Awareness of various aspects of diabetes among people visiting tertiary eye care institute in north India

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ABSTRACT

Purpose: The aim of this study was to assess the awareness of the people visiting eye care institute with various aspects of diabetes.

Method: Cross sectional survey was carried out during January to March 2018. Survey instrument was developed with the help of experienced faculty, and literature review. Random sampling was done to identify individual. Participants were considered aware if they were aware of the fact that diabetes could be identified by blood or urine tests. Participants were considered diabetics if they reported being on medication for diabetes. Data was collected by means of personal interview with the participants.

Result: 530 participants were interviewed. A total of 482 (90.9%) participants were aware of diabetes. Of them, 156 (32.4%) respondents were diabetics, and 326 (67.6%) were non diabetics. Overweight 156 (32.4%), and family history 119 (24.7%) were the most common risk factor identified by participants. Among complications, the kidney was cited by 218 (45.2%), and eyes was cited by 228 (47.3%). Only 40 (25.6%) diabetic, and 45 (13.8%) non diabetic participants were aware about diabetic retinopathy. 201 (41.7%) participants knows that taking healthy food can prevent diabetes. Knowledge about diabetes (34.4%) and time (29.3%) were identified as major barrier to diabetes screening.

Conclusion: This study shows that the majority of people visiting a tertiary eye care institute were aware of diabetes. However their knowledge about its risk factors, complications, prevention, and management was poor. Integrated approach among various healthcare providers is required in creating awareness about all aspects of diabetes.

1. Introduction

Non-communicable diseases (NCD) like diabetes mellitus, cardiovascular diseases, cancer, and chronic respiratory diseases are the leading cause of disability and mortality globally.^{1,2} Rising prevalence of DM is a global challenge to public health. The expected number of diabetic patients will rise to 642 million by 2040.³ In 2011, India had 62.4 million people with diabetes.⁴ The overall prevalence of diabetes in India was 7.3%.⁵ Prevalence of diabetes was found to be higher among males in south India, and among females in north India.^{6,7} The association of diabetes with socioeconomic status has been changing. Previously diabetes has been considered to be associated with higher socioeconomic status, now it is also prevalent among lower socioeconomic status.⁸ Literature also suggest that people with lower socioeconomic status were more prone to complications associated with

diabetes.⁸

Family history, environmental factors, sedentary life style, obesity, age, and high blood pressure are important risk factor of diabetes. Good food habit, physical activities, and regular check-up can help people in controlling diabetes. Complications of diabetes are; cardiovascular disease, diabetic neuropathy, diabetic nephropathy, diabetic retinopathy, foot damage, skin conditions, hearing impairment, Alzheimer's disease, and depression.

More than 50% of Indian population still lives in rural areas. Knowledge and awareness about risk factor of diabetes, and its complications is very poor in north India.⁸ Thousand of people (patients and their attendants) are visiting eye care facilities every day. Eye care facilities can also play a pivotal role in educating people about diabetes, and its complications. Murthy et al. also highlighted the needs of an integrated approach where the eye care and diabetic care services work

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Table 1
Sociodemographic characters of the study population.

S.No	Particular	Diabetes aware	Diabetes not aware	Total	p-value
1	Gender				
	Male	300 (62.2%)	31 (64.6%)	331 (62.5%)	0.74
	Female	182 (37.8%)	17 (35.4%)	199 (37.5%)	
2	Previously counselled				
	Yes	181 (37.6%)	9 (18.8%)	190 (35.8%)	0.01
	No	301 (62.4%)	39 (81.2%)	340 (64.2%)	
3	Education Level				
	Illiterate	133 (27.6%)	28 (58.3%)	161 (30.4%)	0.00
	Primary	144 (29.9%)	7 (14.6%)	151 (28.5%)	
	Secondary	109 (22.6%)	8 (16.7%)	117 (22.1%)	
	Graduation and above	96 (19.9%)	5 (10.4%)	101 (19.1%)	
4	Income				
	≤ 10,000 INR	306 (65.5%)	40 (83.3%)	346 (65.3%)	0.01
	> 10,000 INR	176 (36.5%)	8 (16.7%)	184 (34.7%)	
5	Family Member				
	≤ 6 members	379 (78.6%)	33 (68.8%)	412 (77.7%)	0.11
	> 6 members	103 (21.4%)	15 (31.2%)	118 (22.3%)	
6	Age of participants	53.4 ± 10.3 Years	54.8 ± 11.5 Years		0.4

together toward prevention and management of diabetes.⁹ Accordingly, this study aims to assess the knowledge, and awareness about diabetes and its complications among different strata of people attending a tertiary care eye institute in north India. This information is crucial in educating people about diabetes to reduce the future burden of this disease.

2. Methodology

The study was approved by the institutional ethics committee. The study adhered to the principles of declaration of Helsinki. A cross sectional survey among participants aged 18 years and above visiting tertiary care eye institute was conducted from January to March 2018. Participants were randomly selected from a pool of patient's attendants visiting our institute. Quality control system was implemented during data collection to ensure uniformity and accuracy of the data. Identified participants were invited to participate in this survey. The objective of the study was discussed and they were requested to sign the informed consent. Participants who signed the informed consent, or gave their thumb impression were enrolled in the survey. The participants were asked to answer each question face-to-face with one trained interviewer. Each interview took approximately 20–25 min and was conducted at a designated places which was comfortable to all participants. After the interview, general information about diabetes, and its risk factors, complications, and management was provided by the interviewer. Participants were considered aware if they were aware of the fact that diabetes could be identified by blood or urine tests. Participants were considered diabetics if they reported being on medication for diabetes.

In a previous Indian study, knowledge regarding diabetes was reported in 58.4% people.⁹ Based on those findings calculated sample size (prevalence, $p = 58.4\%$ i.e. 0.584, $q = 1 - p$, $\alpha = 0.05$, allowable error, $d = 5\%$ and applying formula $Z_{\alpha/2}^2 pq/d^2$) for this survey was 374. Assuming losses due to incomplete questionnaires at 20%, the sample size was adjusted to 450. Pretested questionnaire was developed with the help of experienced faculty and literature search.¹⁰ Questionnaire consist of demographic factor, and questions to assess awareness, risk factor, prevention, and complication of diabetes. It also contains questions to assess barriers in diabetic screening. Questionnaire had nine questions to assess the demographics, eleven questions to assess the knowledge, risk factors, complications, prevention, two questions to assess socioeconomic status, and one question to assess their attitude about study intervention. Questionnaire was pretested on staff working at the institute to assess its internal consistency. However the data generated during pretesting was not included in the final analysis.

For the purpose of comparison, all the patients were divided in to two groups according to their awareness of diabetes. Participants who were aware of diabetes were further divided into diabetics and non-diabetics.

2.1. Statistical analysis

The statistical analysis was performed with SPSS 17.0 software (SPSS Inc, Chicago, IL, USA). Descriptive statistics were obtained to determine the frequency and proportions. Mean and standard deviation was calculated for continuous variables. Summaries of descriptive statistics and group comparisons are provided, which were made using the unpaired *t*-test for continuous data and the chi square test for proportions.

3. Results

Baseline characteristics of study population: 530 participants were interviewed. Out of them 331 [62.5%, 95% CI: 58.2%–66.4%]] were males and 199 [37.5%, (95% CI: 33.5%–41.7%)] were females. Average age of participants was 35 ± 10.4 years (Range: 35–91 years). 161 [30.4%, (95% CI: 26.6%–34.4%)] of them were illiterate, 151 [28.5%, (95% CI: 24.8%–32.4%)] had primary education, 117 [22.1%, (95% CI: 18.7%–25.8%)] had secondary level, and 101 [19.1%, (95% CI: 15.9%–22.6%)] were graduate and above.

Awareness about diabetes: Of 530 participants, 482 [90.9%, (95% CI: 88.1%–93.1%)] were aware of diabetes (Group 1). Mean age of participants of group one was 53.4 ± 10.3 years. In group 1, 300 [62.2%, (95% CI: 57.8%–66.4%)] participants were males, and 182 [37.8%, (95% CI: 33.5%–42.1%)] were females. All other characteristics are shown in Table 1. Forty eight [9.1%, (95% CI: 6.9%–11.8%)] participants were not aware of diabetes (Group 2). Mean age of group two participants was 54.8 ± 11.5 years. 31 [64.6%, (95% CI: 50.4%–76.5%)] participants of group two were male, and 17 [35.4%, (95% CI: 23.4%–49.5%)] were female. 28 (58%) participants of group two were illiterate. (Table 2). A comparison of all characteristics between male and female of group 1 are shown in Table 3.

Associations of awareness of DM with various social demographic factors: In group one, 156 [32.4%, (95% CI: 25.3%–33.6%)] participants were diabetics, and 326 [67.6%, (95% CI: 63.3%–71.6%)] were non diabetics. Mean age of diabetic participants was 54.2 ± 10.2 years. Of them, 101 (64.7%) were males, and 55 (35.3%) were females. 71 [45.5%, (95% CI: 37.9%–53.3%)] diabetics participants were having family history of diabetes as compared to 99 [30.4%, (95% CI: 25.6%–35.5%)] non diabetic [$p = 0.001$, Chi-square test (OR: 1.9; 95%

Table 2
Characteristics and knowledge of the respondent who were aware of diabetes (Group 1).

S.No	Characteristics	Diabetics	Non diabetics	Total	p-value
1	Gender				
	Male	101 (64.7%)	199 (61%)	300 (62.2%)	0.43
	Female	55 (35.3%)	127 (39%)	182 (37.8%)	
2	Previously counselled				
	Yes	78 (50%)	103 (31.6%)	181 (37.6%)	0.00
	No	78 (50%)	223 (68.4%)	301 (62.4%)	
3	Family History of diabetes				
	Yes	71 (45.5%)	99 (30.4%)	170 (35.3%)	0.01
	No	85 (51.5%)	227 (69.6%)	312 (64.7%)	
4	Education Level				
	Illiterate	36 (23.1%)	97 (29.8%)	133 (27.6%)	0.00
	Primary	48 (30.8%)	96 (29.4%)	144 (29.9%)	
	Secondary	43 (27.6%)	66 (20.2%)	109 (22.6%)	
	Graduation and above	29 (18.6%)	68 (20.6%)	96 (19.9%)	
5	Is diabetes prevalence increasing				
	Yes	124 (79.5%)	263 (80.7%)	387 (80.3%)	0.75
	No/Don't Know	32 (20.5%)	63 (90.3%)	95 (19.7%)	
6	Frequency of diabetes check-up				
	6 months	93 (59.6%)	168 (51.5%)	261 (51.4%)	0.05
	1 year	31 (19.9%)	55 (16.9%)	86 (17.8%)	
	2 year	4 (2.6%)	6 (1.8%)	10 (2.1%)	
	SOS	28 (17.9%)	97 (29.8%)	125 (25.9%)	
7	Diabetes Complication				
	Aware	139 (89.1%)	252 (77.3%)	391 (81.1%)	0.01
	Not aware	17 (10.9%)	74 (22.7%)	91 (18.9%)	
8	Organs that can affect by diabetes				
	Eyes	77 (49.4%)	151 (46.3%)	228 (47.3%)	0.53
	Heart	23 (14.7%)	45 (13.8%)	68 (14.1%)	0.78
	Kidney	65 (41.7%)	153 (46.9%)	218 (45.2%)	0.27
	Brain	11 (7.1%)	29 (8.9%)	40 (8.3%)	0.49
	Lungs	18 (11.5%)	34 (10.4%)	52 (10.8%)	0.71
	Feet	11 (7.1%)	13 (4%)	24 (5%)	0.14
9	Diabetic retinopathy awareness				
	Yes	40 (25.6%)	45 (13.8%)	85 (17.6%)	0.01
	No	116 (74.4%)	281 (86.2%)	397 (82.4%)	
10	Awareness of risk factors of diabetes				
	Aware	117 (75%)	257 (78.8%)	374 (77.6%)	0.34
	Not aware	39 (25%)	69 (21.2%)	108 (22.4%)	
11	Risk factors of diabetes				
	Family history	39 (25%)	80 (24.5%)	119 (24.7%)	0.91
	High blood pressure	26 (16.7%)	60 (18.4%)	86 (17.8%)	0.64
	Mental stress	34 (21.8%)	61 (18.7%)	95 (19.7%)	0.42
	Sedentary life style	15 (9.6%)	46 (14.1%)	61 (12.7%)	0.16
	Overweight	43 (27.6%)	113 (34.7%)	156 (32.4%)	0.11
12	Diabetes can be prevented				
	Yes	107 (68.6%)	221 (67.8%)	328 (68%)	0.82
	No/Don't Know	49 (31.4%)	105 (32.2%)	154 (32%)	
13	How diabetes can be prevented				
	Diet control	65 (41.7%)	136 (41.7%)	201 (41.7%)	0.99
	Regular medications	65 (41.7%)	139 (42.6%)	204 (42.3%)	0.84
	Regular exercise	64 (41%)	131 (67.2%)	195 (40.5%)	0.86
14	Previous eye check-up				
	Yes	104 (66.6%)	220 (67.5%)	324 (67.2%)	0.94
	No	52 (33.4%)	106 (32.5%)	158 (32.8%)	
15	Barrier to diabetic screening				
	Access to healthcare facility	25 (16%)	50 (15.3%)	75 (15.6%)	0.84
	Knowledge about diabetes	60 (38.5%)	106 (32.5%)	166 (34.4%)	0.19
	Cost of healthcare	27 (17.3%)	92 (28.2%)	119 (24.7%)	0.01
	Time	43 (27.6%)	98 (30.1%)	141 (29.3%)	0.57
16	Is this discussion help in understanding diabetes?				
	Yes	145 (92.9%)	301 (92.3%)	446 (92.5%)	0.81
	No	11 (7.1%)	25 (7.7%)	36 (7.5%)	
17	Family Income				
	≤ 10,000 INR	107 (68.6%)	199 (61%)	306 (63.5%)	0.11
	> 10,000 INR	49 (31.4%)	127 (39%)	176 (36.5%)	
18	Family members				
	≤ 6 members	124 (79.5%)	255 (78.2%)	379 (78.6%)	0.75
	> 6 members	32 (20.5%)	71 (21.8%)	103 (21.4%)	

CI: 1.3 to 2.8)]. 124 [79.5%, (95% CI: 72.4%–85%)] diabetic participants felt that prevalence of diabetes has been increasing. Among diabetics, 65 [41.7%, (95% CI: 34.2%–49.5%)] participants were diabetics from 0 to 5 years, 40 [25.6%, (95% CI: 19.4%–33%)] from 6 to 10

years, 25 [16%, (95% CI: 11.1%–22.5%)] from 11 to 15 years, and 26 [16.7%, (95% CI: 11.6%–22.3%)] from 16 to 20 years. Thirty seven [23.7%, (95% CI: 17.7%–30.9%)] of them were type 1 diabetics, and 119 [76.3%, (95% CI: 69%–82.2%)] of them were type 2 diabetics.

Table 3
Distribution of characteristics among males and females (Group 1).

S.No	Characteristics	Male	Female	Total	p-value
1	Previously counselled				
	Yes	125 (41.7%)	56 (30.8%)	181 (37.6%)	0.02
	No	175 (58.3%)	126 (69.2%)	301 (62.4%)	
2	Education Level				
	Illiterate	67 (22.3%)	66 (36.3%)	133 (27.6%)	0.01
	Primary	90 (30%)	54 (29.7%)	144 (29.9%)	
	Secondary	73 (24.3%)	36 (19.8%)	109 (22.6%)	
	Graduation and above	70 (23.3%)	26 (14.3%)	96 (19.9%)	
3	Is diabetes prevalence increasing				
	Yes	243 (81%)	144 (79.1%)	387 (80.3%)	0.61
	No/Don't Know	57 (19%)	38 (20.9%)	95 (19.7%)	
4	Frequency of diabetes check-up				
	6 months	168 (56%)	93 (51.1%)	261 (54.1%)	0.29
	1 year	49 (16.3%)	37 (20.3%)	86 (17.8%)	
	2 year	4 (1.3%)	2 (3.3%)	10 (2.1%)	
	SOS	79 (26.3%)	46 (25.3%)	125 (25.9%)	
5	Diabetes Complication				
	Aware	243 (81%)	148 (81.3%)	391 (81.1%)	0.93
	Not aware	57 (19%)	34 (18.7%)	91 (18.9%)	
6	Diabetic retinopathy awareness				
	Yes	61 (20.3%)	24 (13.2%)	85 (17.6%)	0.04
	No	239 (79.7%)	158 (86.8%)	397 (82.4%)	
7	Awareness of risk factors of diabetes				
	Aware	239 (79.7%)	135 (74.2%)	374 (77.6%)	0.16
	Not aware	61 (20.3%)	47 (25.8%)	108 (22.4%)	
8	Diabetes can be prevented				
	Yes	217 (72.3%)	111 (61%)	328 (68%)	0.01
	No/Don't Know	83 (22.7%)	71 (39%)	154 (32%)	

Awareness of risk factor of diabetes: 117 [75%, (95% CI: 67.6%–81.1%)] diabetic participants said that they were aware about risk factors of diabetes as compared to 257 [87.8%, (95% CI: 74.1%–82.9%)] non diabetics [$p = 0.41$, Chi-square test]. The most common risk factor identified by respondents were: overweight 156 [32.4%, (95% CI: 28.3%–36.6%)] family history 119 [24.7%, (95% CI: 21.1%–28.7%)] mental stress 95 [19.7%, (95% CI: 16.4%–23.4%)] high blood pressure 86 [17.8%, (95% CI: 14.6%–21.5%)] and lack of physical activity 61 [12.7%, (95% CI: 9.9%–15.9%)]

Awareness of complications of diabetes: 139 [89.1%, (95% CI: 83.2%–93.1%)] diabetic participants were aware about at least one complication of diabetes as compared to 252 [77.3%, (95% CI: 72.4%–81.5%)] among non-diabetics [$p = 0.003$, Chi-square test (OR: 2.4; 95% CI: 1.3 to 4.2)]. Among complications, the kidney was cited by 218 [45.2%, (95% CI: 40.8%–49.6%)] eyes 228 [47.3%, (95% CI: 42.8%–51.7%)] heart 68 [14.1%, (95% CI: 11.2%–17.5%)] lungs 52 [10.8%, (95% CI: 8.3%–13.8%)] brain 40 [8.3%, (95% CI: 6.1%–11.1%)] feet 24 [5%, (95% CI: 3.3%–7.3%)] Stomach was also cited by 23 [4.7%, (95% CI: 3.2%–7.1%)] respondent, and one participant said liver can be affected by diabetes.

Awareness of diabetic retinopathy: 40 [25.6%, (95% CI: 19.4%–33%)] diabetic participants were aware about diabetic retinopathy as compared to 45 [13.8%, (95% CI: 10.4%–17.9%)] non diabetics [$p = 0.002$, Chi-square test (OR: 2.1; 95% CI: 1.3 to 3.4)]. 20.3% (95% CI: 16.1%–25.2%) males were aware of diabetic retinopathy as compared to 13.2% (95% CI: 9%–18.8%) [$p = 0.04$, chi square test]. 59 [69.4%, (95% CI: 58.9%–78.1%)] participants who were aware of diabetic retinopathy believe that individual with controlled diabetes can also develop diabetic retinopathy. 127 [81.4%, (95% CI: 74.5%–86.7%)] diabetic participants were aware of that several other underlying medical condition can enhance the damaging effect of diabetes as compared to 221 [67.7%, (95% CI: 62.5%–72.6%)] non diabetic participants [$p = 0.001$, Chi-square test].

Awareness about prevention: 107 [68.5%, (95% CI: 60.9%–75.3%)] diabetic participants felt that diabetes can be prevented as compared to 221 [67.8%, (95% CI: 62.5%–72.6%)] non diabetic

participants [$p = 0.94$, Chi-square test]. 201 [41.7%, (95% CI: 37.3%–46.1%)] participants said that diabetes can be prevented by taking healthy food, 204 [42.3%, (95% CI: 37.9%–46.7%)] said that regular intake of medicine has been required, and 195 (40.5%, (95% CI: 36.1%–44.9%)] said that it can be prevented by doing regular exercise.

Barrier to diabetic screening: 75 [15.6%, (95% CI: 12.6%–19.1%)] participants felt that access to health care facility is the barrier in diabetic screening, 166 (34.4%, (95% CI: 30.3%–38.7%)] said knowledge about diabetes, 119 [24.7%, (95% CI: 21.1%–28.7%)] said that cost, and 141 [29.3% (95% CI: 25.3%–33.4%)] felt that time is the barrier. A total of 446 [84.1% (95% CI: 80.8%–87.1%)] participants felt that this questionnaire based discussion helped them in better understanding of diabetes.

4. Discussion

This study was conducted to assess the knowledge of people coming to a tertiary care eye institute regarding diabetes, its risk factors, complications and prevention. Majority of the participants were aware of diabetes. In general, they know that this is a disease related with sugar level in the body. Most of the people called this “*sugar ki bimari*” (in Hindi). This does not correlate to the study by Muninarayana et al.¹¹ They reported that 50% of diabetic patients in south India had no knowledge of diabetes. Deepa et al. also reported awareness of diabetes among 43.2% people.¹⁰ Hussain et al. reported that 80% people were aware of diabetes.¹² This may be because of the difference in selection of study population, and study area. Majority of the respondents had an opinion that prevalence of diabetes has been increasing.

The higher prevalence of diabetes among males across 15 states of India was reported by Anjana et al.⁵ The present survey reported that there was no difference between males and females regarding diabetes awareness. Although Deepa et al., reported higher awareness of diabetes among males.¹⁰ Most of the participants who were not aware of diabetes were illiterate and belonged to lower income group. Thirty five percent of the participants had attended at least one counselling regarding diabetes from a healthcare providers at any setup. Only 9% of them were not aware of diabetes in general. They do not know that this disease is related to sugar level. This indicate that the counselling done by healthcare providers can help in increasing the awareness of diabetes among population. Educating people to create awareness is the first step in diabetes prevention.¹³ There was no statistically significant difference between age of participants who were aware of, and who were not aware of diabetes.

Although 90% of the participants were aware of diabetes, but more than 50% of them were not aware of its complications. Only 14% of them were aware that diabetes can affect heart. Less than 10% of them know that it can also affect nerves. Deepa et al. also reported similar results.¹⁰ Less than 20% of all participants know that sedentary life style, and high blood pressure could lead to diabetes. However, more than 60% participants were aware that diabetes could be prevented, and around 40% of them know that it could be prevented by regular exercise and diet control.

Diabetic participants were more aware of complications of diabetes, and diabetic retinopathy as compared to non-diabetics. However there was no difference of awareness about risk factors, and prevention of diabetes between diabetic, and non-diabetic participants. Eyes, and kidney were the most cited organs that can be affected by diabetes. Namperumalsamy et al. also reported that most of the people surveyed felt that the eye was most commonly affected by diabetes.¹⁴ Heart, brain, and feet were also cited by many diabetic and non-diabetic respondents. Surprisingly; lungs, and stomach were also cited by few respondents. Lungs was cited by 11% diabetic respondents. This highlight that although people know about diabetes, they do not have complete knowledge about other aspects of diabetes.

Only 17% of the participants who were aware of diabetes, were also aware of diabetes retinopathy. Twenty five percent of the diabetic

participants were aware of diabetic retinopathy. However Alzahrani et al.,¹⁵ Almalki et al.,¹⁶ Lingam et al.,¹⁷ and Lian et al.¹⁸ reported high prevalence of awareness of diabetic retinopathy among diabetic people. Shah et al. reported that 63% of diabetics screened in their study were not aware of diabetic retinopathy.¹⁹ Males were more aware of diabetic retinopathy as compared to females. Illiterate females were least aware of diabetic retinopathy. Similar results has been reported by Hussain et al.,¹² and Bakkar et al.²⁰

Family history of diabetes, and overweight were the major risk factors of diabetes cited by participants. High blood pressure, mental stress, and sedentary life style were also marked. Sixty percent of them mark more than one risk factor. There were no difference of awareness regarding risk factor of diabetes among diabetic and non-diabetic participants. Most of the participants were not aware of that diabetes can be prevented by healthy food, and daily exercise. Few of them said that diabetic people require regular medication to control diabetes.

67% of the participants had their eye examination done previously. However 33% of diabetic participants had not underwent any eye examination by an ophthalmologist. This indicate the need of diabetic retinopathy screening among diabetic people in the study area. Counselling has been provided to them, that even if your vision is stable; you need an eye examination by an ophthalmologist. There are many potentially devastating eye problems that can develop without causing discomfort or distorting vision. Diabetic retinopathy, a serious complication that is more likely to occur in people with Type 1 diabetes but may develop in anyone with diabetes.

Knowledge about importance of regular checkup, available time for routine examination were the most common barrier marked by respondents in getting their diabetes/eye examination regularly. In this study, monthly income of 69% diabetic participants were less than 10,000 INR, compared to 61% of non-diabetic. Previously diabetes was thought to be a disease of rich people.^[9] 93% of the participants feels that this discussion would help them in better understanding of diabetes, its risk factors, complications, management, and prevention.

Diabetes education tool can be designed to empower diabetic patients; focusing on self-management, and possible complications of uncontrolled blood sugar. Since patients and relative spend time in waiting hall this tool can be distributed as a brochure for self-reading so that patients are more careful to monitor their blood sugar levels closely, adhere to the treatment regimen, and do regular physical exercise to control diabetes. This will help them to manage their own condition effectively.

Counselling sessions with family members of patients; who present or referred to the diabetic retinopathy clinic will help in educating them regarding diabetes.

This study shows that the majority of people visiting a tertiary eye care institute were aware of diabetes. However their knowledge about its risk factors, complications, prevention, and management was poor. Knowledge about diabetes, cost of treatment, and access to health care facility were identified as a barrier in diabetic screening. Educating people, affordable treatment, and easy access are the vital components in prevention, management, and control of diabetes. Eye care facilities can also be used in educating people and creating awareness about diabetes.

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Declaration of interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.cegh.2019.05.002>.

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