Demographics and Awareness of Diabetic Retinopathy among Diabetic Patients Attending Department of Ophthalmology at Dhulikhel Hospital

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ABSTRACT

Background

Diabetes mellitus is considered as a major public health concern globally. Poor management of diabetes may lead to several serious complications including end-stage renal disease, diabetic retinopathy, diabetic neuropathy, and cardiovascular complications. Among them diabetic retinopathy is one of the leading causes of visual impairment and blindness in Nepal.

Objective

To assess the demographics and level of awareness among individuals with diabetes about diabetic retinopathy during their visit to Department of Ophthalmology at Dhulikhel Hospital.

Method

A descriptive cross-sectional study was conducted involving all consecutive cases of diabetes mellitus who attended eye clinic with the principal investigator and co-investigator from March 2021 to August 2021. Detailed demographics of the participants, their level of awareness regarding diabetic retinopathy and associated complications were documented. This was followed by a detailed ocular examination intending to screen for the presence of features of diabetic retinopathy.

Result

A total of 260 patients with a mean age of 54 years ± 12.20 (range of 24 - 85 years) were included. The male to female ratio was 2.2:1. Among them, 65.4% of the patients had diabetes mellitus for less than 5 years duration. Diabetic retinopathy was found in 18.46% of the cases. Awareness of diabetic ocular complications was significantly higher among literate population (p = 0.054), among those who have positive family history of diabetes mellitus (p = 0.529) and those who had undergone prior fundus evaluation (p = 0.000).

Conclusion

From result of this study, we can emphasize that there is a necessity for health education in order to increase the awareness and knowledge about diabetic retinopathy to lower the burden of sight threatening complications related with the issue.

KEY WORDS

Awareness, Demographics, Diabetic retinopathy

INTRODUCTION

More than half of the world's diabetics are presumed to be in the Asian countries in likes of Nepal.[1,2] With the rapid rise of diabetes in low- and middle-income countries, about one fifth of individuals with diabetes are projected to have diabetic retinopathy (DR).[3,4] Almost one-fourth of people 20 years and older in urban areas of Nepal exhibits diabetic tendencies as shown in one population-based study.[5] Hence, there is need to provide health education to diabetic patients about the risk factors and probable sight threatening complications due to diabetes, in order to detect complications early for timely treatment. But with limited resources, lower literacy rates and lack of awareness the situation in developing countries such as Nepal is dire.[6-8]

METHODS

This is a single centered based, descriptive cross-sectional study that was conducted from March 2021 to August 2021, after getting ethical approval from Institutional Review Committee of Kathmandu University School of Medical Sciences, Dhulikhel. The study was conducted as per the Declaration of Helsinki. Informed consent was obtained from the patients before enrollment in the study by principal investigator. All patients above age of 18 years who were diagnosed as diabetics, were included in this study. Patients with other ocular co-morbidities that might have altered the response of the questionnaires and ocular conditions hampering complete fundus evaluation were not included in this study. Prevalence of diabetic retinopathy was considered to be 19.4% to calculate the sample size.[9]

Sample size was calculated using the formula;

$n = z^2 p(1-p)/e^2$

where,

n = sample size

z = confidence interval at 95% (standard value of 1.96)

p = prevalence (19.4%)

e = allowable error (5%)

Detailed demographics, education status, occupation, duration of diabetes mellitus, family history of diabetes mellitus, frequency of retinal evaluation and presence of hypertension were noted. Participants were also asked to respond to a standardized 7-point questionnaire (fig. 1) that consisted of questions related to the awareness and knowledge about diabetic retinopathy.[10] All the data concerned with the questionnaire were collected by the principal investigator and co-investigators during the OPD visits of the enrolled diabetic patients. The presenting and best-corrected Snellen visual acuities were recorded. Detailed fundus evaluation was done after pupil dilation under slit lamp biomicroscope (Haag Streit 900) with a Volk 90 D lens. Diabetic retinopathy characteristics, including diabetic macular edema (DME), were graded according to the Early Treatment Diabetic Retinopathy Study classification (ETDRS) report.[11] The data obtained were analyzed in Statistical Package for The Social Sciences (SPSS) version 16 (SPSS Inc, Chicago, IL, USA). Descriptive statistics were reported using means and standard deviations (SD) for continuous variables and frequency with percentages for categorical variables. Normality of data was assessed using Shapiro-Wilk test. Multivariable odds ratio was calculated using Mantel-Haenszel Common Odds Ratio Estimate to estimate any potential risk factors affecting awareness of diabetic retinopathy. The p-value < 0.05 was regarded as statistically significant.

1. Do you know diabetes can affect your eyes?
   a. Yes b. No
2. Do you think individuals with controlled diabetes can develop eye complications?
   a. Yes b. No
3. When do you think you should visit an ophthalmologist?
   a. When blood sugar level is well controlled
   b. When blood sugar levels are poorly controlled.
4. How did you get to know about diabetic retinopathy?
   a. Doctor / nurse / ophthalmologist b. Television/ newspaper/radio
   c. Family/ friends/ relatives with diabetes d. none
5. How frequently do you think you should get your eyes examined?
   a. Don't know b. Yearly
   c. Every 6 months d. Only when vision is affected
6. Do you know what treatment is available for diabetic retinopathy?
   a. Good control of diabetes b. LASER
   c. Surgery d. Do not know.
7. What is the reason for your visit to the ophthalmologist to undergo screening for DR?
   a. Doctor's referral b. Self-awareness

Figure 1. Questionnaire related to awareness and knowledge about diabetic retinopathy

RESULTS

During the study period, total of 260 patients with diabetes mellitus were recruited. The mean age of the population in the study was 54 years ± 12.20 (range of 24 - 85 years) with males to female ratio of 2.2:1. Considering the study demographics, 96.90% of the patients were form province 3, among whom 68.50% of the cases were from Kavre district itself where the hospital is situated. Majority of the patients were homemaker (n = 98, 37.70%), followed by businessmen (n = 62, 23.80%) and farmers (n = 42, 18.50%) (Table 1) and 80% (n=178) of the patients were found to be literate among whom 38.40% (n=100) had completed their school level education.

Considering diabetes and associated issues, 85.40% (n=170) had diabetes mellitus for less than 10 years duration while 14.60% (n=38) of cases had diabetes for more than 10 years. Along with diabetes, notably 42.30% (n=110) also had coexistent systemic hypertension. 47.70% (n =124) of them had positive family history for diabetes mellitus in their first-degree relatives.

Regarding vision, the best corrected visual acuity (BCVA) of right eye was better than 6/18 among 87.7% (n=288) cases

Table 1. Demographic characteristics of the diabetic patients.

Demographics		Frequency	Percentage
Age (years)	< 40	28	11.00
	40-49	68	26.00
	50-59	82	31.50
	60-69	52	20.00
	70-79	24	9.20
	≥ 80	6	2.30
Sex	Female	82	31.50
	Male	178	68.50
Province	1	2	0.80
	2	6	2.30
	3	252	96.90
Occupation	Homemaker	98	37.70
	Business	62	23.80
	Agriculture	48	18.50
	Service	22	8.50
	Others	30	11.50
Education	Illiterate	52	20.00
	Primary level	80	30.80
	Secondary level	28	10.80
	School leaving Certificate level	44	16.90
	Intermediate	26	10.00
	Bachelor and above	30	11.50

Table 2. Diabetes related issues: duration of diabetes mellitus

Duration of diabetes mellitus	Frequency	Percentage
0-5 years	170	65.40
6-10 years	52	20.00
11-15 years	16	6.20
16-20 years	14	5.40
21-25 years	4	1.50
>25 years	4	1.50

while BCVA of worse than 6/18 in 12.30% (n=32) cases. Similarly, in left eye the BCVA better than 6/18 was noted in 90.00% (n=234) cases and BCVA of less than 6/18 in 10.00% (n= 26) cases (Table 3). Further, 28.80% (n=75) of the cases were newly diagnosed as having diabetes mellitus and had undergone fundus evaluation for the first time. Rest of the cases were on their regular follow up. Among them, diabetic retinopathy was found in 18.46% (n=48) of the cases, where 1.50% (n=4) of them were already at the stage of proliferative diabetic retinopathy (Table 4). Clinically significant macular edema was found in 3.07% (n=8) in right eye and 2.31% (n=6) in left eye. Whereas clinically significant macular edema of the both eyes were present in 0.80% (n=2).

Regarding knowledge level about diabetic retinopathy, 82.31% (n=214) patients knew that diabetes mellitus could affect eye. Further, 85.50% (n=222) believed that retinopathy will not occur if diabetes is well-controlled

Table 3. Table showing best corrected visual acuity

Parameters	Right Eye	Left Eye
	Frequency (Percent)	Frequency (Percent)
6/6 - 6/18	228(87.70)	234(90.00)
< 6/18 - 6/60	30(11.50)	18(6.90)
< 6/60 - 3/60	0(0.00)	4(1.50)
< 3/60 - CF	2(0.80)	2(0.80)
HM	0(0.00)	2(0.80)
PL	0(0.00)	0(0.00)
NPL	0(0.00)	0(0.00)

Table 4. Pattern of diabetic retinopathy

Diabetic retinopathy	Right eye Frequency(percent)	Left eye Frequency(percent)
no DR	212 (81.53)	214(82.30)
mild NPDR	28 (10.76)	26(10.10)
moderate NPDR	12 (4.61)	12(4.60)
severe NPDR	4 (1.53)	4(1.50)
PDR	4 (1.53)	4(1.50)

whereas 14.50% (n=40) thought that diabetic retinopathy would develop even with controlled diabetes status. Similarly, about half of the patients (n=132) strongly believed that they should visit an ophthalmologist only when their blood sugar was poorly controlled in order to check for diabetic retinopathy. And to our notable concern, only 28.50% (n= 74) believed they should get their eye examined biannually irrespective of their blood sugar level. Of the 212 individuals who were aware of diabetic retinopathy, 48.50% (n=126) said that their source of information regarding diabetic retinopathy were health care professionals, additional 30.80% (n=80) learned about diabetic retinopathy from family members, friends or relatives who suffered from diabetes and rest learned through mass media. Regarding need of eye examination, 72.30% (n=188) came for their first eye examination after their physician's advice and 27.70% (n=72) came for eye examination on their own. 33.80% (n=88) patients did not have knowledge regarding the requirement of regular follow ups whilst 4.60% (n=12) of them thought they should visit an ophthalmologist only when they have problems with vision (Table 5). approximately 61% (n=158) patients had no awareness regarding the available treatment options for diabetic retinopathy while 3.10% (n=8) of them knew LASER as treatment option for diabetic retinopathy. 1.50% (n=4) of them were under the impression that only surgery was the treatment available for diabetic retinopathy. Further, only 34.60% (n=90) of the respondents knew that achieving good control of diabetes helps preventing development of diabetic retinopathy. While analyzing further, we noted awareness of diabetic ocular complications being significantly higher among literate population, among those with positive family history of diabetes mellitus and those who had undergone prior fundus evaluation (Table 6).

Table 5. Knowledge about frequency of eye examination

Frequency of eye examination	Frequency	Percentage (%)
Do not know eye examination is necessary	88	33.80
Once in a year	28	10.80
Twice a year	132	50.80
Only when eye affected	12	04.60
Total	260	100.00

Table 6. Significant association toward awareness of diabetic retinopathy

Risk factors	Multivariable Odds Ratio (Confidence Interval, 95 %)	P value
Education: literate versus illiterates	2.026 (0.987 to 4.160)	0.054
Family history of DM: yes or no	0.814 (0.428 to 1.546)	0.529
Fundus exam: first time or follow up	0.256 (0.132 to 0.496)	0.000

DISCUSSION

Diabetic retinopathy is becoming one of the biggest issues regarding the ocular problems threatening vision among diabetic population in underdeveloped countries. Environmental factors as well as negligence towards the disease process owing to lack of awareness among the target population has created a huge disease burden among underdeveloped countries. Concerning the issue, we tried to evaluate the status of awareness about diabetic retinopathy and its related issues among the patients with diabetes mellitus who visited our center for their further management. The mean age of population in our study was 54 ± 12.2 years (range of 24-85 years) which was comparable with other hospital-based studies conducted in different parts of Nepal.[7,12] Males outnumbered females in our study unlike many other studies from south Asian region where fe male predominance was noted among diabetic population.[7] However, Thapa et al. from Nepal in her study reported similar distribution of sex as comparable to our study.[12] Demographic similarity in terms of occupation was also noted among studies from within Nepal.[12] Among the study population one fourth of the patients were illiterate. Among those who were literate, less than half of them had completed school level education. These data correlated with current literacy stratification similar to other studies in Nepal.[6] Notably patients who were aware about ocular complications due to diabetes were relatively few in our study compared to other similar studies.[13-16] Nevertheless, the level of awareness noted in this study was slightly better compared to previous studies carried out in Nepals.[7,8]

Considering awareness level, among those who were aware of diabetic eye disease, only half of them had received their information from primary care physicians. This indirectly reflects the need for proper information dissemination at primary point of contact. Further it may indirectly raise questions regarding the quality of available health care system. We noted 2/3rd of the patients came to the ophthalmologist after a primary physician referral whilst only 1/3rd came on their own accord, which emphasizes the important role played by the primary care physicians in increasing the awareness of diabetic retinopathy.[13] This fact is also upheld by another study conducted in Ireland which revealed that physicians advice was a significant factor among diabetic patients to visit an ophthalmologist to receive screening for diabetic retinopathy.[17] Further, it is noted that family members, especially those with positive family history were second significant source of information which was concordant with results from Thapa et al. in 2012.[12] It was noted that among very few significant associations literacy rate and positive family history had major impact on awareness about diabetic eye disease which was similar to study by Shetgar et al. and Thapa et al. and.[10,12]

Although one-third of the total patients considered had history of diabetes of more than 5 years, nearly one third of them never had their fundus evaluated prior. This reflects not only lack of awareness but also lesser referral rates from primary point of contact for ophthalmic evaluation after diagnosis. The rate of diabetic retinopathy cases among our group of patients was 18.46% which was concordant with various other studies.[7,14] Although nearly 80% population answered that diabetes mellitus could affect eye, they were unaware about the need of frequent eye checkup. Similar was the result as mentioned by Saikumar et al. from Kerala.[18] More than 4/5th of the individuals in the study were of the opinion that individuals with controlled diabetes will not develop diabetic retinopathy and half of them also thought they should visit an ophthalmologist only when their blood sugar was poorly controlled. This concerning result was congruent to the results noted in study by Shetgar et al. as well.[10] Even though worse than the results obtained in India, in our study nearly 1/3rd of the respondent was aware that they should get their eyes examined in spite of good blood sugar control, which was one of the positive aspects noted regarding knowledge level among the patients.[18,19]

In regards to treatment options for diabetic retinopathy, only about 4.00% respondents had knowledge regarding treatment options available for diabetic retinopathy whereas more than half were oblivious about the facilities available which is very low considering other studies done abroad.[17] Hence, it is extremely crucial to spread knowledge regarding diabetic retinopathy to motivate the diabetic patients to undergo timely eye examination and get them engaged in a health seeking behavior. However as this is a single centered study with a limited number of study population focusing to particular part of province,

the results gathered might not be representative of all diabetic people from different parts of our country. Hence a multi centered study regarding knowledge attitude and practice model research should be conducted to gather concrete data sets for intervention level work in field of diabetic retinopathy in Nepal.

CONCLUSION

With this study we can understand that it is crucial to spread knowledge regarding diabetic retinopathy through all available medium in order to motivate and encourage the diabetic patients to undergo timely eye examination and engage themselves in health seeking behavior, thereby reducing the sight threatening complications of diabetic retinopathy.

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