

# Diabetic Patients' Awareness of Diabetic Retinopathy Complications in Parsa, Nepal: Community-Based Cross-Sectional Study

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**Abstract:** *Diabetes mellitus is a growing problem in Nepal, but the awareness of diabetic retinopathy is very poor. In addition to that, some patients didn't visit the ophthalmologist for the routine eye examination. All of this indeed will increase the demand for better diabetes education to make DM patients more aware about their conditions and related complication. This study aims to assess the level of awareness for DR among diabetic patients in Parsa, Nepal. This cross-sectional community-based study was conducted on 280 diabetic patients in Parsa, Nepal. Data were collected through a formal interview method. This study used DR awareness questionnaire which was developed from previously published studies. From the results it was revealed that the awareness of DR among the diabetic patients was very poor. Around 60% of the diabetic patients believed that diabetes could not affect their eyes and blindness. The results of the present study was also revealed that large proportion of the diabetic patients was believed there was no need for the regular screen for DR if both eyes are good and. The present study was also reported that about 54% of the diabetic patients were check up their eyes only when vision was affected. Diabetes is a growing problem in Nepal, but awareness of DR is very poor. Our study found that the awareness of DR among the diabetic patients in Nepal was very poor. It was recommended that the Nepali population should be sensitised about diabetic eye diseases.*

**Keywords:** Awareness; Diabetes mellitus; Diabetic retinopathy; Eye screening

## 1. Introduction

Diabetes mellitus (DM) is a disease which characterized by a chronic increase in blood glucose. In 2017, it was estimated that about 8.8% of the adult population worldwide were diabetics [1]. Most patients were aged above 60 years and prominent in countries classified high-income countries. However, in low and middle income countries, most patients were at age 40–60 years old [1]. Whiting et al. [2] estimated that there will be a rise to 522 million people with diabetes in 2030. In Nepal, the prevalence of diabetes among people aged 20 years and above to be 14.6% and the prevalence among people aged 40 years and above to be 19% [3].

DM is a global burden due to its systemic complications that affect different parts of the body [1,4]. DM has many complications, including neuropathy, nephropathy, cardiovascular disease, and diabetic retinopathy (DR). DR is a condition that may occur in people who have diabetes. It causes progressive damage to the retina. DR is a serious sight-threatening complication of diabetes. It constitutes 4.8% of the global causes of blindness. DR is a silent disease, early detection and intervention is essential for its management and prognosis [5]. DR is the main cause of visual impairment in middle-aged and elderly people [6]. Over one-third of estimated diabetic patients have signs of DR, and severe signs of DR are presented in a third of them. Severe signs include non-proliferative diabetic retinopathy or proliferative diabetic retinopathy or the presence of diabetic macular edema [7]. Also, about 75% of patients with more than 20 years of DM are expected to develop DR or diabetic macular edema [8]. It is recognized that more than 77% of patients who survive for over 20 years with diabetes are affected by retinopathy [9]. It is estimated that 10.2 million US adults 40 years and older known to have diabetes, the

estimated prevalence rate for developing DR was 40.3% [10]. Several studies reported DR in 19-47% of diabetic patients in Nepal [11-14].

Diabetes mellitus is a growing problem in Nepal, but the awareness of diabetic retinopathy is very poor [11-14]. In addition to that, some patients didn't visit the ophthalmologist for the routine eye examination. Patient awareness to DR will be the key to further improvements in DR management and prevention. Patients should be informed that they play an integral role in their glycemic control and eye care. There is a lack of studies to assess the level of knowledge about DR among DM patients and find associated factors with low DR awareness in Nepal. This study aims to assess the level of awareness for DR among diabetic patients in Parsa, Nepal.

## 2. Method

This cross-sectional community-based study was conducted between December 2018 to May 2019 in Parsa, Nepal. Sample size for the study was calculated based on estimating the awareness of diabetes retinopathy among diabetics patient. Anticipating a percentage of 45.3% awareness with 95% confidence level with 5% margin error, the minimum recommended sample size is 265 [15]. The study included 280 diabetics patient (male:145; female: 135) who were 18 years or older. Data were collected through a formal interview method. Baseline characteristics and measurements of the study participants such as blood pressure, height and body weight were obtained at the time of visit. The socioeconomic data; duration of diabetes, type of medication, education level, income, smoking, alcohol intake, physical exercise, etc. of the participants were

recorded. Participants with type I diabetes and patients with gestational diabetes were excluded from the study.

This study used DR awareness questionnaire which was developed from previously published studies [16,17]. Questions consist of 10 items that aim to assess the DR knowledge and awareness. The questionnaire composite of 10 questions: 3 of them about diabetic retinopathy knowledge, 5 questions about screening and 2 of them about prevention and treatment (Table 1). Patients who answered > 60% of the questions correctly were considered to have good knowledge about DR. The study was approved by the Institutional Review Board. After a written informed consent was obtained, a DR awareness questionnaire was administered by a physician to the patients.

**Table 1:** Knowledge and Awareness Questionnaire of DR

<i>Knowledge and Awareness Questionnaire</i>	
Do you think that Diabetes could affect the eye?	Yes / No
Do you think that DM could cause blindness?	Yes / No
Have your eyes been checked by a doctor last year?	Yes / No
No need for the regular screen for DR if both eyes are good.	Yes / No
Do you think a good control of Diabetes might prevent DR?	Yes / No
Can a diabetic patient have eye problems at the same time of Diabetes diagnosis?	Yes / No
How frequently should a person with diabetes undergo an eye checkup?	Every 6 months - Yearly or every 2 years - Only when vision affected
When you have diabetes at the first time, you must screen your eye.	At the time of diabetes diagnosis - 5 years after diabetes diagnosis - only if there are eye symptoms
Do you think retinopathy is a treatable condition?	Yes / No
Do you think seeing optometrist (regular eyeglass store) is enough for people with diabetes?	Yes / No

Data were presented by sex. Mean and standard deviation were used for continuous variables and frequency and percentage were used for categorical variables to summarize data. To test the significant difference of different categorical variables, Chi-square test was performed. Statistical analysis was done using SPSS version 20. The level of significance was set at  $p < 0.05$ .

### 3. Results

This study included 280 Nepali participants with an average age was  $53.82 \pm 13.97$  years. The socio-demographic and health characteristics of participants were shown in Table 2 according to the sex. Of the 280 participants, 51.79% were men and 48.21% were women. The mean ages of men and women were  $53.48 \pm 13.63$  years and  $54.17 \pm 14.15$  years respectively. No significant difference in mean age was obtained between the sexes. The mean values of BMI and blood pressure of the participants were within the normal

range. In case of men participants, more than 60% of the participants were smoked and 28.27% participants were drunk. Whereas; in case of women participants the alcohol intake was fairly low (5.92%) and only 10.37% of participants were reported smoked. More than 60% of the participants were rural residence. Engaging in regular physical activity among the participants was low (men-13.1%; women-8.89%). Large proportion of the study participants were illiterate or just able to sign (men-29.65%; women-37.78%). Per capita annual income of the study participants was also low. Regarding the disease duration, 20.7% men and 22.96% women were diagnosed with diabetes mellitus <5 years, 44.83% men and 42.96% women between 6 and 10 years and 34.48% men and 34.07% women for more than 10 years. Type of medication of the participants was also studied and from the results it was noted that about 42% men and 53% women was regularly used blood glucose lowering tablets; 39% men and 36% women was used insulin and 19% men and 11% women was used both blood glucose lowering tablets and insulin. Among the participants; 38.62% men and 43.7% had diabetic related eye problems. The results also reported that 12.41% man and 10.37% women had family history of eye disease related to diabetes.

Table 3 shows the results of awareness for DR among diabetic patients. The vast majority of participants believed that diabetes could not affect their eyes (59.29%) and blindness (62.86%). The vast majority of participants believed that controlling their blood sugar cannot preserve their vision (62.14%). Among the participants, only 42.07% men and 39.26% women were aware of diabetic related eye problems. Around 70% of the diabetic participants could not check their eyes by a doctor in last year. Large proportion of the participants was believed there was no need for the regular screen for DR if both eyes are good and about 54% of the participants were check up their eyes only when vision was affected or if there are eye symptoms occur.

**Table 2:** Socio-demographic and health characteristics of participants (n=280)

Variable		Male (n=145)	Female (n=135)
Age (years)		53.48±13.63	54.17±14.15
Height (cm)		164.54 ±8.55	152.79±9.07
Weight (kg)		62.98±9.85	55.54±9.74
BMI (kg/m <sup>2</sup> )		23.26±4.16	23.79±4.27
Blood pressure (mm Hg)	Systolic blood pressure	134.22±5.41	131.05±17.51
	Diastolic blood pressure	86.71±2.45	88.01±13.01
physical work		19 (13.1%)	12 (8.89%)
Alcohol intake		41(28.27%)	8 (5.92%)
Smoking		89 (61.38%)	14 (10.37%)
Residence	Rural	88 (60.69%)	84 (62.22%)
	Urban	57 (39.31%)	51 (37.78%)
Educational status	Illiterate/ able to sign	43 (29.65%)	51 (37.78%)
	Primary	78 (53.79%)	72 (53.33%)
	Secondary or above	24 (16.55%)	12 (8.89%)
Income (NRs)	<1000	35 (24.14%)	28 (20.74%)
	1000-3000	68 (46.9%)	76 (56.3%)
	>3000	42 (28.96%)	31 (22.96%)
Duration of diabetes	Less than 5 years	30 (20.7%)	31 (22.96%)
	In 5-10 years	65 (44.83%)	58 (42.96%)

(%)	More than 10 years	50 (34.48%)	46 (34.07%)
Type of medication	Tablet	61 (42.07%)	71 (52.59%)
	Insulin	56 (38.62%)	49 (36.3%)
(%)	Tablet and insulin	28 (19.31%)	15 (11.11%)
Eye problem due to diabetes		56 (38.62%)	59 (43.7%)
The family history of eye disease related to diabetes		18 (12.41%)	14 (10.37%)

**Table 3:** Knowledge and Awareness Questionnaire with the percentage of the correctly answered

Knowledge and Awareness Questionnaire	Correct answer	Male (n=145)	Female (n=135)	$\chi^2$ (p)
Do you think that Diabetes could affect the eye?	Yes	61 (42.07%)	53 (39.26%)	0.229 (NS)
Do you think that DM could cause blindness?	Yes	57 (39.31%)	47 (34.81%)	0.605 (NS)
Have your eyes been checked by a doctor last year?	Yes	44 (30.34%)	40 (29.63%)	0.017 (NS)
No need for the regular screen for DR if both eyes are good.	No	39 (26.9%)	33 (24.44%)	0.22 (NS)
Do you think a good control of Diabetes might prevent DR?	Yes	55 (37.93%)	51 (37.78%)	0.001 (NS)
Can a diabetic patient have eye problems at the same time of Diabetes diagnosis?	Yes	43 (29.65%)	38 (28.15%)	0.077 (NS)
How frequently should a person with diabetes undergo an eye checkup?	Every 6 months	8 (5.52%)	3 (2.22%)	2.011 (NS)
	Yearly	23 (15.86%)	13 (9.63%)	2.424 (NS)
	Every 2 years	43 (29.65%)	40 (29.63%)	0.00 (NS)
	Only when vision affected	71 (48.96%)	79 (58.52%)	2.565 (NS)
When you have diabetes at the first time, you must screen your eye.	At the time of diabetes diagnosis	2 (1.38%)	0 (0.00%)	-
	5 years after diabetes diagnosis	31 (21.38%)	16 (11.85%)	4.543 (p<0.05)
	Only if there are eye symptoms	112 (77.24%)	119 (88.15%)	5.76 (p<0.05)
Do you think retinopathy is a treatable condition?	Yes	98 (67.59%)	74 (54.81%)	4.813 (p<0.05)
Do you think seeing optometrist (regular eyeglass store) is enough for people with diabetes?	No	88 (60.69%)	71 (52.59%)	1.868 (NS)

#### 4. Discussion

DM damages small blood vessels throughout the body and including retina. DR occurs when these tiny blood vessels are damaged and leak blood and other fluids which cause

swelling of retinal tissue and resulting in cloudy or blurred vision. DR usually affects both eyes. The longer a person has diabetes, the more likely they will develop DR. If left untreated, DR can cause blindness. The Nepal Diabetes Association reported that in urban areas diabetes affects approximately 15% of people aged 20 years and above [18]. Several Studies on DR in different areas of Nepal reported that the prevalence of DR varies between 19 to 47% among the diabetic patients in Nepal [11-14]. A recent study in India quoted the prevalence rate of diabetic retinopathy to be 21.27% in diabetic patients with a range of 12.27% in the central zone and 34.06% in the north zone [19].

From the results it was revealed that the awareness of DR among the diabetic patients was very poor. Around 60% of the diabetic patients believed that diabetes could not affect their eyes and blindness. Our finding was consistent with another study by Shrestha et al. [20] in Nepal reported that less than 30% of people having diabetes are aware of diabetic eye disease.

The results of the present study were also revealed that a large proportion of the diabetic patients believed there was no need for the regular screen for DR if both eyes are good and. The present study was also reported that about 54% of the diabetic patients were checked up their eyes only when vision was affected. Our finding was consistent with Thapa et al. [21]. Thapa et al. [21] reported that almost 50% of diabetic patients in Nepal never had a retina evaluation despite having lived with diabetes for more than 10 years. Paudyal et al. [22] reported that the diabetic eye care services in Nepal are not integrated with comprehensive diabetes management. Limited access to DR screening and vitreo-retinal services is the major barrier for service utilization. As a result, people with diabetes often reach eye health providers with late stage, sight-threatening DR [22].

#### 5. Conclusion

Diabetes mellitus is a growing problem in Nepal, but the awareness of diabetic retinopathy is very poor. Our study found that about 60% of the diabetic patients believed that diabetes could not affect their eyes and blindness. A large proportion of the diabetic patients believed there was no need for the regular screen for DR if both eyes are good and about 54% of the diabetic patients were checked up their eyes only when vision was affected. It was recommended that the Nepali population should be sensitized about diabetic eye diseases.

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