

# Correlation between types of diabetic retinopathy and its psychosocial impact

Chinmay T Jani, Tejas Desai, Sonal Parikh, Aashka A Shah, Sonali Katara

**INTRODUCTION:** Diabetic retinopathy affects majority (70% to 90%) of diabetic patients, causes visual impairment which leads to severe psycho-social disruption in life. Our objective was to study the patients of diabetic retinopathy, co-relate between the types of diabetic retinopathy and the extent of psychosocial impairment in these patients.

**MATERIALS AND METHODS:** Data of the diabetic patients attending the Retina Clinic of C.H. Nagri Eye Hospital, Ahmedabad was collected using a pretested questionnaire. It included ocular history, history related to diabetes, data of ocular examination and type of retinopathy (if present). For psycho-social assessment, the patients were made to fill the validated Gujarati language version of "General Health Questionnaire -28 (GHQ 28)." Self-scoring was done ranging from 0-1-2-3 (lower to higher disability respectively). Analysis of significance was carried out by *Mann-Whitney Test* using statistical software. **RESULTS:**

Total 308 patients were studied. The subjects were divided into 3 groups: (A) Diabetes Mellitus Type-2 (DM-2) patients without retinopathy. (B) DM-2 patients having Non-Proliferative Retinopathy (C) DM-2 patients having Proliferative Retinopathy. According to the accepted scoring pattern of GHQ-28 (cut of point 25), it was observed that 80.26% of patients having non proliferative retinopathy in both eyes and 93.75% patients having proliferative retinopathy in both eyes were psychosocially impaired. The impairment was found to be more severe in proliferative retinopathy patients as compared to non-proliferative retinopathy patients. (p value <0.005) (Mean GHQ score in PDR=41.88 > NPDR = 35.74). It was also found that in DM-2 patients without retinopathy the average mean score was 25.22 which showed less impairment (p value <0.005). Detailed analysis showed that there was more impairment in the field of social dysfunction.

**CONCLUSION:** Patients of Diabetic Retinopathy had more psychosocial impairment which shows its significant impact on quality of life and overall health. Psychiatric counselling must be given to the impaired patients to decrease the impact of the disease on the psychosocial aspect of health. It is necessary to decrease the psychosocial suffering along with the control of disease.

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## **INTRODUCTION:**

Diabetes – a group of metabolic diseases characterized with high blood sugar has become a major global concern. 347 million people in the world have diabetes.(1) WHO projects that diabetes will be the 7<sup>th</sup> leading cause of death by 2030. (2) Complications arising due to diabetes affect many organs of the body. It has specific micro-vascular and macro-vascular complications. Diabetic retinopathy is one of the most common micro-vascular complications affecting the diabetic patients. Diabetic retinopathy is a complication of both type-1 and type-2 Diabetes Mellitus. It develops in nearly all patients with type-1 diabetes and in more than 77% of those with type-2 who survive over 20 years with the disease.(3) WHO has estimated that diabetic retinopathy is responsible for 1% of the 39 million cases throughout the world. (4)

The biggest risk factor for developing diabetic retinopathy is longer duration of diabetes. Hypertension and hyperlipidemia also increase the occurrence of diabetic retinopathy. Diabetic retinopathy usually manifests as a gradual, painless progression of vision loss. Sometimes along-with vision loss vitreous hemorrhage or macular edema may occur. Symptoms include blurred and double vision, distorted vision, cotton-wool spots in the vision, dark areas in the vision, poor night and poor color vision.

Mainly diabetic retinopathy is of two types: Non-Proliferative Diabetic Retinopathy (NPDR) and Proliferative Diabetic Retinopathy (PDR). NPDR is characterized by microaneurysms, retinal hemorrhages, edema, cotton wool spots, and hard exudates. Early Treatment Diabetic Retinopathy Study (ETDRS) classification divides NPDR into mild, moderate, severe, very severe. PDR develops in more than 50% of cases after about 25 years of the onset of disease. The hallmark of PDR is occurrence of neovascularization over the changes of very severe non-proliferative diabetic retinopathy. Later on condensation of connective tissue around the new vessels results in formation of fibro-vascular epiretinal membrane. Vitreous detachment and vitreous hemorrhage may occur at this stage.

Diabetes and vision loss can profoundly affect patient's life. There is a strong association between diabetes and impaired mental health. (5) There is evidence which suggest that presence of diabetes doubles the odds of comorbid depression. (6) Due to gradual vision loss, relations with the family members and friends get changed causing a severe impact on the life. Activities get hampered due to loss of vision which causes loss of self-esteem. This leads to isolation, anxiety, depression and despair. (7) In India 18% of diabetic patients have diabetic retinopathy. (8) Thus it becomes necessary to know the type of psychosocial impairment and its severity in these patients.

This study was carried out for assessing the psychosocial impact of diabetic retinopathy patients using GHQ-28 questionnaire.

## **OBJECTIVE:**

- To study the extent of psychosocial impairment in the patients having diabetic retinopathy.

## **MATERIALS AND METHODOLOGY:**

A prospective observational cross-sectional study of 308 Diabetic Mellitus type-2 (DM-2) patients presenting to the retina clinic of Shri C.H.Nagri Eye Hospital, Ellisbridge, Ahmedabad was undertaken from January 2013 to August 2013.

The study protocol was reviewed by the members of the Institutional Review Board (IRB) of Smt N.H.L. Municipal Medical College and they gave an official approval for carrying out the study. Also, written informed consent was taken from all subjects.

### **Inclusion criteria:**

- Patients having diabetes mellitus type-2 and age more than 40 years.

### **Exclusion criteria:**

- Patients having other ocular diseases apart from diabetic retinopathy which could contribute to blindness were excluded from the study.

Following data of the diabetic patients attending the retina clinic of C.H.Nagri Eye hospital, Ahmedabad was collected: ocular history, duration and extent of diabetes mellitus, associated concomitant systemic disease, ocular examination, visual acuity, type of eye retinopathy.

Ocular examination included detailed anterior segment examination carried out by a slit lamp, fundus examination by 90D slit lamp bio-microscopy, macular evaluation by OCT (Ocular Coherent Tomography) and FFA (Fundus Fluorescein Angiography).

### **Psychosocial Assessment:**

All the patients were made to fill the validated Gujarati language version of “General Health Questionnaire -28 (GHQ 28) “(9)

The GHQ-28 provides information on extent of impairments related to

- Somatic symptoms,
- Anxiety and Insomnia,
- Social Dysfunction, and
- Severe Depression.

Self-scoring was done ranging from 0-1-2-3 (lower to higher disability respectively). The mean score of all the questions and 4 sub-sections along with total GHQ score were calculated and assessed.

### **Statistical Analysis:**

Statistical analysis was carried out using the licensed version of statistical software SPSS (version 20). Mann Whitney test was carried out to find out significance of the results, if any.

The patients were divided into three groups:

(A) DM-2 patients with Proliferative Diabetic Retinopathy (PDR)

(B) DM-2 patients with without retinopathy.

(C) DM-2 patients with Non Proliferative Diabetic Retinopathy (NPDR)

Following comparisons of GHQ scores were carried out and their significance was found using the software:

- 1.) DM patients with retinopathy vs. without retinopathy.
- 2.) Patients having retinopathy in both eyes vs. single eye.
- 3.) Patients having PDR vs. patients having NPDR.
- 4.) DM Patients with NPDR vs. without retinopathy.
- 5.) DM patients with PDR vs. without retinopathy.

### **RESULTS:**

Data of 308 diabetes melitus-2 patients and of age greater than 40 years was collected out of which 198 (64.3%) were male and 110 (35.7%) were female.

Out of 308 patients, 178 (57.8%) patients had diabetic retinopathy of which 102 (57.3%) patients were having NPDR and 58(32.6%) patients had PDR. 18 (10.1%) patients had NPDR in one eye and PDR in other.

Results related to diabetic history:

#### **Table 1: Average duration of diabetes:**

Out of 308 patients 198 (63%) patients had positive family history of diabetes.

#### **Table 2: Treatments received by the patients for diabetes:**

76% patients were receiving oral tablets. The patients who were not taking any treatment for the diabetes were referred to the diabetologist.

Results of Ocular associated history:

A total of 178 patients had diabetic retinopathy. Based on the history obtained from these patients, following results were obtained.

**Table 3: Associated co-morbidities:**

47% diabetic retinopathy patients had hypertension. This shows that hypertension is also a major risk factor for diabetic retinopathy apart from diabetes.

Out of 178 diabetic retinopathy patients 120 (67.41%) were already receiving the treatment. Following table shows the three types of treatments received by them.

**Table 4: Types of ophthalmic treatments received by the patients:**

47.5 % patients were receiving or had received photo-coagulation therapy as a treatment for the disease which is the first line treatment for diabetic retinopathy.

**GHQ ANALYSIS:**

**Table 5: Percentage of Psychosocially impaired diabetic patients:**

Note:

DM = Diabetes Mellitus

NPDR = Non Proliferative Diabetic Retinopathy

PDR = Proliferative Diabetic Retinopathy

Out of total 178 DM patients having diabetic retinopathy 147 (82.58%) patients were psycho-socially impaired. Furthermore, these scores showed that with increase in the severity of the disease psycho-social impairment was also increasing.

**Table 6: Mean GHQ scores in patients of diabetic retinopathy:**

From the GHQ Mean scores it is clearly seen that all the patients of diabetic retinopathy have psychosocial impairment of various levels. This impairment was observed to increase with increase in the severity of the disease.

It is also seen that more impairment is seen in the field of social dysfunction as compared to other fields. On detailed analysis of the GHQ scale, it was found that apart from social dysfunction, patients also reported higher mean scores in the following questions

- 1.) GHQ-1 (Been feeling perfectly well and in good health?) 2.04
- 2.) GHQ-3 (Been feeling run down and out of sorts?) 1.94
- 3.) GHQ-4 (Felt that you are ill?) 1.93
- 4.) GHQ-11 (Been getting edgy and bad-tempered?) 1.81

Highest GHQ Means Scores were obtained in the following questions belonging to the social dysfunction field.

GHQ-17 (Felt on the whole you were doing things well?) 2.15

GHQ-18 (Been satisfied with the way you've carried out your task?) 2.13

### **Significance of severity of psychosocial impairment in different types of retinopathy:**

Comparison of GHQ scores was carried out between different groups of patients. Analysis of significance was carried out by Mann-Whitney Test and p value was obtained which showed following results.

**Table 7: Comparison of GHQ Scores of patients with Diabetic Retinopathy:**

## **DISCUSSION:**

Diabetic Retinopathy causes mild to severe visual impairment. The biggest risk factor is the longer duration of diabetes. Diabetes itself is also a peculiar disease which affects many organs. Besides that it affects the psycho-social health of patients. Depression, anxiety, insomnia, isolation are some of the psychosocial symptoms which seem to be aggravated in diabetes patients.(10-14) In our study we found that the average duration of the patients having NPDR was 10.62 years and PDR was 10.76. While average duration of diabetes on the patients not having retinopathy was 5.54. This showed that longer duration was associated with occurrence of diabetic retinopathy. However no significant association was obtained between the psycho-social impairment and duration of diabetes. Similar results were obtained in the study by Hirai, F.E et al. (15)

Visual impairment itself causes ill-effects on the emotional well-being of such patients. Many studies have been done to support the fact that visual impairment causes severe impact on mental and emotional health of patients.(7, 16-18) Two studies by Nyman, S.R. et al. show that emotional health is hampered in the working age people as well as in older people due to vision loss.(16, 17) Psychological distress was observed in the patients having vision loss due to different eye disorders in a study by Ash, D.D et al. (18) Diabetic retinopathy causes impact on the psycho-social health of the patients due to the visual impairment and other symptoms (19, 20)

In our study, for the assessment of psycho-social impairment we used the validated Gujarati version of "General Health Questionnaire-28." (9, 21-24) By using GHQ-28, we assessed the psycho-social impairment of the patients in the fields related to somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression.

Amongst the diabetic patients not having retinopathy, only 37 (28.4%) patients were psycho-socially impaired. 61 (80.26%) patients having NPDR in both the eyes & 45 (93.75%) patients having PDR in both the eyes were psychosocially impaired. It was also observed that out of all diabetic retinopathy



patients, 147 (82.58%) were psychosocially impaired. The higher mean ranks obtained showed that DM patients having retinopathy were more psycho-socially impaired as compared to DM patients not having diabetic retinopathy. (p value <0.001) Moreover, we also observed that patients having diabetic retinopathy in both the eyes were more psychosocially impaired as compared to those having it in only one eye. (p <.001)

In a study by Fenwick, E. et al key search terms were applied to the electronic databases. Overall, the evidence suggested that diabetic retinopathy and associated vision loss have several debilitating effects, including disruption of family functioning, relationships and roles; increased social isolation and dependence; and deterioration of work prospects resulting in increased financial strain. Adverse emotional responses include fear, anxiety, vulnerability, guilt, loss of confidence, anger, stress and self-perception issues.(19) The results of this study were similar to our study. It was also observed in our study that diabetic retinopathy patients were short tempered, had sleep problems and possessed a feeling of not having good health.

Again, with the increase in the severity and duration of diabetic retinopathy, the psychosocial health was also impaired. On comparing the psychosocial impairment based on the GHQ scores obtained it was found that PDR patients were more affected as compared to NPDR patients, who in turn were more impaired than DM patients without retinopathy (p value<0.001). More depression, anxiety and social dysfunction was found in the patients of PDR as compared to NPDR. Similar results were obtained in the study by Wulsin, L.R et al. (25)

Apart from diabetes, hypertension is also a major risk factor for diabetic retinopathy. Out of retinopathy patients 47% patients were hypertensive. This showed the high prevalence of hypertension in the diabetic retinopathy patients. Prevention of hypertension also helps in decreasing the occurrence of retinopathy in diabetic patients. Study by Lombail, P. et al stated that retinopathy was more in hypertensive patients as compared to the non-hypertensives. (26)

It is recommended that psychiatric counseling must be carried out for all the diabetic retinopathy patients. The patients and their relatives must receive health education regarding the mental health and the relatives must also receive instructions on taking special care of the diabetic retinopathy patients. Such kind of counseling will help reduce their emotional suffering and enable them to cope up with life in a better way. Bernbaum, M et al. had developed a program which was to improve independence, self-esteem, and glycemic control in patients with diabetes and blindness.(27) In another study, they showed that patients benefitted by this kind of rehabilitation program. The study suggests that a rehabilitation program could be of clinical benefit early in the course of vision loss associated with diabetic retinopathy. (28) Other studies have also been done which support various rehabilitation programs for the patients having visual impairment due to eye disorders like diabetic retinopathy to decrease their mental sufferings. (18, 29-31)



## **CONCLUSION:**

Psychosocial impairment was found to be significantly higher in the patients having diabetic retinopathy as compared to diabetic patients without retinopathy. (p value= <0.005 i.e. highly significant)

The impairment was more severe in proliferative retinopathy patients as compared to non-proliferative retinopathy patients. The impairment was severe in patients having retinopathy in both eyes than those having retinopathy in single eye.

The impairment was seen more in proliferative retinopathy patients as compared to DM-2 patients having no retinopathy. The impairment was also observed to be more in non proliferative retinopathy patients as compared to DM-2 patients without retinopathy.

Diabetic Retinopathy 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 assessment must be carried out in all the Diabetic Retinopathy patients. Psychiatric counseling must be given to the affected patients to decrease the impact of the disease on their psychosocial health. It is necessary to prevent and control the psychosocial suffering along with control of the disease. Psycho-social well-being of the patients should also be improved along with the visual improvement of the diabetic retinopathy patients.

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## **Table 1**(on next page)

Average duration of diabetes:

2 **Table 1: Average duration of diabetes:**

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Diabetic patients with normal eye	5.54 years
NPDR patients	10.62 years
PDR patients	10.76 years

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5 Out of 308 patients 198 (63%) patients had positive family history of diabetes.

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## **Table 2**(on next page)

Treatments received by the patients for diabetes:

**Table 2: Treatment received for diabetes:**

Type	No. of patients	Percentage
Insulin I.V.	32	10.39
Oral tablets	234	75.97
Both	23	7.47
Other medications	4	1.30
Not receiving	15	4.87

76% patients were receiving oral tablets. The patients who were not taking any treatment for the diabetes were referred to the diabetologist.



### **Table 3**(on next page)

Associated co-morbidities:

**Table 3: Associated co-morbidities:**

Types	No. of patients	Percentage
Hypertension	83	46.62
Ischemic Heart Disease	15	8.42
Nephropathy	5	2.80
Neuropathy	2	1.12
Thyroid disorders	7	3.93

47% diabetic retinopathy patients had hypertension. This shows that hypertension is also a major risk factor for diabetic retinopathy apart from diabetes.

## **Table 4**(on next page)

Table 4: Types of ophthalmic treatments received by the patients:

2 **Table 4: Types of Eye Treatment:**

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Type	No. of patients	Percentage
Laser (photocoagulation)	36	30.00
Insulin injection	27	22.50
Oral Medications	25	20.83
Laser + Injections	13	10.83
Laser + Oral Medication	8	6.67
Injections+ Oral Medication	4	3.33
All types of medication	7	5.83

4 47.5 % patients were receiving or had received the photo-coagulation therapy as a treatment for the  
5 disease which is the first line treatment for the diabetic retinopathy.  
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## **Table 5**(on next page)

Percentage of Psychosocially impaired diabetic patients:

**Table 5: Percentage of Psychosocially impaired diabetic patients:**

Sr. No	Type of Retinopathy	Total patients	Psycho-socially impaired patients
1	DM patients without retinopathy.	130	37 (28.46%)
2	NPDR in single eye	26	17 (65.38%)
3	PDR in single eye	10	8 (80%)
4	NPDR in both eyes	76	61 (80.26%)
5	PDR in both eyes	48	45 (93.75%)
6	NPDR +PDR	18	16 (88.89%)

Note : DM = Diabetes Mellitus

NPDR = Non Proliferative Diabetic Retinopathy

PDR = Proliferative Diabetic Retinopathy

Out of total 178 DM patients having diabetic retinopathy 147 (82.58%) patients were psycho-socially impaired. Furthermore, these scores showed that with increase in the severity of the disease psycho-social impairment was also increasing.

## **Table 6**(on next page)

Mean GHQ scores in patients of diabetic retinopathy:



2 **Table 6: Mean GHQ scores in patients of diabetic retinopathy:**

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Sr No.	Type of retinopathy	Somatic Symptoms	Anxiety and Insomnia	Social dysfunction	Severe Depression	GHQ-28 Scale Scoring (>25 Significant)
1	DM patients without retinopathy	6.51	6.97	7.73	4.01	25.22
2	NPDR in single eye	7.81	6.50	9.15	4.69	28.15
3	PDR in single eye	8.50	8.50	9.50	5.30	31.80
4	NPDR in both eyes	8.62	8.88	10.87	7.37	35.74
5	PDR in both eyes	10.73	9.92	12.54	8.69	41.88
6	NPDR +PDR	10.22	9.33	12.56	9.11	41.22

4 From the GHQ Mean scores it is clearly seen that all the patients of diabetic retinopathy have  
 5 psychosocial impairment of various levels. This impairment was observed to increase with increase in  
 6 the severity of the disease.

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## **Table 7** (on next page)

Comparison of GHQ Scores of patients with Diabetic Retinopathy:

**Table 7: Comparison of GHQ Scores of patients with Diabetic Retinopathy:**

Sr. No.	Psychosocial impairment Severity (comparison between various groups)	p value
1	DM patients with retinopathy > DM patients without retinopathy	<.005
2	Retinopathy in both eyes > Retinopathy in single eye	<.005
3	PDR > NPDR	<.005
4	NPDR > DM patients without retinopathy	<.005
5	PDR > DM patients without retinopathy	<.005

Note : DM = Diabetes Mellitus

NPDR = Non Proliferative Diabetic Retinopathy

PDR = Proliferative Diabetic Retinopathy