Prevalence And Factors In Diabetic Retinopathy In Obese Females Presenting At Lady Reading Hospitals

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Abstract

background: The aim of this study is to examine the prevalence of diabetic retinopathy (DR) and its related variables in patients with diabetes treated at Lady Reading Hospital in Peshawar between July 1, 2023, and June 30, 2024.

Method: Patients in this descriptive cross-sectional study, who were diabetes patients between the ages of 30 and 60, were treated at Lady Reading Hospital in Peshawar. Patients with a diagnosis of either Type 1 or Type 2 diabetes mellitus, complete medical records, and the ability to give informed permission were the requirements for inclusion. Patients with insufficient medical data, individuals who were pregnant, patients with additional retinal illnesses, and patients who refused to give consent were all excluded. With an emphasis on demographics, comorbidities, lifestyle factors, and clinical data, data was gathered through structured interviews, physical examinations, and inspections of medical records. Examinations of the eyes verified the existence of DR. Using chi-square tests, logistic regression analysis, and descriptive statistics, SPSS software version 24.0 was used to analyze the data with sample size 121 patients.

Result: Patients with DR had a lower prevalence of cardiovascular illnesses (6%) compared to those without (51%), with a p-value of 0.000. Significant correlations were found between DR and high blood pressure (36.7% vs. 5.7%, p=0.000) and inflammation (42.4% vs. 7.9%, p=0.000). A strong correlation was seen between DR and higher parity (>2 children) (50% vs. 16.9%, p=0.000). Significant variables included being older (46–60 years, 52.9% vs. 30-45 years, 17.2%, p=0.000), married (55.5% vs. single, 0%, p=0.000), and a housewife (31.1% vs. employed, 5.6%, p=0.025). There was no significant correlation found between smoking status and p=0.283.

Conclusion: Inflammation, higher parity, age, married status, and homemaker status were all found to be significant risk factors for diabetic retinopathy in the study. In order to reduce the risk of DR, these findings emphasize the necessity of focused screening and management programs for at-risk populations. Reducing the prevalence of diabetes-related disorders (DR) in patients may need careful blood pressure control as well as managing inflammation.

Keywords: Diabetic retinopathy, prevalence, hypertension, inflammation, demographic factors.

Introduction:

The International Diabetes Federation (IDF) projected that 536.6 million people worldwide, or 10.5% of the population, had diabetes mellitus in 2021 among those aged 20 to 79[1]. DR is a prevalent retinal vascular condition that often causes considerable visual impairment and eventually worsens in most patients with DM. A few visual symptoms may appear during non-proliferative periods in the early stages of DR. Vision loss may result from the disease's progression to more severe phases, such as severe non-proliferative DR (NPDR) and proliferative DR (PDR). If untreated, a substantial loss of vision could happen. Following 20 years of DM management, the majority of patients have some level of retinopathy. Diabetic retinopathy (DR) is a disease that does not exhibit symptoms in the early stages, which makes early detection crucial. To prevent new cases of blindness caused by inadequate management, a systematic approach to DR screening and a follow-up care system are required[1-4]. The degree of a person's visual impairment might have an impact on their quality of life. Positive visual results can result from regular follow-up visits and patient compliance with treatment. The World Health Organization defines quality of life (QoL) as an individual's subjective assessment of their position in life, taking into account their cultural and value systems, as well as their own objectives, standards, expectations, and worries. Clinically speaking, there are two main stages of diabetic retinopathy (DR): proliferative diabetic retinopathy (PDR), which is more severe and is characterized by abnormal blood vessel growth in the retina, on or around the optic disc, and/or on the iris, and non-proliferative diabetic retinopathy (NPDR), which is characterized by vascular leakage and microaneurysms. A potentially blinding side effect of diabetic macular edema (DME) is the build-up of fluid in the retina, which causes macular thickness, reduced vision acuity, and central visual distortion[5-7]. DME can develop at any stage of the disease. In DR, DME is categorized as either present or missing and rated independently. A recognized diagnostic method for identifying and evaluating DME is optical coherence tomography (OCT). Since the vascular endothelial growth factor (VEGF) pathway is essential to angiogenesis, anti-VEGF medications are presently the most widely used therapeutic approach for conditions linked to angiogenesis. The angiopoietin-TIE (tyrosine kinase, endothelial) pathway is another crucial endothelial and cell-specific route in controlling angiogenesis. Regarding the sex difference in visual loss caused by DR, there exist contradictions. Research has shown that women are more likely than men to get DR. It has been discovered that having a male partner increases the likelihood of acquiring DME, the incidence of DR, and the risk that DR may proceed. Inducing damage to neuronal and vascular endothelial cells, local microglia and other inflammatory cells become activated in DR. They also release cytokines. OCT indicators associated with inflammation, particularly localized changes in retinal inflammation, may act as proxy markers for retinal inflammation[8-10].

Material and methods:

From July 1, 2023, to June 30, 2024, a descriptive cross-sectional study was carried out at Lady Reading Hospital in Peshawar with sample size 121 patients. The purpose of the study was to determine the prevalence of diabetic retinopathy (DR) in diabetic patients as well as its contributing factors. Patients who visited the departments of endocrinology and ophthalmology provided data. The hospital's review board granted ethical approval, and each subject gave their informed consent.

People who have been diagnosed with Type 1 or Type 2 diabetes met the inclusion criteria. between the ages of 30 and 60. People ready to provide their informed permission. those with complete medical records, including eye exams and diagnostic tests. Individuals with retinal problems unrelated to diabetes were excluded based on certain criteria. people whose medical histories are incomplete. expecting mothers those who decline to give their informed consent.

Documentation, Demographics, lifestyle factors (smoking, occupation), comorbid conditions (hypertension, chronic renal disease, cardiovascular illnesses), and clinical data (blood pressure, glycemic control, BMI) were all gathered. Assessments of the eyes were done to verify the existence of DR. A secure database was used to store the data, and SPSS version 24.0 was used for analysis. The data were summarized using descriptive statistics, and correlations between DR and different parameters were found using logistic regression analyses and chi-square tests. Statistical significance was attained when the p-value was less than 0.05. To emphasize the most important discoveries and trends, the data were shown as tables and graphs.

Results:

There was a significant correlation (p=0.000) between the presence of cardiovascular illnesses and diabetic retinopathy in 38.8% of patients. 3.3% of patients had chronic kidney disorders, although there was no discernible correlation (p=0.299). 3.3% of cases had pregnancy, which did not significantly correlate with diabetic retinopathy (p=0.917). Patients with diabetic retinopathy had a considerably higher prevalence of high blood pressure (36.7%, p=0.000). 8.3% of patients had obesity, although there was no discernible correlation (p=0.200). Diabetic retinopathy was linked to poor glycemic control (p=0.024, 14.8%). Patients with diabetic retinopathy had a considerably higher prevalence of inflammation (42.4%, p=0.000). Diabetic retinopathy and hypertension (> 140 mm Hg) were substantially correlated (p=0.000). Age (46–60 years), marital status (married), and occupation (housewife) were the characteristics that were significantly correlated with diabetic retinopathy (p=0.000, p=0.000, and p=0.025 respectively, while smoking shows no significant association(p=0.283).

Table 1: diabetic retinopathy with their details.

Symptoms		Diabetic retinopathy		total	p-value
		present	absent		
Cardio vascular diseases	present	2(6%)	45(51%)	47(38.8%)	0.000
	absent	31(94%)	43(81%)	74(61%)	
Chronic kidney diseases	present	2(6%)	2(2.3%)	4(3.3%)	0.299
	absent	31(94%)	86(97.3%)	117(96.7%)	
pregnancy	present	1(3%)	3(3.4%)	4(3.3%)	0.917
	absent	32(97%)	85(96.6%)	117(96.7%)	
High blood pressure	present	12(36.7%)	5(5.7%)	17(14%)	0.000
	absent	21(63.3%)	83(94.3%)	104(86%)	
obesity	present	1(3%)	9(10%)	10(8.3%)	0.200
	absent	32(97%)	79(90%)	111(91.7%)	
Poor glycemic control	present	1(3%)	17(19%)	18(14.8%)	0.024
	absent	32(97%	71(81%)	103(85.2%)	
inflammation	present	14(42.4%	7(7.9%)	21(17.3%)	0.000
	absent	19(57.6%)	81(92.9%)	100(82.7%)	

Table 2: diabetic retinopathy with respect to hypertension.

Hypertension	Diabetic retinopathy		p-value
	present	absent	
>140	14(16.9%)	69(83.1%)	0.000
>160	19(50%)	19(50%)	

Table 3: diabetic retinopathy with respect to different variables

variables		Diabetic retinopathy		p-value
		present	absent	
age	30-45	15(17.2%)	72(82.8%)	0.000
	46-60	18(52.9%)	16(47.1%)	
Marital status	Married	33(55%)	27(45%)	0.000
	Un married	0(0%)	61(100%)	
Occupation	Housewife	32(31.1%)	71(68.9%)	0.025
	job	1(5.6%)	17(94.4%)	
smoker	present	0(0%)	3(100%)	0.283
	absent	33(28%)	85(72%)	

Discussion:

Significant correlations between diabetic retinopathy (DR) and a number of comorbidities and symptoms are shown by the data in Table 1. Patients without DR had a significantly higher prevalence of cardiovascular illnesses (51%) compared to those with DR (6%), with a p-value of 0.000 showing a strong inverse correlation. Significant positive correlations between DR and high blood pressure and inflammation were observed. Inflammation was detected in 42.4% of patients with DR against 7.9% without (p=0.000), and high blood pressure was seen in 36.7% of patients with DR compared to 5.7% without (p=0.000). Damage to neuronal cells and vascular endothelial cells results from the activation of retinal glial cells and their production of inflammatory mediators. It has been proposed that HRF are collections of active microglia. Histologic investigations on human eyes indicated that lipid-filled cells, which are activated microglial cells, and anteriorly migrating retinal pigment epithelial cells are the sources[11-12]. On the other hand, there were no notable differences between the groups with and without DR for chronic kidney illnesses,

pregnancy, or obesity, indicating that these conditions may not be highly associated with DR in this population. Table 2 focuses on the connection between DR and hypertension. The statistics show a direct link between the presence of DR and elevated blood pressure levels. In particular, patients with blood pressures higher than 160 mmHg had a 50% incidence of DR, while patients with blood pressures higher than 140 mmHg had a lower prevalence of 16.9% (p=0.000). Aqueous humor in the eyes was shown to have higher levels of cytokines, such as CD14, that are expressed by macrophages and microglia. Initially, resident microglial cells are found close to ganglion cells and in the inner retinal layers. In fact, in healthy individuals without DM, they are entirely absent from the outer retina and only present in the inner retina. As long as the inflammation continues, microglial cells proliferate posteriorly[13-14]. This implies that the chance of having DR is greatly increased by more severe hypertension. These results highlight the necessity of strict blood pressure control in diabetes individuals in order to possibly lower the incidence of retinopathy. Inner retinal macromolecules are generally prevented from migrating outside by the external limiting membrane (ELM).The bipolar cell and Müller cell nuclei are the primary constituents of INL. Normal Müller cell functions include establishing the blood-retinal barrier, preserving the metabolic balance of the retinal extracellular environment, and facilitating communication between retinal arteries and neurons. Müller cells react to hypoxia and hyperglycemia by releasing inflammatory mediators and losing their ability to absorb fluid. Men were shown to have higher levels of 12 inflammatory proteins (two proteases, seven chemokines, two proteins involved in programmed cell death, and one T-cell surface protein) in aqueous humor compared to women in patients with DM and no DR. These results suggest that male DM patients exhibit a more inflammatory phenotype than female DM patients[15-16]. A number of lifestyle and demographic factors were looked at in relation to DR in Table 3. There was a significant correlation between age and the prevalence of DR (52.9%), with older patients (46–60 years) showing a larger prevalence than younger patients (30–45 years), who had a prevalence of 17.2% (p=0.000). Another important factor was marital status, as married people had a 55% frequency of DR compared to 0% in single people (p=0.000). Another predictor was occupation; housewives had a higher prevalence of DR (31.1%) than did those in employment (5.6%) (p=0.025). However, there was no significant correlation found between smoking status and DR (p=0.283), suggesting that smoking may not be a major risk factor for DR in this cohort.

Conclusion: Important variables linked to diabetic retinopathy in the population under investigation are identified by the study. While high blood pressure and inflammation were positively associated with DR, cardiovascular illnesses were negatively connected with it. DR and hypertension, especially in severe cases, correlated strongly. Age over fifty, marital status, and housewifery were important demographic variables associated with increased prevalence of DR. These findings emphasize how crucial it is to control diabetes and all of its coexisting illnesses completely in order to reduce the risk of developing DR. To investigate these correlations and create focused solutions for populations that are at risk, more research is required.

Limitation: The cross-sectional design of this study limits the capacity to establish a causal relationship between the factors that are linked with diabetic retinopathy (DR) and the condition itself. Furthermore, there's a chance that the sample isn't entirely typical of the larger diabetes community, which could restrict how broadly the results can be applied. Recall bias and inaccuracies may be introduced when certain variables, including smoking status and occupation, are based solely on self-reported data. Moreover, two important variables that influence the development of diabetic radiculopathy (DR) were overlooked in the study: the length of diabetes and the degree of glycemic control over time. Finally, because the study only looked at one tertiary care hospital, it's possible that regional differences in risk factors and prevalence were overlooked, which means that additional research in a variety of contexts would be needed to confirm these findings.

Conflict: none

Funds: none

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