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Research Article

DIABETES MELLITUS (DM), GLYCEMIC CONTROL & DISEASE MANAGEMENT LINK WITH DIABETIC RETINOPATHY (DR) BETWEEN INSULIN AND NON- INSULIN CASES

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Abstract:

Objective: This study was focused to evaluate the Diabetic Retinopathy (DR) in Diabetes patients and in relation to the kind and time spread of the disease. Moreover, different ways of cure and glycemic controls were also studied during this research.

Methods: This was a descriptive study conducted at Allied Hospital, Faisalabad (May, 2017 to January, 2018). The sample was composed of Insulin dependent (IDDM) and non-insulin dependent (NIDDM) patients selected by utilizing the non-probable sampling technique. Patients' complete history was obtained and initial medical exams were taken. Blood sugar levels were checked by measuring Hb levels. The related information was furnished on a pre-set form and analysis was completed by using SPSS.

Results: Out of 108 patients, 33 were diagnosed with Type-1 and 75 with Type-2 DM. The percentage of females in each group was 54.5% and 49.3% respectively. The prevalence of Diabetic Retinopathy (DR) in Type-1 & Type-2 group was 60.6% & 37.3% respectively with a p-value of less than 0.005. The DR prevalence in patients under 5 years was minimum whereas 100% patients above 20 years were seen with DR. In IDDM patients, DR was observed in 60.6% & 53.1% in Group 1 & 2 respectively. In addition, patients with Hb levels of less than 7 percent were not reported with DR.

Conclusion: The Insulin Dependent Diabetes Mellitus (IDDM) patients have more cases of Diabetic Retinopathy (DR) as compared to Non-IDDM subjects. The long duration of diabetes is also the risk factor for development of DR. Increased blood sugar measured by levels of HbA1c is a solid reason for assessing the morbidity of the DR in diabetes patients.

Keywords: Diabetes mellitus, Diabetic retinopathy, HbA1c, IDDM, NIDDM, Glycemic.

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INTRODUCTION:

The number of diabetes patients is 3.66 million in the world and number is growing due to world population, modernization, corpulence and deskbound life pattern [1].

Diabetic Retinopathy is considered as the most common microvascular complication causing partial or complete blindness in patients under 40 years [2]. Different studies on the topic have delivered that approximately 33.33% diabetes patients suffer from DR. Also one tenth population of diabetes patients was found to be experiencing extreme Retinopathy stages as Edema (DME) and Proliferative DR [34, 5].

Some studies have mentioned certain factors which increases the risk for the prevalence of DR. These factors are hyperglycemia (increased sugar in blood), High BP, abnormal lipid profiles, duration of diabetes, gravidity, sexual maturity, and cataract surgery [3]. Glycemic control is a double edged sword in controlling the DR in diabetes patients. Glycemic control increased death rate during ACCORD trials which shows that NIDDM patients who are prone to greater risk of macro-vascular complications are likely to be effected adversely [7].

An ARIC study revealed that the cardiovascular diseases are two times more likely to develop in patients with DR [8]. The interaction between doctors from both departments is recommended. Different DR screening programs are being implemented in different parts of the world such as National Plan for Screening in UK & Ophthalmological Diabetes Tele medical Network (OPHDIAT) in France. These programs have improved the DR screening from 50% to 70% [10, 11]. The WESDR studies have delivered that the prevalence of DR is directly related to the length of the disease in Type-1 and Type-2 patients [12]. The length of the disease is considered as a strong forecaster of development of Diabetic Retinopathy [13].

With the advancements in medical science, it is now becoming possible for local health care providers to process the screening of DR in remote areas. A concerted effort is needed for the evaluation of DR images at these facilities [14]. A study conducted by Rajala delivered that intense

DR condition is linked with higher mortality [15].

The correct picture of complications occurring due to the intensity and incidences of DR are vital for formulating an effective road map to counter the DR in diabetes patients and related risk factors. The current set-up was aimed at exploring the main attributes of DR in our sample which are helpful for doctors at local clinics in management of the disease.

PATIENTS AND METHODS:

This descriptive study was carried out at Allied Hospital, Faisalabad (May, 2017 to January, 2018). The sample was based on convenient non-probability technique and included patients irrespective of their gender. The patients were above 14 years and suffering from either IDDM or NIDDM since 1 year and above. The patients were selected according to inclusion criteria and those patients who were suffering from associated Micro and Macro vascular diseases were dropped. All the patients underwent thorough examination and evaluation by a worthy ophthalmologist. Glycemic control was measured by evaluating the Hb level (HbA1c) of each patient.

All the information collected through clinical and verbal means was recorded on a pre designed form. Furthermore, the data was evaluated by SPSS. The values were considered significant at $p < 0.05$.

RESULTS:

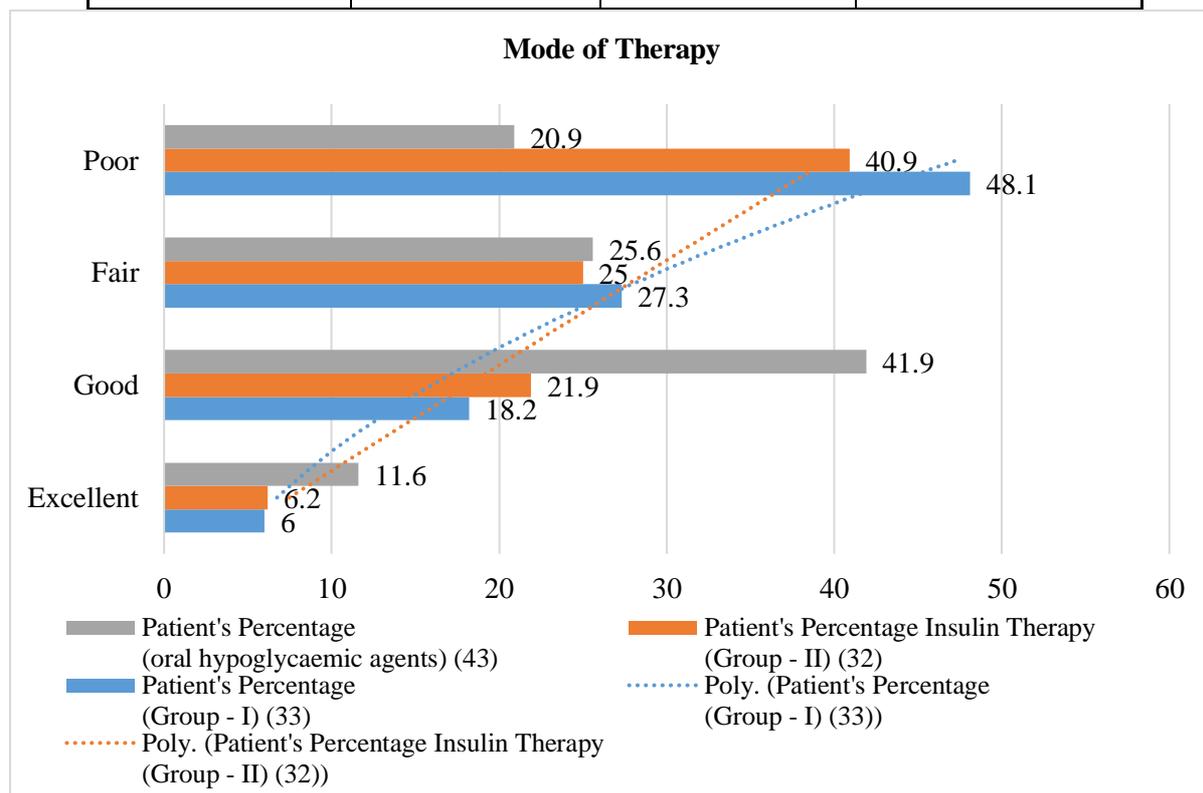
The sample consisted of 108 subjects. Further evaluation confirmed that the 33 patients had IDDM and 75 were experiencing NIDDM. In IDDM group the female proportion was higher (54.5%) whereas equal proportion was observed in Type-2 group.

The mean age of IDDM group was relatively lower (42 ± 15.9 years) as compared with NIDDM group (69 ± 6.8 years). All patients in Type-1 were insulin dependent whereas 32 out of 75 in Type-2 were receiving insulin. The length of the disease was more than 10 years in 51% IDDM patients as compared to 56% in Non IDDM patients.

Levels of glycemic control were measured for each subject in both groups. Type-1 group had 48 patients with poor control whereas 15 patients had poor glycemic control in Type-2 group. The glycemic control levels were divided into excellent, good, fair and poor categories according to default values provided in literature (Table – I) [7].

Table – I: Association of Mode of therapy with glycemc control

Glycemc Controls	Patient's Percentage (Group - I) (33)	Patient's Percentage Insulin Therapy (Group - II) (32)	Patient's Percentage (oral hypoglycemic agents) (43)
Excellent	6	6.2	11.6
Good	18.2	21.9	41.9
Fair	27.3	25	25.6
Poor	48.1	40.9	20.9

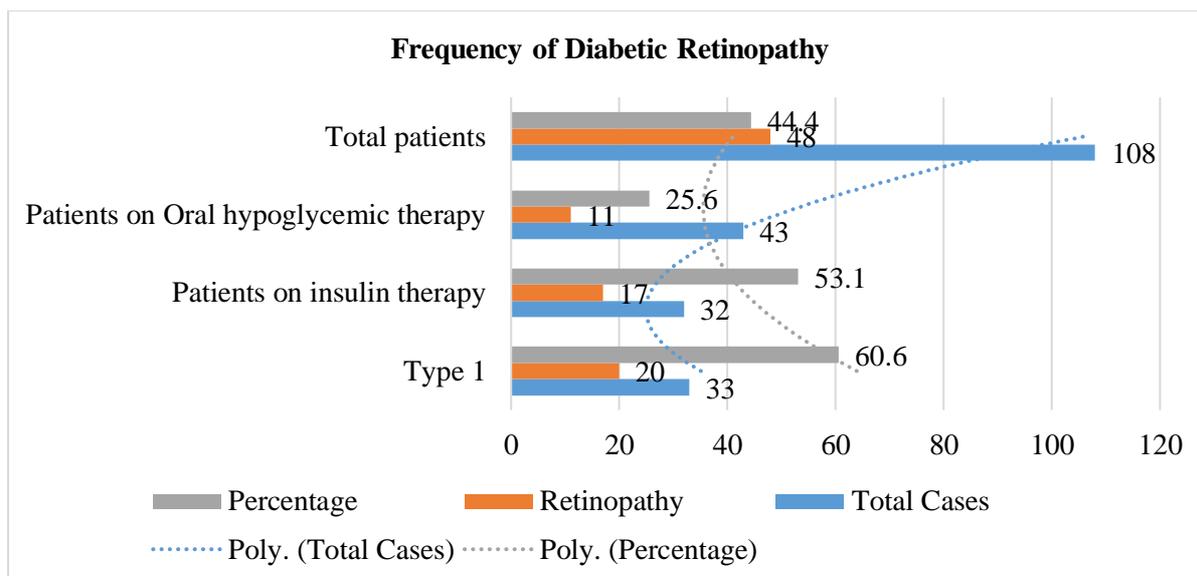


Funduscopy of both groups produced 60.6% & 37.3% DR prevalence in Type-1 and Type-2 respectively. In Non-IDDm group, 17 patients were insulin dependent whereas 11 were on oral agents or dietary therapy. DR was found to be strongly related with the duration of the diabetes independent of its type.

Type-1 patients with Hb level below 7% were clear of DR. Hb levels of 10% in Type-1 were the victims of DR (10 patients). Type-2 patients were seen with more DR patients using insulin. It is shown in Table – II.

Table – II: Frequency of Diabetic Retinopathy according to Type and Mode of Treatment

Type of diabetes		Total Cases	Retinopathy	Percentage
Type 1 Diabetes	Type 1	33	20	60.6
Type 2 Diabetes	Patients on insulin therapy	32	17	53.1
	Patients on Oral hypoglycemic therapy	43	11	25.6
	Total patients	108	48	44.4



DISCUSSION:

The prevalence of diabetic retinopathy is becoming the leading cause of blindness in young people [2]. The increasing trend refers to the existing life style. DR is effected by many factors namely type of disease, length, treatment method, glycemic control and associated complications. The current study has proved that IDDM patients are suffering more from DR as compared to NIDDM patients (60% & 37% respectively). Many international studies have found the same results for the type of the disease. Henricsson & Romero have shown the higher number of IDDM patients suffering from DR as compared to Non-IDDM patients [17, 18].

Most of the DR patients were female (54.5%) in the Type 1 group. Type-2 group was indifferent in respect of gender distribution of DR patients. The finding is opposed by some other studies by Naeem MK and Pradeepa R et al [20, 21]. Another study conducted at Bahawalpur also confirmed that Type-2 patients have equal proportion of males and females [19].

The prevalence of DR in patients using insulin was higher. In both groups, the patients using insulin had developed DR more frequently as compared to non-insulin users. Out of 65 patients using insulin for glycemic control, 37 had developed DR.

The study delivered that prevalence of DR in patients under 5 years was 12.6% in Type-1 group which is supported by Henricsson study (16%) for the same criteria [17]. International literature argues that 5-10 years' duration of DM is closely related to the development of DR and reaches to 90.5% with the duration of 15 years of the disease. Our study showed that all the patients suffering from diabetes for more than 20 years were also suffering from

DR. The findings are supported by Goldstien et al. and EURODIAB studies [22, 23]. A study done by Karamanos produced that patients were seen with improved micro-vascular symptoms with better glycemic control [24].

In Type 2 group, the occurrence of DR was found in 17.7% subjects under 5 years' duration of DM. With the increase of duration over 20 years the prevalence of DR jumped to 77.7%. These numbers are comparable with 16% and 72% respectively of Henricsson et al [17].

It has been supported by studies that micro-vascular complications and Glycemic controls are directly related [25]. Association of reduced glycemic control and increased development of DR has been concluded by many researchers [26, 28]. Current study described that the poor glucose control catalyzed the DR prevalence in 87.5% (Type-1) and 86.6% (Type-2) which is also delivered by the study carried out by Monique SR et al. [16].

No earlier data on this topic was available. The findings of the study in hand are comparable to the findings of other domestic and foreign researchers. The research is helpful for physicians dealing with Diabetes and Retinopathy. Due to smaller sample size the results can be generalized. Hence, to assess the factors affecting DR, a large scale study is required to be conducted.

CONCLUSION:

The Insulin Dependent Diabetes Mellitus (IDDM) patients have more cases of Diabetic Retinopathy (DR) as compared to Non-IDDM subjects. The long duration of diabetes is also the risk factor for development of DR. Increased blood sugar measured by levels of HbA1c is a solid reason for

assessing the morbidity of the DR in diabetes patients.

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