic section particularly focused on what non-diabetic individuals advised their diabetic family members/friends for preventing complications of diabetes mainly focusing on retinopathy. This section focused to assess the awareness in non-diabetic population regarding practices that should be focused for prevention as well as treatment of diabetic retinopathy.

Statistical analysis was carried out using the licensed version of Statistical Software SPSS version 20. Chi-square test was used for qualitative analysis done to generate the results. Pearson co-relation was used to find association between different variables.

RESULTS

The data collected from 1152 participants was analyzed and represented quantitatively in the form of tables as well as qualitatively in the form of graphs.

Out of total study population, 121 (10.5%) were diabetics whereas 1031 (89.5%) were nondiabetics. Mean age of Diabetics was higher than non-diabetics (p<0.001). Diabetics and non-diabetics had same distribution in terms of education and occupation. Females were 40%. We had equal number of participants from all 9 states of India with very minute variation.

Table 1: Socio-demographic characteristics of study population.

Characteristics	Diabetics (n=121)	Non-diabetics (n=1031)	Total population (n=1152)	P value
Sex				
Male	62.80%	59.70%	60%	0.502
Female	37.20%	40.30%	40%	
Age (years)	55.71±10.327	37.55±15.294	39.46±15.86	<0.001
25-35	10%	29.50%	27.60%	<0.001
25-45	8%	18.90%	17.90%	
45-55	30%	26.70%	27%	
>55	52%	24.90%	27%	
Education				
No education	6%	2.40%	2.20%	0.466
Primary education	34%	8.40%	8.10%	
Secondary education	56%	32.80%	32.90%	
Graduate	4%	47.40%	48.20%	
Post graduate	-	9.00%	8.50%	
Occupation				
Private/business/government	54%	52.60%	52.80%	0.93
Labor	28%	27.10%	27.20%	
Home duties/unemployed	18%	20.30%	20.00%	
Mean duration of diabetes	8.65 years			

The results of the study are further divided into three parts.

Section A: Knowledge

The responses from people regarding various misbeliefs about diabetes as well as diabetic retinopathy were evaluated. Table 1 and 2 represent knowledge section of the study.

As we can see overall, non-diabetic people lacked knowledge about diabetes. Whether diabetic or non-diabetic, majority of the people did not know about the treatment of diabetes or diabetic retinopathy. Regarding diabetic retinopathy, only 34% of non-diabetics knew

about the disease and 55% of diabetics knew about the disease. These percentages show that there is a significant lack of knowledge regarding treatment and complications of the disease.

Based on the Table 3 we can see that there was an overall lack of accurate knowledge of symptoms and causes of diabetes. When asked about treatment of DR, many people still considered old home remedies and using spectacles as choice of treatment.

Table 2: Statistics describing the prevalence of knowledge of diabetes and diabetic retinopathy among the participants.

Knowledge					
S. no.	**Questions**	**Diabetics (%)**	**Non-diabetics (%)**	**Total (%)**	**P value**
1	Do you know what Diabetes is?	100	97	97.3	<0.001
2	Do you know symptoms of diabetes?	95.9	74.1	76.4	<0.001
3	Do you know the causes of diabetes	72.7	54.9	56.8	0.001
4	Can diabetes affect your eyes?	84.3	79.3	79.9	0.198
5	Treatment of diabetes?	14.1	14.3	14.2	0.539
6	Greater risk of diabetic retinopathy	54.5	35.8	62.2	<0.001

Table 3: The most common responses obtained for the questions asked in the knowledge section of the questionnaire.

S. no.	Questions	Responses					
1	State the symptoms of diabetes:	Increased food intake	Pain in legs	Increase in urine	Vision abnormalities		
2	State the causes:	Genetically	Increased intake of carbohydrates	Sedentary lifestyle	Stress	Obesity	
3	Which parts of the body are involved	Eyes	Kidney	Extremities	Ears		
4	How are eyes affected in diabetes.	Decreased visual acuity	Red eye	Floaters			
5	Treatment of DR:	Photocoagulation	Medication	Injections	Diet restrictions	Splashing water on eye	Spectacles

Table 4: Correlated the level of knowledge with the level of education of the participants.

Questions asked		Do you know what Diabetes is?	Do you know diabetics are at increased risk of retinopathy?
Level of education	Pearson correlation	0.262**	0.096*
	p value	<0.001	0.031

**p value=0.001, *p value=0.05

We also correlated the level of education with the knowledge about diabetes and diabetic retinopathy. Educated people had better knowledge about diabetes (low correlation). Whereas even though educated people showed more knowledge about diabetic retinopathy, there was negligible correlation between these two variables (Table 4).

Section B: Attitude

The responses were categorized into five categories: strong disagreement, strong agreement, moderate disagreement, moderate agreement and indecisiveness about the statement.

It can be observed that a quarter of the participants did not know that diabetes is a lifestyle disease and the fact that it is not curable. Only 15% of the participants are confident about the disease being incurable (Figure 1).

Only 16% of the participants strongly agreed that diabetes had no relation with the economic status of the patient. Only half of the participants were aware that diabetes can be inherited genetically from parents (Figure 1).

A significant proportion of participants (48%) had a misconception that consumption of sweets did not lead to diabetes while 33% agreed that consuming sweets led to diabetes (Figure 1).

A significant proportion of participants (48%) still think that consumption of sweets does not lead to diabetes while 33% agree that consuming sweets leads to diabetes (Figure 1).

Total 40% of the participants believed that diabetes can be cured completely only with proper diet control. Only 20% of the participants strongly agreed that diabetics were more likely to develop eye problems than non-diabetics (Figure 2).

Almost equal proportions of the participants agreed and disagreed on whether diabetics should get their eyes examined periodically by an ophthalmologist or not (Figure 2).

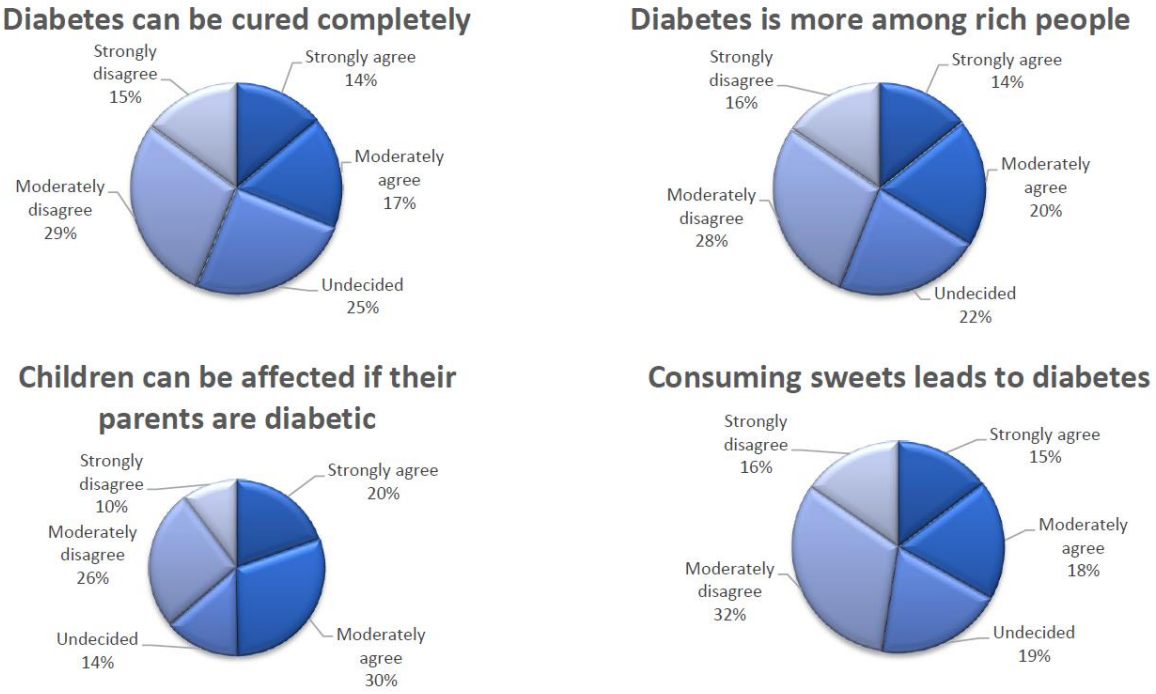

Figure 1: Pie charts depicting the responses of participants on first four questions of attitude section.

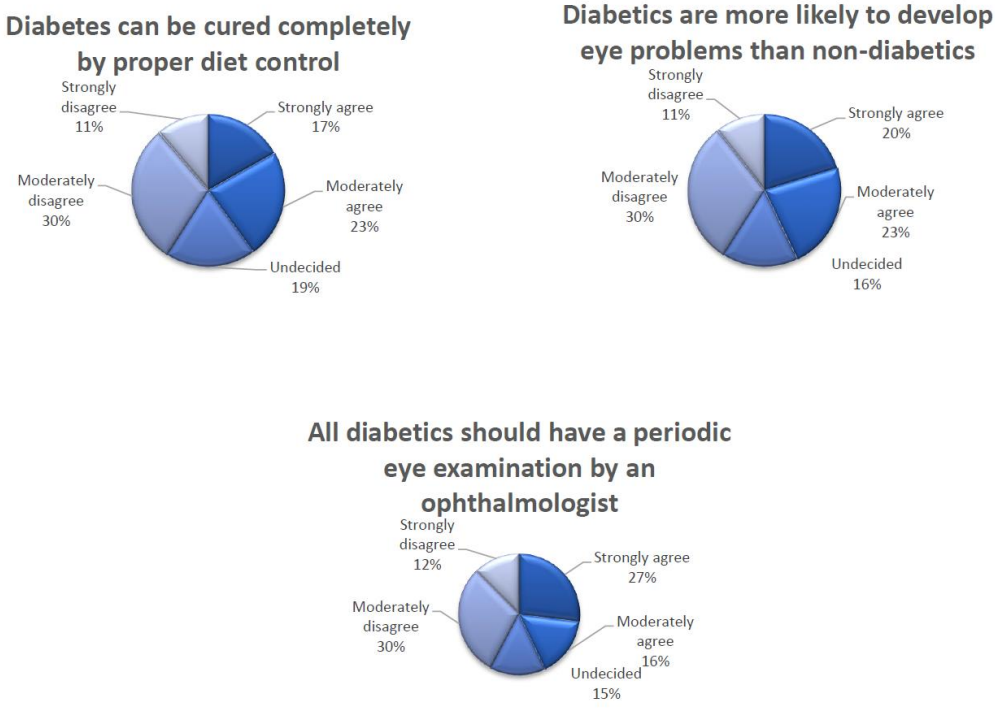

Figure 2: Pie charts depicting the responses of participants on last three questions of Attitude section.

Section C: Practices

Only 56 (46.2%) out of 121 diabetic participants were aware of the existence of diabetic retinopathy. Almost 40% said that their doctors had never advised them about Diabetic retinopathy and 54% of total diabetics had never had a fundus examination before. Out of 46.2 % people who underwent fundus examination only 19 (35%) were going for regular checkup (Table 5). Total 50% of the non-diabetic participants said that they advise visit to ophthalmologists but only 25% out of 1031 knew what diabetic retinopathy was. Only 13% knew what the treatments for DR are, out of which only 31% knew that laser-photocoagulation was one of the treatment modalities (Table 6).

Table 5: Data collected from the practice section of the questionnaire from the participants who were diabetics.

Practice - diabetic (n=121)			
Questions		**Yes**	**No**
1. Has your doctor advised you?		60.3%	39.7%
2. Have you been informed about your eye condition?		52%	48%
3. Have your undergone Fundus examination?		46.2%	53.8%
4. Do you know about DR?		46.2%	53.8%
5. Do you know treatment of DR?		(n=23) 19.8%	81.2%
5a. Medicines		14	
5b. Laser- photocoagulation		4	
5c. Injection		6	
6. Which treatment methods do you use?	Regular exercise/ weight control	Decreased carbohydrate control	Regular blood tests
7. How many times have you undergone fundus examination?	Once (n = 21)	Twice (n=15)	More than once (n=19)

Table 6: Data collected from the practice section of the questionnaire from the participants who were non-diabetics.

Practice - Non-Diabetic (n=1031)		
Questions	**Yes**	**No**
1. Do you encourage diabetics to visit ophthalmologists?	49.9%	49.1%
2. Do you know what DR is?	25.3%	74.7%
3. Do you know what the treatment for DR is?	(n=135) 13%	87%
Treatment:		
3a. Medicines	(n=54) 40%	
3b. Laser	(n=42) 31.1%	
3c. Surgery	(n=39) 28.9%	
4. Sources:		
4a. Social Media	56 %	
4b. Doctors	19.5 %	
4c. Relatives	24.5 %	

DISCUSSION

Diabetes is a fast-growing lifestyle related disease with its biggest risk factor being its long duration. The prevalence of diabetes among adults has reached approximately 20% in urban populations and approximately 10% in rural populations in India.[12] The primary prevention of diabetes is urgently needed in India to curb its rising burden. Diabetes also affects other organs over a period of time which leads to various complications.

Our study allowed us to get a brief idea about existing awareness in the society with regards to diabetes and diabetic retinopathy. Our study was carried out in 9 different states of India. The campaign also helped us in analysing the current knowledge and practices regarding diabetic retinopathy. 20% of our study population did not know that diabetes can affect eyes. Majority of the population did not know the basic of diabetic retinopathy, its screening and treatment guidelines. Majority of the studies carried out till now have shown results focused to specific regions of India, whereas our study was carried out in 9 different states of India and therefore more generalizable to the entire country.

In a similar study by Venugopal et al the awareness and knowledge about DR in Goa was 34.9% and 34.1%, respectively. The level of literacy was strongly associated

with the correct attitude and good practice pattern.[13] A similar study by Lingam et al showed that awareness of DR was more 65.3% among diabetics compared with 22.0% among non-diabetics at all locations.[14] Study by Raj P et al showed that only 10.7% patients with DM presenting to two different AYUSH (Ayurveda, Yoga and naturopathy, Unani, Siddha and Homeopathy) in Telangana were aware of DR and only 8% had undergone DR screening.[15] Study in Tamil-Nadu showed 42% of diabetic patients presenting to CMC, Vellore had good knowledge about diabetes, but only 4.5% had good knowledge about retinopathy.[16] Whereas in our study we saw that only 46.2% of diabetic and 25.3% of non-diabetic knew what diabetic retinopathy was in 9 different states of India. In our study also, we saw that there was positive correlation between knowledge and education level of participants.

In a study by Thapa et al two-fifths of the subjects in Nepal were unaware of Diabetic Retinopathy and its potential for blindness. Very few people follow the practice of going for regular eye check-ups after being diagnosed with diabetes. Study by Memon et al has also shown similar results in Pakistan.[17] A lack of awareness of DR coupled with a high proportion of cases already at a sight threatening stage of retinopathy at their first presentation reflects the need for improved awareness in South Asian nations.[18]

Managing diabetic retinopathy is a very crucial but difficult task especially in India. Government has initiated a national program for the management and prevention of diabetes and related metabolic disorders. Lifestyle modification is an effective tool for the primary prevention of diabetes in Asian Indians. Indeed, ophthalmologists must consider the needs, preferences, values, as well as financial and personal circumstances of individual patients, and work within the realities of their healthcare setting.[12] Wide disparities in socioeconomic levels, educational background, and the availability of diabetes care pose major hurdles in the management of this disease in India.

We tried motivating the people through our awareness campaign to visit ophthalmologists and get their eyes checked. The campaign enabled people to gain knowledge about both diabetic retinopathy as well as various complications that arise due to diabetes. Data from a study carried out at Aravind eye care centre suggested that a lot of effort is required to increase awareness regarding diabetic retinopathy in this population and to transform this increased awareness to actual utilisation of services. They saw that only 2.5% of the paramedical personnel and 0.5% people from the community were aware that diabetes could affect all 5 major systems listed which showed that even paramedics lacked information related to diabetic retinopathy.[19] Creating awareness by means of distributing pamphlets, display posters, and television displays on ocular complications due to diabetes will improve the awareness level of DR among patients visiting the tertiary care centre.[13]

Screening of DR is not prevalent in India and especially in rural sector where a huge diabetic population of India lives. Efforts have been made at Government level to streamline screening of DR. A pilot project by Murthy et al has demonstrated that services for detecting and managing DR can be successfully integrated into the existing public health system at the district and sub-district levels. Major objectives of this project included the management of DR to be included at all levels of the government health system, augmenting capacity of physicians through a certificate course, ophthalmologists and health support personnel and empowering carers, and people with DM to reduce the risk of DR through increased awareness and self-management. This was the first effort of augmenting the public health system to provide screening and management for DR on such a large scale in India. The pilot was unique in that it brought together the needs of the population, the will of the government and the skills of the mentoring partners to serve a common cause.[20] Study by Raj et al has also showed that AYUSH hospitals could provide a feasible and acceptable location for providing DR screening services.[15] The results of this study will form the basis of a future awareness campaign, as well as the basis of advocacy to health authorities.

Diabetic retinopathy is a leading cause of blindness all around the world. By early screening, blindness from diabetic retinopathy is now largely preventable with timely detection and appropriate interventional therapy. Routine, repetitive, lifelong, expert clinical retinal examination is essential for the fundamental ophthalmic care of the patients with diabetes.[21] In a unique study, it was found that DR patients had more psychosocial impairment as compared to patients without diabetic retinopathy which shows its significant impact on quality of life and on general health status of patients. Psycho-social well-being of the patients should also be improved along with the visual improvement of the diabetic retinopathy patients.[22]

Limitations

Our study included KAP study as well as awareness campaign to analyze the current state of diabetic retinopathy and its practices in India. A significant limitation of KAP study is that it is difficult to postulate our prevalence findings among the community. We found volunteers to conduct campaign and study only from 9 out of 28 states of India. Even though these 9 states are diverse in population, results can still be skewed. Our study mainly included population from cities and not from rural areas due to the availability of volunteers. The actual awareness can still be lower in rural regions. Also, we did not conduct post-campaign survey to see the impact of the awareness campaign. Despite the limitations as mentioned above, this is one of the largest

studies regarding the awareness of diabetic retinopathy in India. Similar surveys should be conducted before and subsequent to the awareness campaign.

CONCLUSION

The study showed a clear lack of knowledge regarding both diabetes and diabetic retinopathy. An alarming percentage of patients were never told about the complication and need for regular fundus examinations by their doctors. Vision impairment related to the disease is preventable and therefore we need to increase its awareness in the population. It is also important for primary care practitioners to understand the low levels of awareness of DM and DR in India so that when they are treating or referring a patient with DR or DM, they explain that DR and vision loss are possible outcomes of the disease. A collaborative approach of Primary care practitioners, ophthalmologists, diabetologist as well as health-policy makers is required to provide needs-based, context-specific comprehensive diabetic care services to the people with DM in India.

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