Journal of Chitwan Medical College 2021;11(37):45-52
Available online at: www.jcmc.com.np

ORIGINAL RESEARCH ARTICLE

DIABETIC RETINOPAHTY: KNOWLEDGE, ATTITUDE AND PRACTICE

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Received: 7 Jul, 2021

Accepted: 6 Sep, 2021

Published: 30 Sep, 2021

Key words: Attitude; Diabetes mellitus; Diabetic retinopathy; Knowledge; Practice.

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Citation

Giri P, Sah R, Shrestha M, Mansuri RH, Dhital BM, Ranabhat S. Diabetic retinopahty: knowledge, attitude and practice. Journal of Chitwan Medical College.2021;11(37):45-52.

ABSTRACT

Background: Diabetes Mellitus is a metabolic disorder with a multisystemic involvement such as heart, blood vessels, kidneys, nerves including eyes where, hyperglycemia causes loss of pericytes and thus damages retinal capillaries leading to diabetic retinopathy. The aim of this study was to access knowledge, attitude and practice pattern in diabetes patients residing in Chitwan and neighboring districts.

Methods: A community based cross-sectional study was carried out involving diabetes mellitus patients in three districts namely Chitwan, Nawalpur and Gorkha province along with patients who were referred to the hospital. Questionnaire were provided to the patients that accessing knowledge about the ocular complications, attitude and practice concerning diabetes and diabetic retinopathy. General systemic and ocular examinations were performed, including assessment of random blood sugar. The data was collected from March 2019 to June 2019. The collected data analyzed using Statistical Package for Social Studies (SPSS) version 11 (Armonk, IBM, USA).

Results: This study included 500 patients, ranging from 30-85years. Diabetes mellitus was diagnosed at an average age of 60.52±11.47 years (32-89 years) who were mostly being treated with an oral-hypoglycemic agents. About 95.2% of the patients in the screening camp and 96.4% from hospital were aware regarding the ocular complication in diabetes. Diabetic retinopathy prevalence was observed in 28% of the patients out of which 26% were from screening camp and 14.8% were from hospital, in whom bilateral ocular involvement were frequently observed.

Conclusions: The knowledge and attitude of the patient in our study were found to be adequate towards the diabetes and diabetic retinopathy. Nonetheless, this was not executed well in daily practice by the respondents.

INTRODUCTION

Diabetes mellitus (DM) is a metabolic syndrome characterized by hyperglycemia resulting from defects in insulin secretion/ action, or both causing long-term damage, dysfunction, and failure of different organs.[1] The global public health burden of DM is estimated to reach 300 million by 2025 and 366 million by 2030.[2,3] Significant rise in observed globally among adults above 18 years from 4.7% in 1980 to 8.5% in 2014 and approximately 80% of death is estimated, most frequently in low-middle income coutries.[4,5]

Diabetic retinopathy (DR) is an important cause of blindness, and occurs due to chronic damage to the retinal capillaries with global prevalence of 34.6%.[6,7] It is estimated that vision-threatening diabetic retinopathy (VTDR) will increase from 37.3 million to 56.3 million, if prompt action is not taken.[7]

In Nepal, the prevalence of type II DM is 1.4-19%, with prevalence in urban and rural populations is 8.1% and 1% respectively.[8] With the increasing prevalence of DM, the prevalence of DR tends to rise. Early detection of DR and its complications can be reduced to 50% with timely treatment/ regular screening.[9] Community-based prevalence of diabetic retinopathy in Nepal is 9.9%.[10] Early detection of DR prevents irreversible visual impairment, and effective screening methods needs to be formulated for this silently blinding disease.[11]

This study aimed to determine the knowledge, attitude and practice (KAP) in diabetic patients regarding DM and DR, to determine the association between KAP patterns, and to identify barriers to compliance with follow-up and treatment regimens for DM and DR in Chitwan and neighboring districts.

METHODS

A community based cross-sectional study was conducted in three districts; Chitwan in Province No 3 (Bagmati), Nawalpur and Gorkha in province no 4 (Gandaki) of Nepal from March 2019 to June 2019 through DR screening camps. Similarly, diagnosed diabetic patients visiting the eye hospital for DR screening during the same duration were also included in the study for comparison. For the screening camp, preliminary estimation of total population of the proposed area and expected known diabetes mellitus was carried before organizing the DR screening camp. The allocated area falls

under the coverage of Bharatpur Eye Hospital (BEH) and can be categorized as a semi-urban due to rapid urbanization. Local organizing committee or diabetes association of that area is recognized and mutual relationship for the co-ordination and conduction of a screening camp was established. For patients included in the hospital-based screening, self-visit or referral by physician/ endocrinologist were included. The information of the screening camp was disseminated through local newspapers, radio station, television, social media and also by actively mobilizing the volunteers for the program. Provision of a consultant physician and lab facility for the measurement of spot random blood sugar was arranged. Only a diagnosed case of diabetes mellitus were included in the study. Exclusion criteria were children (age less than 18 years), mentally challenged patients who were not able to provide informed consent and respond to the questionnaire, patients with hazy media causing difficulty in adequate visualization of the fundus for grading of diabetic retinopathy, patients with retinal vein occlusion or ocular ischemic syndrome and any other comorbidities other than diabetes mellitus.

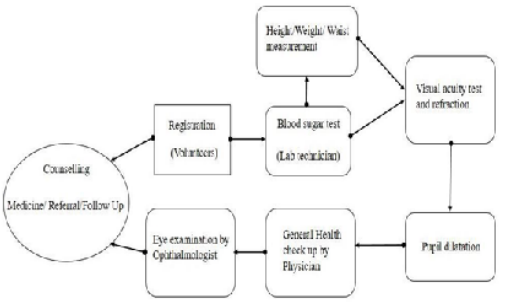

Figure 1: Schema of the implementation of the screening camp

A prepared questionnaire which was validated by World Diabetic Foundation was used to collect the responses from the patients. They comprised of sections on demography, medical history, anthropometric measurements and set of questions on knowledge about ocular complications of diabetes and eye care, attitude and practice with regard to diabetes and diabetic retinopathy (Annex 1). English language questionnaire were translated to Nepali to the participants verbally maintaining privacy by a translator and answers were recorded. A total of eight questions were asked in knowledge and attitude and 12 questions were asked in practice. Written informed consent was obtained from all the participants. The study was approved by the institutional review committee of Bharatpur eye hospital and it adhered to the tenets of declaration of Helsinki.

The examination of the participants was carried out as follows; Baseline visual acuity (VA) was taken by Snellen's visual acuity in an ambient illumination. Blood sample were taken for the estimation of random blood sugar. Aneroid sphygmomanometer along with auscultation of heart sound was used for measurement of blood pressure. For anthropometric measurements wall mountable stadiometer, measuring tape and digital weighing scale were used to assess height, waist/ hip circumference and weight respectively. Recommendations, of BMI cut-off points in Asian population, by WHO was used to define obesity.[12] Dilated fundus examination was carried out with head mounted indirect ophthalmoscope with +20 D lens and slit lamp examination with +90 D lens. Grading of Retinopathy was done according to ETDRS Grading scale[13] and recorded. According to stage of retinopathy patient was given necessary advice. Similarly, hospital-based patients were examined in a same manner. However, fundus photographs were taken for grading of DR as well as documentation in hospital-based patients. All the ocular examinations were carried out by consultant ophthalmologist. The questionnaires were filled up by patient who are literate and/ or by the hospital volunteer who were trained for the purpose of data collection. The data collection was performed in a single sitting.

The collected data was transformed on spreadsheet using Excel version 2013 software (Microsoft, USA) and Statistical Package for Social Studies (SPSS) version 11 (Armonk, IBM, USA) was used for the analysis. Qualitative variables were reported using frequency and percentage. Quantitative data were defined using mean ± standard deviation. Chi square test was applied for categorical variables. p value was calculated at 95% confidence interval and p value <0.05 was considered statistically significant.

RESULTS

A total of 500 patients (250 from screening DR camps and 250 from hospital out-patient department) with known diabetes from three different districts (Chitwan, Gorkha and Nawalpur) were enrolled in the study. The age of respondents ranged from 30 to 85 years with a mean of 59.71 ± 11.53 years in DR screening camps and 61.34 ± 11.39 years in hospital-based camps. Majority of the patients were in the age group of 61 to 70 years (34.4%) in DR screening camps followed by 77 (30.8%) in the hospital-based patients. (Figure 4) Females (68%) were more predominant in the camps with male: female ratio of 1: 2.125, whereas males (60.4%) were predominant in the hospitals with male: female ratio of 1: 0.65. (Figure 6) Majority of the participants were residing in an urban area (Figure 2) and the literacy rate was found to be (38.4%) in the screening group and (69.6%) in the patients visiting the hospitals. (Figure 3) Most of the participants were housewives followed by farmer in the camps whereas farming was the predominant occupation among the service seekers in hospital (Figure 5).

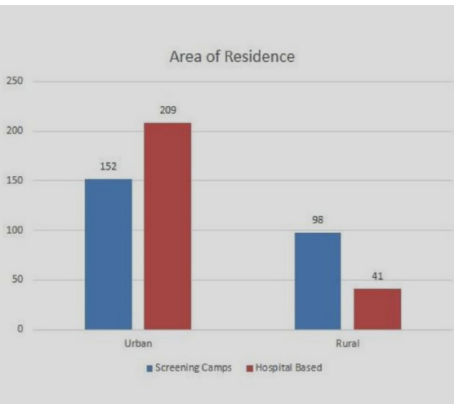

Figure 2: Area of residence

ISSN 2091-2889 (Online) ISSN 2091-2412 (Print) JCMC/ Vol 11/ No. 3/ Issue 37/ Jul- Sept, 2021

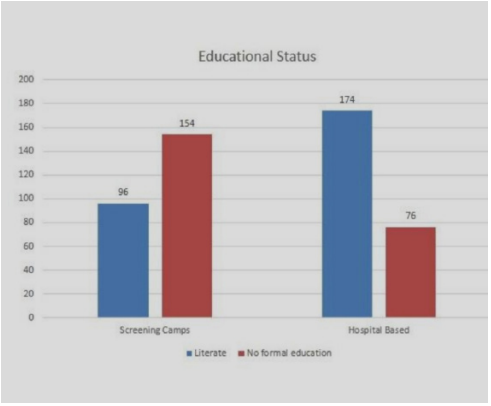

Figure 3: Educational status of the participants

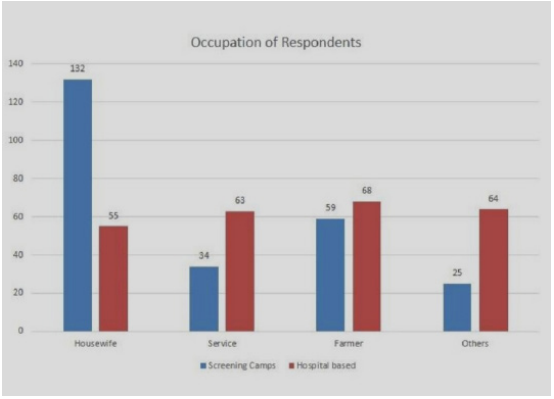

Figure 5: Occupation the respondents

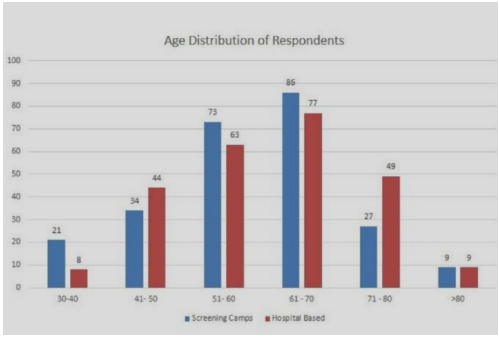

Figure 4: Age of the respondents

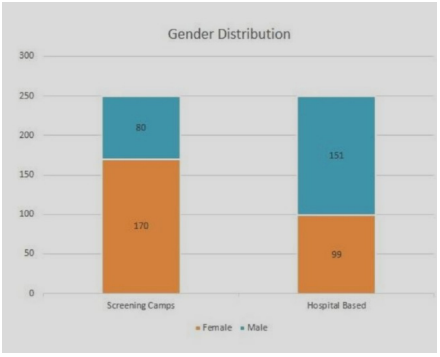

Figure 6: Gender of the participants

Table 1: Clinical characteristics of respondents

Parameters	DR Screening Camps (%) n=250	Hospital based (%)n = 250
Age of respondents at onset of Diabetes		
< 30 years	18 (7.2)	15 (6)
31-40 years	37	(14.8)
41-50 years	56 (22.4)	64(25.6)
51- 60 years	79 (31.6)	65(26)
61-70 years	50(20)	51(20.4)
> 70 years	10(4)	22(8.8)
Duration of Diabetes among the respondents		
0-5 years	120(48)	119(47.6)
6-10 years	69 (27.6)	66(26.4)
11- 15 years	33(13.2)	27(10.8)
> 15 years	28(11.2)	38(15.2)
Current management of diabetes		
Oral medicines	210 (84)	225 (90)
Insulin	17(6.8)	22(808)
Lifestyle Modifications	14(5.6)	2 (0.8)
None	9 (3.6)	1 (0.4)
Hypertension among respondents		
Yes	106(42.4)	97(38.8)
No	144 (57.6)	153 (61.2)
Family history of diabetes		
Yes	50(20)	68(27.2)
No	200(80)	182(72.8)

The average age at the diagnosis of diabetes was 60.52 ± 11.47 years (range 32-89 years) and the diagnosis of diabetes among the respondents was confirmed within five years in both groups. Most of the respondents were under oral hypoglycemic agents in both the groups, similarly 9/250 (3.6%) denied any form of measures to control diabetes in screening camps and only a single patient in hospital based denied any form of controlling measures. Majority of respondents 144/250 (57.6

%) in the screening camps and 153/250 (61.2 %) in the hospital-based patients did not report to have hypertension as well as only around one fifth (23.6%) of respondents in the DR camp group and (27.2%) in the hospital-based participants had family history of diabetes (Table 1).

Among 203 hypertensive patients, only 175 mentioned the exact year of onset (non-response is 28). Out of 269 female respondents, only 167 respondents recalled the information about their child. Of the total 167, nine had child with birth weight more than four kg and 158 had child less than four kg. The anthropometric parameters and the average blood pressure values of the respondents measured at the time of examination were depicted in Table 2 and 3. The waist/ hip ratio was lower in DR camp respondents 0.98 ± 0.054 compared to hospital-based patients of 1.01 ± 0.115. Similarly, mean BMI was within a normal range of 22.86 ± 3.7 in hospital-based patients and overweight in camp-based respondents.

Table 2: Mean anthropometric parameters and measured blood pressure values

	Waist measurement (cm)	Hip measurement (cm)	Height(mt)	Weight kg)	Blood pressure (systolic)	Blood pressure (diastolic)
DR Screening camps	94.11± 21.41	95.86 ± 21.62	1.49 ± 0.08	62.4 ± 10.78	127.8 ± 15.82	79.96 ± 10.43
Hospital Based	94.11± 21.41	62.07 ± 32.36	1.69 ± 0.06	65.61 ± 9.31	124.98 ± 15.51	79.88± 9.50

Table 3: Waist/Hip circumference ratio and Body Mass Index (BMI)

Parameters	DR Screening camps (%) n = 250	Hospital Based (%) n = 250
Waist/Hip Measurement		
<0.85	5 (2)	2 (0.8)
0.85 – 0.9	20(8)	14(5.6)
0.9 – 0.95	26(10.4)	36 (14.4)
0.96 – 1	118 (47.2)	70(28)
>1	81(32.4)	128 (51.2)
Overall	0.98 ± 0.054	1.01 ± 0.115
BMI		
Underweight	2 (0.8)	21 (8.4)
Normal	77(30.8)	165 (66)
Overweight	96(38.4)	54(21.6)
Obese	75(30)	10(4)
Mean	28.05±5.64	22.86±3.7

Among the 500 respondents after VA test and dilated fundus examination, majority had no evidence of diabetic retinopathy (66.8%) in the camp group compared to (77.2%) in the hospital-based participants. Similarly, ocular findings of diabetic retinopathy were found in 140 (28%) respondents out of which (26%) in camp and (14.8%) in hospital group had bilateral involvement. Mild grade of DR changes was commonly found in both groups (Table 4).

Table 4: Details of ocular findings among the diabetic respondents

Parameters	DR Screening camps (%) n = 250	Hospital Based camps (%) n = 250	p- value
One eye	18(7.2)	20(8)	0.008
Both eyes	65(26)	37(14.8)	
No involvement	167 (66.8)	193 (77.2)	
Parameters	**DR Screening n= 83**	**Hospital Based n=57**	
Mild	50 (35.7)	29(20.7)	0.096
Moderate	23 (16.4)	13(9.3)	
Severe	10 (7.1)	15(10.7)	

Adhering to the pre-set questionnaire with regard to knowledge and attitude of diabetic respondents, (95.2%) in camp and (96.4%) in hospital group were aware that eyes may be affected in patients with diabetes. The participants were found aware of the complications of diabetic retinopathy which may lead to blindness. They were also aware that control of diabetes can reduce the potential blinding ocular complications. Most of them 227/250 (90.8%) compared to 222/250 (88.8%) were conscious about the complications that can occur at any age in the camp group and hospital group respectively. Majority 229(91.6%) in camp compared to 247 (98.8%) in the patient visiting hospital knew about the importance of regular eye check-up which has to be done by an ophthalmologist, the response was 242 (96.8%) in camp compared to 246 (98.4%)

in the hospital group. With lifestyle modification, respondents were found knowledgeable about the possibility of reducing the complications with control of diet and regular physical exercise respectively. However, with regard to treatment, majority of the participants were also found aware that control of diabetes is not possible with medications alone or with insulin injection and they all agreed upon a holistic approach for control of diabetes (Table 5).

Table 5: Knowledge and attitude about diabetes and eye among the respondents

Parameters	DR Screening camps (%) n = 250	Hospital Based (%) n = 250	p-value
The eyes may be affected in person with diabetes			
Yes	238 (95.2)	241 (96.4)	0.209
No	5(2)	7 (2.8)	
Don't know	7(2.8)	2 (0.8)	
Persons with diabetes may become blind			
Yes	225 (90)	240 (96)	0.021
No	13 (5.2)	7 (2.8)	
Don't know	12 (4.8)	3 (1.2)	
Control of diabetes can reduce complications			0.058
Yes	237 (94.8)	245 (98)	
No	5(2)	4 (1.6)	
Don't know	8(3.2)	1 (0.4)	
Complications from diabetes can present at any age			
Yes	227 (90.8)	222 (88.8)	0.737
No	3(1.2)	3 (1.2)	
Don't know	20(8)	25 (10)	
People with diabetes have to check their eyes regularly			
Yes	229 (91.6)	247 (98.8)	0.001
No	9 (3.6)	2 (0.8)	
Don't know	12(4.8)	1 (0.4)	
Eye check-up for diabetes has to be done by			
Eye Doctor	242 (96.8)	246 (98.4)	0.242
Physician	8 (3.2)	4 (1.6)	
Control of diet can reduce complications of diabetes			
Yes	245 (98)	250 (100)	0.080
No	2 (0.8)	-	
Don't know	3 (1.2)	-	
Control of diabetes is possible only with injections			
Yes	13(5.2)	4 (1.6)	0.001
No	208 (83.2)	243 (97.2)	
Don't know	29 (11.6)	3 (1.2)	

The knowledge was not translated into the regular practice in the lifestyle of participants. With regards to application of measures in regular practice, it was found that only less than half of the participants 114 (45.6%) in camp group compared to 117 (46.8%) in the hospital-based group were doing some form of daily exercises but none the less, around half of them reported irregular form of exercise. The respondents reported an ocular examination by an ophthalmologist 246 (98.4) in camps and 248 (99.2%) in hospital participants, the majority of which they underwent within a period of one year. There was a disparity in reporting of the blood sugar, where most of them reported checking the blood sugar once in a month basis, but upon inquiry it was found that the respondents last checked their blood sugar between three to six months 233 (93.2%) in camps and 234 (93.6%) in hospital participants earlier. The participants proclaimed reduced dietary intake since the diagnosis of diabetes, where the hospital-based participants were found more robust 232 (92.8%) in comparison to 175 (70%) in the camp participants. Only less than half were able to reduce their body weight. Among those who reduced their weight, 47 (27.1%) in the camp-based participants and 35 (20.1%) of hospital-based patients claim to reduce their weight by five to ten kg. Majority 178 (71.2%) in the camps and 207 (82.8%) in hospital-based participants reported an appointment with the physician within the last three months. A number comprising of 119/250 (47.6%) of camp participants claim to visit the doctor on a monthly basis and (44%) of the hospital-based patients followed up as advised. Majority 218 (87.2) in camps compared to 227 (90.8%) denied smoking or chewing tobacco. Among the smokers, they recounted smoking up to three sticks per day in 21/55 (38.2%) camp participants to 15/55 (27.3%) in hospital patients (Table 6).

Table 6: Practice pattern among the respondents

Parameters	DR Screening Camps (%) n = 250	Hospital Based (%) n = 250	p value
Exercise by respondents			
Daily	114 (45.6)	117 (46.8)	0.801
Weekly	6 (2.4)	4 (1.6)	
Irregular	130 (52)	129 (51.6)	
Last check up of eyes by respondents			
< 12 months	< 12 months	186 (74.4)	0.757
> 12 months	61 (24.4)	64 (25.6)	
Eye examination done with			
Eye doctor	Eye doctor	248(99.2)	0.411
General doctor	4(1.6)	2(0.8)	
Last check-up of blood sugar			
3-6 months	233(93.2)	234(93.6)	0.283
7-12 months	4(1.6)	8(3.2)	
> 12 months	13(5.2)	8(3.2)	
Reduced diet since diagnosis of diabetes by respondents			
Yes	175(70)	232(92.8)	0.001
No	64(25.6)	15(6)	
Not necessary	11(4.4)	3(1.2)	
Reduced weight since diagnosis of Diabetes by respondents			
Yes	94(37.6)	88(35.2)	0.001
No	118(47.2)	88(32)	
Not checked	38(15.2)	82(32.8)	
Level of weight reduced by respondents (n=174)			
< 5 kg	34(19.5)	30(17.2)	0.14
5-10 kg	47(27.1)	35(20.1)	
> 10 kg	10(5.7)	18(10.4)	
Last visit to doctor for Diabetes control by respondents			
< 3 months	178(71.2)	207(82.8)	0.013
3-6 months	37(14.8)	26(10.4)	
7- 12months	9(3.6)	6(2.4)	
> 12 months	26(10.4)	11(4.4)	
Visit doctor for Diabetes control by respondents			
Monthly	119(47.6)	88(35.2)	0.001
As per advice	30(12)	110(44)	
Irregular	101(40.4)	52(20.8)	
Habit of smoking/chewing tobacco by respondents			
Yes	32(12.8)	23(9.2)	0.198
No	218(87.2)	227(90.8)	
Smoke for per day by respondents (n= 55)			
1-3 cigarette	21(38.2)	15(27.3)	0.633
3-5 cigarette	9(16.4)	5(9.1)	
6-10 cigarette	2(3.6)	2(3.6)	
More than 10 cigarettes	2(1.2)	1(1.8)	
Duration of smoking by respondents (n = 55)			
0- 5 years	14(24.5)	5 (9.1)	0.225
6-10 years	8 (14.5)	7 (12.7)	
More than 10 years	10 (18.2)	11 (20)	

DISCUSSION

This was a community based cross-sectional study conducted with 500 participants, which documented the KAP patterns of diabetic patients regarding diabetes and diabetic retinopathy. This study was done among the participants who were screened for DR in screening camps in the catchment areas of the eye hospital and also among the hospital referred patients.

Our study showed female preponderance of diabetes which

is similar to the national data of Nepal dated 2014, and more prevalent in urban area than rural area.[8] This gender preponderance[14] also points towards the daily work schedule where our study revealed house makers being majority affected with diabetes. The urbanization and sedentary life style have increased the risk of diabetes also in those without positive family history.[15]

The questionnaire prepared to assess knowledge and attitude of diabetic retinopathy in our study were designed to assess both awareness and knowledge of diabetic retinopathy. Just having heard about the disease is awareness, while having understood the disease is knowledge.[16] A study highlighted while awareness of the disease is important, more important in influencing attitude and practice patterns regarding the disease is having good knowledge of the disease.[17] Our study reflected that, respondents were aware that diabetes may affect eyes as a complication of the disease itself (95.8%), and it may lead to potential vision threatening blinding condition (93%).

Participants were fully aware that the complications of diabetes can occur at any age (89.8%) and control of diabetes lead to reduced complications of diabetes (96.4%). They were acquainted with the importance of ocular examination (95.2%) and it needs to be done by an ophthalmologist (97.6%). The participants agreed to the control of diet (99%) and regular exercise (96%) can lead to reduction in the complications of diabetes. Our respondents were found aware of the situation where they were found aware. The knowledge and attitude of our respondents is found adequate towards diabetes and diabetic retinopathy.

Good knowledge about the disease was significantly associated with positive attitude and good practice patterns.[17] However, this knowledge and attitude was not found applied in daily practise by our respondents. Not only among the study participants, a study from Nepal among the physicians who are managing diabetic patients despite good knowledge and attitude revealed a below average practice level.[18]

The overall prevalence of diabetic retinopathy was found to be comparatively higher in camp screening patients 83/250 (33.2%) compared to patients referred to hospitals 57/250 (22.8%). Various literature from hospital based study report a prevalence of diabetic retinopathy ranging from 19% to as high as 78%.[10, 19, 20, 21] The global prevalence of DR was reported to be 34.6%.[22] Our study contradicts the findings of other reports where prevalence of DR was higher in hospital based studies which is attributed to the diabetic patients reporting to the retina department owing to visual complains.[10, 23] The findings of our study represents the increased burden of diabetes and its complication in a community scale which is mostly under reported.

The BMI was also found higher in camp patients compared to hospital-based patients. Studies from Nepal revealed no such association of anthropometric indices with DR,[10] in contrast to which a strong association of BMI and waist circumference with DR was reported. This study showed that obese participants were 3 times more likely to have retinopathy.[24]

There are several limitations with our study. We were not able to perform diagnostic optical coherence tomography in screening camps which would have enabled us to quantify the macular thickness and compare it with diabetic population visiting the hospital. This cohort of diabetic respondents may not represent the entire diabetic population within this catchment area or the nation. A larger multicentric, study with larger number of participants is strongly suggested. Behavioral change communication and lifestyle modification measures ought to be taught to the diabetic individual to be implemented in their daily life to regulate the blood sugar and also to prevent from the complications of diabetes.

CONCLUSION

The results of the present study revealed that knowledge and attitude about diabetic ocular complications and eye care was found adequate among the screened diabetic individuals. Increased number of health care centers in these regions in recent years, media and the health education provided to the diabetic individual may have improved the knowledge and attitude towards diabetic retinopathy. However, a lacunae in implementation of these knowledge and attitude in the daily practice is strongly felt. Lack of awareness concerning the screening for retinopathy was a major barrier to regular screening. Hence, an urgent need to educate about this potentially blinding complication of diabetes and applying these measures in daily routine is felt to improve practice among the diabetic patients.

ACKNOWLEDGEMENT

The author would like to thank Mr. Ramesh Ghimire and Mr. Prasanna Sharma

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

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