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PATTERNS OF RETINOPATHY AMONG DIABETIC PATIENTS AT TERTIARY CARE HOSPITAL JAMSHORO/HYDERABAD

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ABSTRACT

OBJECTIVES: *To assess different patterns of retinopathy in diabetic patients admitted at LUMHS & to determine risk factors for diabetic retinopathy (DR).*
METHODOLOGY: *This descriptive (case series) comparative study was conducted in medical unit IV, LUMHS Jamshoro/ Hyderabad from January 2009 to June 2009. Total 100 patients either known cases or newly diagnosed cases of both type1 and type2 diabetes mellitus, aged 20 to 60 years, were selected. All patients were subjected to thorough history taking & clinical examination. Blood pressure, weight & body mass index (BMI) were recorded & systemic examination done. Every patient then underwent a detailed ophthalmoscopic examination by the principal researcher. Blood & urine samples of those having DR were taken for HbA1c estimation, hemoglobin levels & proteinuria.*
RESULTS: *Out of 100 diabetic patients examined, 24 (24%) had diabetic retinopathy (DR). The commonest form of DR was non-proliferative (74.9% [mild: 33.3 %, moderate: 29.1 %, and severe: 12.5 %]), followed by Maculopathy (16.6 %) and proliferative diabetic retinopathy (8.3 %). The frequency of DR was higher among individuals with type 1 diabetes, having early onset and greater duration of diabetes with proteinuria, poor glycemic control with high blood pressure & among women, anemic & obese patients.*
CONCLUSION: *Routine retinal screening for Diabetic retinopathy at the time of diagnosis in type2 diabetes and annual retinal screening in both type1 and type2 diabetes can considerably reduce the risk of visual loss*

KEY WORDS: Diabetic retinopathy, Patterns, Liaquat University Hospital.

INTRODUCTION

Diabetes mellitus affects 4% of world population & half of them have some degree of retinopathy at any given time. It is estimated that nearly all type 1 diabetic patients & 75% of type 2 diabetic patients will develop retinopathy after 15 years durtation[1]. Diabetes affects 10% of adult population in Pakistan[2] & has the potential to become 3rd most important cause of blindness in Pakistan. The prevalence of diabetic retinopathy in Pakistan ranges between 21-24%. [3]. It is the leading cause of blindness in American adults.4 & remains the leading cause of blindness in working adults throughout the world. Nearly 80% of patients develop diabetic retinopathy after the first 2 decades of diabetes [5]Diabetic retinopathy (DR) doesn't reduce vision in its early stages when treatment is most effective. Preventing blindness from retinopathy relies on early detection of asymptomatic disease by fundoscopy. Retinal photocoagulation is an effective treatment especially if given in early stages[6] Patients with early onset, longer duration of disease[7], those with poor glycemic control[8], hypertension[9], proteinuria[10], anemia, smokers, obese[11], pregnant patients & those taking oral contraceptive pills are at increased risk of developing retinopathy, so these patients should be screened for early detection of retinopathy. Screening can easily be done by using indirect ophthalmoscopy as it is a useful short term alternative available until retinal photography (or digital imaging) becomes affordable and easily available.[3]

OBJECTIVES

To assess different patterns of retinopathy among diabetic patients admitted at Liaquat

TABLE NO.1
CLASSIFICATION OF DIABETIC RETINOPATHY (DR)

No.	Classification	Description
1	Non proliferative (NPDR)	When micro aneurysms, hemorrhages (dot, blot or flame shaped), exudates or cotton wool spots seen in any quadrant
2	Severe NPDR	When intra retinal micro vascular abnormalities seen
3	Proliferative DR	When neovasculrization of retina or iris or pre-retinal or vitreous hemorrhages seen
4	Maculopathy	When hemorrhages, exudates & swelling seen in macula
5	Tractional retinal detachment	When retinal detachment seen

University of Medical & Health Sciences (LUMHS).
To determine risk factors for development of Diabetic Retinopathy (DR).

MATERIAL AND METHOD
Setting: Medical wards of LUMHS Jamshoro

Study Duration: Six months; 1st Jul 2009 –31st Dec 2009
Study Design: Descriptive (case series)
Sample size: 100 Diabetic patients
Sample Technique: Non probability convenience sampling

INCLUSION CRITERIA:
Patients of diabetes mellitus either known case or newly diagnosed case (FBS ³ 126 mg/dl & 2 hour postprandial ³ 200 mg/dl)
Both T1DM & T2DM patients
Ages between 20-60 years

EXCLUSION CRITERIA:
Malignant hypertension
Retinitis Pigmentosa
Age related macular degeneration

DATA COLLECTION PROCEDURE:
100 diabetic patients admitted at LUMHS were randomly selected after meeting inclusion criteria. After getting informed consent, all patients were subjected to thorough history taking & physical examination. Patients were asked about age of onset of diabetes, duration of disease, status of glycemic control, life style modifications, diet, treatment, ocular complications, risk factors for development of DR like hypertension, smoking, oral contraceptive pills & any other associated systemic disease. Blood pressure, weight & BMI were recorded & systemic

FIG 1.
FREQUENCY OF DIABETIC RETINOPATHY

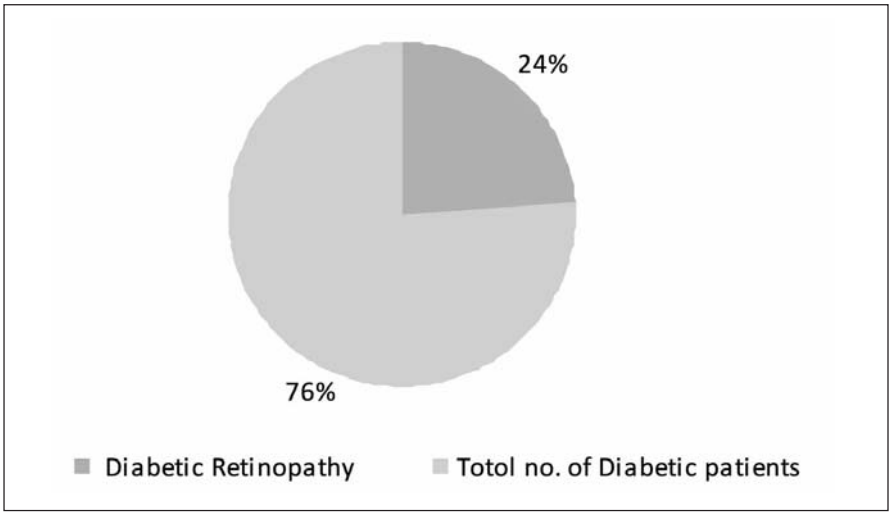
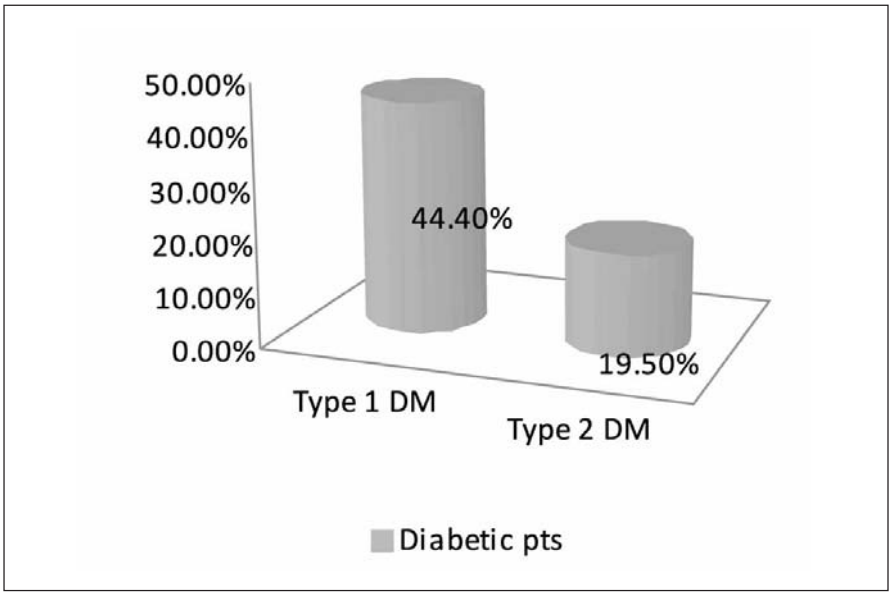


FIG 2
DISTRIBUTION OF DR ACCORDING TO TYPE OF DIABETES



examination done. Blood & urine samples of those having DR were taken for HbA1c estimation, hemoglobin levels & proteinuria. Every patient underwent a detailed ophthalmoscopic examination by the principal researcher. DR was classified according to severity scale adapted by American academy of ophthalmology (AAO) & international council for ophthalmology (ICO) [12,13]. Table no.1 shows the classification of DR.

DATA ANALYSIS**:**
SPSS version 11.5 was used for data analysis. Descriptive statistics mean ± SD was calculated for age of the patients. Frequency & percentage was calculated for gender &

RESULTS
100 diabetic patients were examined for retinopathy, 56 were males & 44 were females. Out of 100 patients, 24 were diagnosed with retinopathy (24%). Figure no.1 shows the frequency of DR. The frequency of DR in males and females was 23.2% (13 patients) & 25% (11 patients) respectively. The age of the patients selected was between 20-60 years. It was found that DR is most prevalent among patients between 30-39 years of age (38.8%). DR was more associated with the degree of hypertension. The frequency of DR approaches to 41.17% in those with blood pressure ³ 160/100 as compared to only 12.91% in those having BP < 140/ 90. It was also found that DR is more frequent in those with 3+dipstick proteinuria (52.63%) than those with 1+ dipstick proteinuria (18.18%). DR was also associated with poor glycemic control. The frequency of DR was higher among patients with HbA1c > 10% (44.44%) as compared to those with HbA1c between 7-8% (17.65%). It was found that the frequency of DR was higher in those patients having hemoglobin < 8g/dl (45.46%) as compared to those with hemoglobin > 10g/dl (19.23%). The frequency of DR approaches to 35.48% among patients with BMI > 35 as compared to only 14.28% with BMI < 30. Table no.2 shows the frequency of DR according to risk factors.
The frequency of DR was higher in T1DM (44.4%) than in T2DM (19.5%) as shown in Figure no. 2.There appears to be a strong relation between the frequency of DR and the duration of diabetes. The frequency of DR approaches to 42.8% among patients

TABLE NO.2
SHOWS THE FREQUENCY OF DR ACCORDING TO RISK FACTORS

	Diabetes mellitus (no.)	**Diabetic Retinopathy (no.)**	**% Of DR**
	100	24	24
Age (years)			
20-29	12	02	16.6
30-39	18	07	38.8
40-49	34	06	17.6
50-59	36	09	25
Sex			
Male	56	13	23.2
Female	44	11	25
Type of Diabetes			
T1DM	18	08	44.4
T2DM	82	16	19.5
Duration of Diabetes			
Newly Diagnosed	10	01	10
< 5 years	34	06	17.6
5-9 years	38	10	26.3
10-14 years	11	04	36.3
> 15 years	07	03	42.8
HbA1c			
>10%	09	04	44.44
9-10%	16	05	31.25
8-9%	35	09	25.71
7-8%	34	06	17.65
<7%	06	00	00.00
Hb g/dl			
>12	06	00	00.00
10-12	52	10	19.23
8-10	31	09	29.03
6-8	11	05	45.46
Dipstick proteinuria			
Trace	26	00	00
1+	33	06	18.18
2+	22	08	36.36
3+	19	10	52.63
BMI			
<25	13	00	00
25-29.9	21	03	14.28
30-34.9	35	10	28.57
35-39.9	31	11	35.48
>40	00	00	00
Hypertension			
<120/80	08	00	00
120-139/80-89	31	04	12.91
140-159/90-99	44	13	29.54
³160/³100	17	07	41.17

having diabetes for more than 15 years as compared to only 10% in recently diagnosed patients. Figure no.3 shows the effect of duration of diabetes on the development of retinopathy. The most common pattern of DR in our study came out to be non-proliferative DR. Figure no.4 shows different patterns of DR & figure no. 5 shows the severity of NPDR among diabetic patients.

DISCUSSION

DR is a common complication of diabetes mellitus & preventive measures can delay the onset, progression & complications of disease. Knowledge of DR status is an essential part of diabetic care so that early treatment can prevent visual impairment. Pakistan has a population of 154 million & >10% of its adult population has diabetes. The incidence of blindness due to diabetes is 50-65/100,000 diabetic populations/year in Europe[14]. It also has emerged as a major public health problem in Pakistan & has the potential to become 3rd most common cause of blindness[3] The frequency of DR varies with age of onset & duration of diabetes. In some of earlier studies in Pakistan, the frequency of DR was reported to be 15% [2,15], 24% [3], 26% [16], & 33% [17]. while it ranges from 20-40% in studies from India.[18] Sri Lanka[19], UK[20], & USA[21]. As shown in figure no. 1 the frequency of DR in present study was 24%, which is similar to earlier studies, but the frequency in a study done at Karachi was 15%[2]. This difference could be due to the fact that this was not a hospital-based study & was not conducted under similar circumstances. In a study done by Shah et al, the frequency of DR was 50.9%[22], these figures are significantly higher than our study; the reasons could be due to lack of awareness in Pakistani population about disease, its complications, lack of eye care services, screening programs & poor referral system.

In majority of studies, the most common type of DR was NPDR as in our study. The prevalence of NPDR was 76.4%[2] & 79.1%[23] in studies done at Karachi. Similar results were obtained in a study done in Jordan (71.8%)8. In our study, the frequency of PDR was 8.3%. This is comparatively higher than reported in earlier studies done by Din et al (5.8%)2 & Shah et al (3.5%)[22]. The reasons could be poor glycemic control, lack of approach to eye care centers as majority of our patients belong to rural areas. The frequency of maculopathy in our study

FIG 3.
EFFECT OF DURATION OF DIABETES ON DEVELOPMENT OF DR

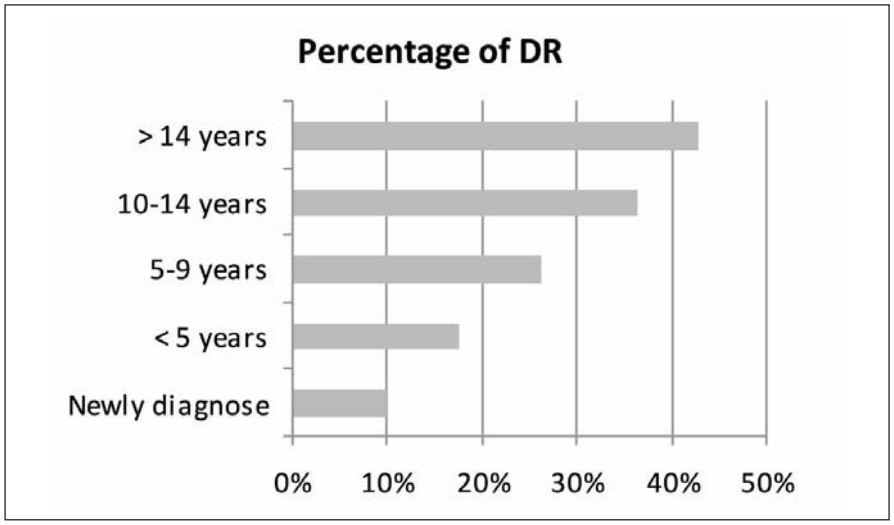


FIG 4.
PATTERNS OF DR

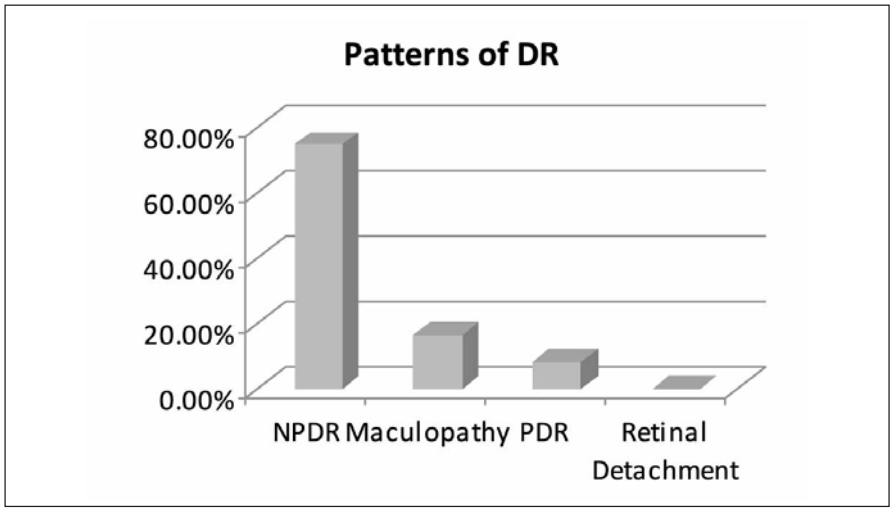
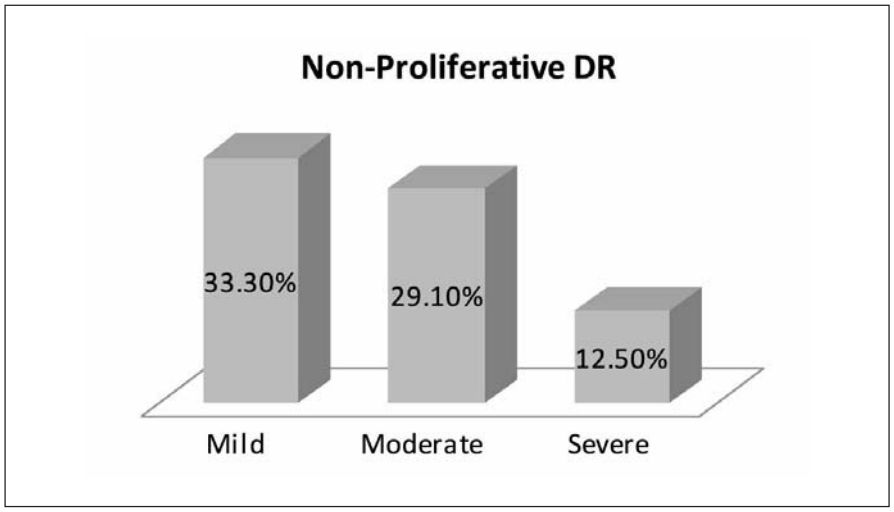


FIG 5.
FREQUENCY OF NPDR



was 16.6% that is about similar to results of Din (17.6%)[2] but lower than study at Jordan (22.8%) [8]. This may be because majority of our patients were young (20-60).

The severity of DR primarily depends upon the duration of diabetes. In a study done by Din et al, after 20 years nearly 60% patients with T1DM & 4% T2DM patients had PDR [2]. Among patients with younger onset diabetes in WESDR, the frequency of any retinopathy was 8% at 3 years, 25% at 5 years, 60% at 10 years & 80% at 15 years24 but the frequency of PDR was 0% at 3 years & 25% at 15 years. Consistent with previous studies, duration of DM was a strong predictor of DR in our study also. Fig shows the effect of duration of DM on the development of retinopathy. Studies from other parts of the world show similar results. As many as 100% T1DM patients have been observed to have some degree of DR after 20-30 years, peaking at about 10-15 years after diagnosis.[24]

Gender was not a risk factor for DR in our study as were shown by Din et al[2], Janghorbani et al [25] & Shah et al 22 in their respective studies. In contrast with a study done by Kayani et al, the frequency of DR was higher among males (42.8%) as compared to females (27.9%) [17]

CONCLUSION

There is a high frequency rate of NPDR and Maculopathy in diabetic patients. The current study indicates that both patterns of DR are common in our community and treatment is highly effective if effective treatment st, but unfortunately both of them are asymptomatic that's the reason most of the patients remains undiagnosed. This indicates the importance of screening in the asymptomatic patients because identification of diabetic retinopathy in early stages can prevent the patients to become blind. The frequency rate in our study was also very high in type 1 diabetic patients and patients with greater duration of disease. Serious national efforts to reduce DR and its associated vision threatening complications are needed. These efforts are best directed toward increasing the awareness of the necessity for regular eye examinations in patients with DM, early detection of DR and strict glycemic control.

RECOMMENDATIONS

All the patients of type1 diabetes mellitus with duration of >5 years should be examined annually for DR

All the patients with newly diagnose type2 diabetes mellitus should be examined for DR at the time of diagnosis

Patients who show signs of retinopathy should be referred to ophthalmology department for detailed eye examination

Short training courses for general physicians in retinal examination should become a regular feature in our teaching hospitals

Screening protocols need to be established at primary, secondary and tertiary referral centers at the provincial and national levels.

More systematic and population-based research is needed to estimate the prevalence and identify risk factors for diabetic retinopathy in Pakistan.

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