Section: Miscellaneous

Original Research Article

TO STUDY THE CORRELATION OF DIET WITH DIABETIC RETINOPATHY IN TYPE 2 DIABETES MELLITUS

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ABSTRACT

Background: Diabetic retinopathy (DR) is a common cause of blindness in the young population, ranging from 15.3% to 42.4%. Duration and control of Diabetes (DM) were found to be strong risk factors for DR. The role of diet in the causation and treatment of DM is established. However, its role in the development and progression of DR is not proven. **Aim & Objective:** To study the correlation between diet and the severity of diabetic retinopathy in Type 2 Diabetes Mellitus patients, and to assess role of dietary manipulation in prevention, retardation and management of diabetic retinopathy: **Material and Methods:** The study was conducted in the Departments of General Surgery, General Medicine, and Ophthalmology at the Northern Railway Central Hospital, New Delhi, from August 2022 to December 2024. It was an observational, analytical, cross-sectional study. A consecutive sampling method was used, and a total of 200 cases were evaluated. All patients underwent a detailed workup to establish the diagnosis, duration, and level of control of DM. They also underwent HbA1c examination, and their previous reports were also reviewed. Subsequently, they all underwent retinal examination, and Diabetic Retinopathy grading was done as per the ETDRS classification. All patients were questioned regarding their dietary habits. **Results and Conclusion:** In this study, 75% participants were vegetarians and 25% participants consumed a mixed diet. The proportion of retinopathy between vegetarians and mixed diet groups, the results was statistically significant, with vegetarians having a lower incidence and severity of DR ($P< 0.01$). Moreover, on subgroup analysis, the PDR proportion showed greater significance ($P< 0.00005$).

INTRODUCTION

Diabetic retinopathy (DR) is universally one of the commonest causes of blindness in the productive age group 20–74 years, ranging from 15.3% to 42.4% in different epidemiologic studies.[1-3] Within the study from India, DR was present in 16.9%, with sight-threatening diabetic retinopathy (STDR) observed in 3.6% and mild retinopathy in 11.8%.[4]

Several risk factors contribute to the progression of DR. Duration and control of Diabetes (DM) were found to be strong risk factors.[5] It arises due to prolonged hyperglycaemia, resulting in microvascular damage to retinal blood vessels, ultimately leading to progressive visual dysfunction.[6] However, retinal neurodegeneration is also involved in the aetiopathogenesis of DR.

Metabolic control of DM is achieved by diet control, exercise, or medications. The role of diet in the causation and treatment of DM is established. However, its role in the development and progression of DR needs to be understood in detail.[7,8] There exist several dietary guidelines for the treatment of diabetes but, similar guidelines for the prevention, retardation, and management of DR need to be established.

The protective role of fish, fruits, and some micronutrients on DR onset and progression has been reported.[9,10] The average daily calorie intake, consumption of eggs, meat, fish, and dairy products have all been studied with varying results. Other

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demographic confounders have also been studied, such as age, gender, family history of diabetes, diabetes duration, and lifestyle factors (smoking and alcohol drinking).[1]

Aim: To study the correlation between diet and the severity of diabetic retinopathy in Type 2 Diabetes Mellitus patients.

Objective: To assess role of dietary manipulation in prevention, retardation and management of diabetic retinopathy.

MATERIALS AND METHODS

The study was conducted in the Departments of General Medicine, Ophthalmology and General Surgery at the Northern Railway Central Hospital, New Delhi, over 30 months, from August 2022 to December 2024. It was an observational, analytical, cross-sectional study.

Study Population

All patients presenting to Medicine, Surgery or Ophthalmology OPD, who on biochemical investigations were found to have high blood sugar levels, were included in the study, subject to the following inclusion and exclusion criteria

Inclusion Criteria

All patients presenting with

1. Laboratory confirmed cases of both sexes, having Type 2 DM
2. Age more than > 35 years.
3. Patients who have had diabetes for 5 years or more.

Exclusion Criteria

1. Patients with Type 1 DM
2. Congenital ocular disease: Myopic fundus
3. Traumatic posterior chamber abnormality, Retinopathy of prematurity
4. Metabolic disorder other than DM, Cataract eye.
5. Patients not having at least 2 reports of HbA1c/ year for at least the preceding 5 years.

Sampling Method and Size

A consecutive sampling method was used, and 200 patients were enrolled during the study period. A total of 200 cases were evaluated.

Methodology

All patients who attended the Departments of General Surgery, General Medicine and Ophthalmology at the Northern Railway Central Hospital, New Delhi, and were found to have a raised blood sugar or a history of DM were referred to the Medicine department for a detailed work up to establish the diagnosis, duration and level of control of DM. They underwent HbA1c examination, and their previous reports were also reviewed. The average HbA1c was the average of all available Hba1c reports over at least the last five years, with at least 2 HbA1c reports per year.

Subsequently, they all underwent retinal examination by a professional hand-held direct ophthalmoscope. Consultants in the department of ophthalmology did all examinations personally. Diabetic Retinopathy grading was done as per the ETDRS classification.

Diabetic Retinopathy level	Retinal findings
Mild NPDR	Microaneurysm
Moderate NPDR	Haemorrhages (Dot or blot) or MAs in one to three retinal quadrants and/or cotton wool spots, hard exudates, or venous beading
Severe NPDR	Intraretinal haemorrhages (> 20 in each quadrant), venous beading in two or more quadrants, or an IRMA in one or more quadrants
PDR	NPDR that has progressed to PDR, and they exhibit either neovascularization of the disc/elsewhere or vitreous/preretinal haemorrhage

All patients were questioned regarding their dietary habits and classified as Vegetarians (not vegans) and those on a mixed diet.

The results were analysed using the Chi-Square test to find the importance of the type of diet in DR.

RESULTS

In this study, 75% participants were vegetarians and 25% participants had a mixed diet.

On comparison of the proportion of retinopathy between vegetarians and mixed diet groups, the results were statistically significant. Moreover, on subgroup analysis, the PDR proportion showed greater significance in the mixed diet group

Table 1: Distribution Rheumatological disorders in children

VARIABLES		NORMAL		NPDR		PDR		p-Value
		N	%	N	%	N	%	
DIET	VEG	82	54.7	56	37.3	12	8	0.012
	MIXED	12	24	26	52	12	24	

Table 2: Pattern of rheumatological diseases

VARIABLES		NORMAL		PDR		p-Value
		N	%	N	%	
DIET	VEG	82	54.7	12	8	0.00005
	MIXED	12	24	12	24	

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DISCUSSION

In this prospective observational study, on analyzing in our study, vegetarians were found to have a lower incidence and severity of DR. Several previous studies have found varying results of diet on DR. Gopinath et al,[10] have demonstrated the benefits of dairy products on retinal vasculature. Mahoney et al. have shown that fruits like citrus fruit, apples, berries, and dark green leafy vegetables, which are rich in flavonoids, have a protective role in DR.[11]

In the Delhi NCR region, the non-vegetarian diet mainly consists of red meat, and fish consumption is less frequent. Most studies that have shown an advantage of a non-vegetarian diet in DR have studied the role of fish and seafood. Since vegetarians consume more dairy products, vegetables, and fruits, our results are consistent with the existing literature.

CONCLUSION

In the areas away from coastlines, where consumption of fish and sea food is low, vegetarians consuming fresh fruit, vegetables and dairy products, have a better outcome in terms of prevention, retardation and management of DR.

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