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Research Article

### CROSS SECTIONAL ANALYSIS ON RELATIONSHIP BETWEEN RISK FACTORS DIABETES AND DR: RESEARCH HELD IN LAHORE

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**Abstract:**

**Aim:** The purpose of this research was to evaluate the relation of Diabetic Retinopathy (DR) with Diabetes Mellitus (DM) by examining the glycemic control, mode used for curing, type and duration of DM. **Study Type:** Cross sectional analysis. **Time and Place:** Completed the study in the time duration of 06 months started from January, 2018 and ended in June, 2018 at Mayo, Hospital Lahore. **Methodology and material:** Made the selection of total 108 patients by using non-probability, convenient sampling method. Only selected those patients, either found victims of non-insulin dependent diabetes mellitus (NIDDM) or insulin dependent diabetes mellitus (IDDM) also called Type-II and Type-I diabetes. Carried of complete analyses of every patient and collected all previous antiquity information by them. Through glycosylated hemoglobin level (HbA1c) carried out the assessment of Glycaemic-control. Used a pre-designed proforma for the collection of whole data. Performed the analysis of all information by the help of SPSS software V.16. **Results:** Found Type-I (IDDM) & Type-II (NIDDM) diabetes, after the examination as 30.6% (33) and 69.4% (75) respectively out of total 108 diabetes patients. There were 49.3% (37) women and 54.5% (18) ladies in Type-II and Type-I groups accordingly. Observed DR in a few patients as < 5 years' time period in these two groups which was 15.69% in Type-II and 12.59% in Type-I. Comparison of Type-I & Type-II groups showed that there was DR in 60.61% (20) and 37.29% (28) patients respectively with P-value as less than 0.005. With the time period of more than 20 years of diabetes, the Diabetic Retinopathy (DR) raised as 77.69% in Type-II patients with P-value less than 0.02 and 100% in Type-I diabetes patients with P-value as less than 0.001. Found Diabetic Retinopathy (DR) as 53.09% in Type-II cases with oral hypoglycaemics and/or diet therapy and 60.59% in Type-I sufferers who were under the treatment of insulin therapy. Found no sign of Diabetic Retinopathy (DR) in any patient of either group who was with HbA1c < 7%. **Conclusion:** Found direct connection of greater level of HbA1c with the growth of Diabetic Retinopathy (DR). Patients of Type-I diabetes who were under the treatment of insulin therapy for a long period of time were having higher occurrence of Diabetic Retinopathy (DR) than the patients of Type-II diabetes patients.

**Keywords:** HbA1c (AASH & KMDC 18(2):86;2013), Insulin Dependent Diabetes Mellitus (IDDM), Non-Insulin Dependent Diabetes Mellitus (NIDDM), Diabetes mellitus, Diabetic Retinopathy (DR).

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**INTRODUCTION:**

Patients of diabetes are rising in number day by day in the whole world due to lazy life routines, increasing frequency of fatness, increased population in cities and overall aging people, approximately 3.66 billion people of the world are suffering from diabetes [1]. Numerous problems of macro-vascular and micro-vascular linked with diabetes. Main reason for disease in long term diabetes is retinopathy amongst the problems of microvascular. According to findings of a study the main reason of loss of vision and blindness in young patients of diabetes having age as >40 years of the progressive countries is Diabetic Retinopathy (DR) [2]. 33.33% persons of diabetes were having indications of DR and an estimate of Proliferative Diabetic Retinopathy (PDR) and Diabetic Macular Edema (DME) which are eyesight frightening stages of retinopathy were there in 10% [3, 4, 5]. Cataract surgery, puberty, pregnancy, duration of diabetes, dyslipidaemia, hypertension and hyper-glycaemia are a few factors attached with greater hazard of DR according to the findings of different longitudinal and cross-sectional studies [3, 4]. With yearly occurrence rate as 65 thousand there are nearly 700 thousand people having DR in USA. Recently calculated frequency of DR in United States of America was almost 28.49% in age group of more than 40 years which indicates a very high prevalence rate [6]. Although, glycaemic control have the prominence role in reducing the DR development, death ratio amongst the persons taking part in the Action to Control Cardiovascular Risk in Diabetes (ACCORD) trial increased because of comprehensive glycaemic control that increases demand of extra care of the patients with type-2 diabetes as danger of cardiovascular happenings is very high in them [7]. With the existence of DR, the hazard of building CVD augmented double as per analysis of a research study on Atherosclerosis Risk in Communities (ARIC) [8]. Hence, risk factors amongst DR and CVD are overlapping with each other prescribing the requirement for adjacent association among ophthalmologists and diabetologists.

The Ophthalmological Diabetes Telemedical Network (OPHDIAT) program adapted in France and the National Plan for Screening started in the UK are the results of sense of realizing the diabetic retinal imaging importance and many other countries are also adopting such like programs. Kitted with non-mydriatic cameras to test the eye sight, the OPHDIAT consist of 11 screening centres. Operating staff makes fundus photographs and a specialist (ophthalmologists) checks out the images and allots grade to these pictures. Carried out DR screening

analyses of total 15308 cases and found 23.4% (3351) patients with DR [9]. Before starting the OPHDIAT program rate of DR was 50% and it improved to >70% afterwards [10, 11]. With long term period of diabetes, the prevalence of DR augmented gradually in patients with together IDDM and NIDDM (type 1 and type 2) as stated in a study on the natural history of retinal disease in diabetics {Wisconsin Epidemiologic study of Diabetic Retinopathy (WESDR)} [12]. The major cause of development of DR might be the time period of diabetes in a patient [13].

Suggestions are under consideration to enhance the role and task of initial level health care providers and to train them to evaluate retinal photographs at the primary care centres. Resultantly telemedicine and telehealth programs are in implementation stage in the whole world [14]. In a research study by Rajala U *et al.* observed odd ratio of mortality in four years of follow up which clears the association of severe DR with raised death ratio [15].

DR showed a major problem in public health sector and to demolish it proper planning is very necessary for which exact information regarding the severity and prevalence of DR and related risk factors is necessary. Identification of retinopathy in a diabetic person at very early stage is off-course too much important for timely management of this disease and to control the further progress of it. That is why extra care needed in prescription of diabetes treatment. The present study aims to find out the hidden characteristics of DR in local public sector so that the doctors might be able to advice the best medical and physical treatment for the diabetes patients.

**MATERIAL AND METHODS:**

Carried out the current observational research study with non-probability convenience sampling method at Mayo Hospital, Lahore and completed it in 24 weeks duration from January, 2018 to June, 2018. Selected only those patients, either found victims of non-insulin dependent diabetes mellitus (NIDDM) Type-II diabetes or insulin dependent diabetes mellitus (IDDM) Type-I diabetes and spent more than one year in suffering from diabetes and at least having the age more than 14 years.

Excluded all those patients who were not willing for the said therapy and excluded each and every patient who was suffering from any other disease like any ophthalmological disease other than diabetic retinopathy or renal disease, hypertension, and severe anemia etc. Made a strict compliance on exculpation criteria. Together with fundoscopic checkup by a

qualified ophthalmologist, collected the complete historical information of diabetes of patients and carried out detailed physical inspection. Applied plasma adrenomedullin assay technique on ELISA to analyzed the glycaemic control through glycosylated Hemoglobin level noted as HbA1c fraction.

An especially designed proforma was used to write down all gathered information. Carried out the analyses of gathered information by using SPSS V.16 software. P value less than 0.05 determined as statistically enough.

### RESULTS:

Patients selected for the present research study were 108 in number and out of which there were 75 patients who were having NIDDM (type-II) diabetes and 33 were having IDDM (type-I) diabetes. Type-II group showed 1:1 distribution ratio of gender whereas, in Type-I group females were in majority as showed a percentage 54.4%.

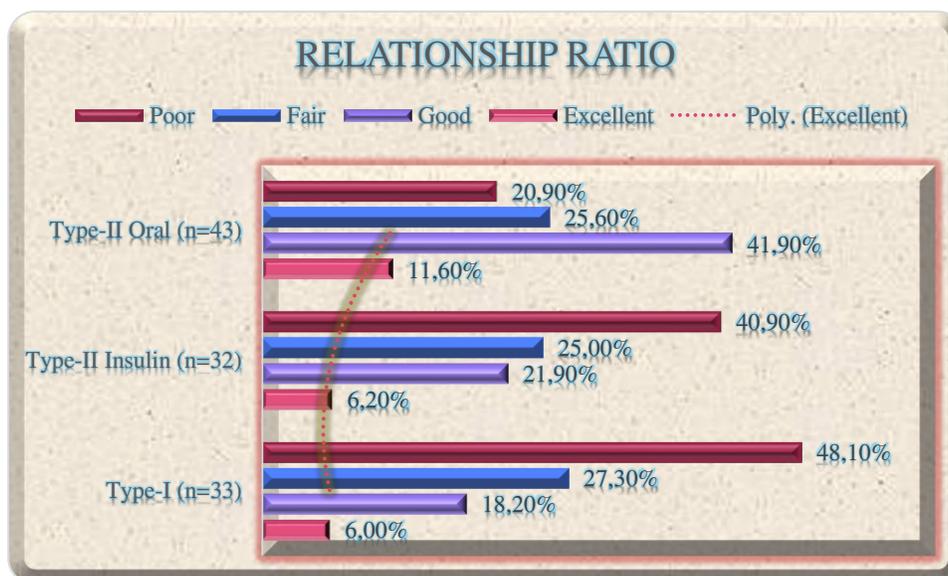
Average age of Type-I group as  $42 \pm 15.9$  years ranging 15-60 years clearly presented that there was access of young patients in it as in comparison to

second group Type-II where average age was  $68 \pm 15.8$  years ranging from 33-75 years of age. 43 patients of Type-II group were having dietary therapy and/or oral hypoglycaemic agent and on insulin therapy there were 32 patients. On the other hand, all patients of Type-I group, since the diagnosis time of diabetes were having insulin treatment.

Calculated the diabetes duration of 10 years as long period and found 56% (42) patients of Type-II and 51.52% (17) patients of Type-I patients, having long duration of diabetes. Used HbA1c level to analyze the glycaemic control. This analysis showed that more than 10% of HbA1c with P-value as less than 0.001 the poor glycaemic control was there in 20.93% (09) patients of Type-II group who were on dietary therapy and/or oral hypoglycaemic agent and 46.88% (15) patients of Type-II group having insulin treatment as compared to Type-I there were 48.48% (16) patients found with poor glycaemic control. According to the established standards published in literature, granted poor, fair, good and excellent grad levels to glycaemic control [7]. Clear picture shown below in the table.

**Table No 1: Relationship Ratio of Glycaemic Control and Mode of Therapy**

Mode of Therapy	Excellent	Good	Fair	Poor
Type-I (n=33)	06.0 %	18.2 %	27.3 %	48.1 %
Type-II Insulin (n=32)	06.2 %	21.9 %	25.0 %	40.9 %
Type-II Oral (n=43)	11.6 %	41.9 %	25.6 %	20.9 %



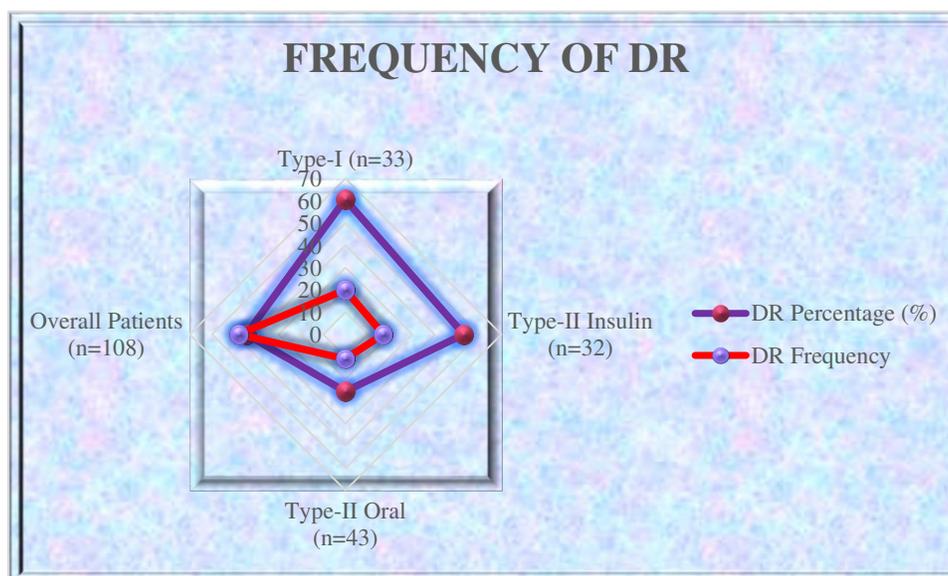
In IDDM Type-I group found 60.61% (20) patients of retinopathy through fundoscopic examination, whereas, in NIDDM Type-II group there was 37.33% (28) patients found victims of retinopathy. Among which 25.58 % (11) patients were having dietary therapy and/or oral hypoglycaemic agent and 53.13 % (17) patients were having insulin treatment directly. Regardless of diabetes type observed DR more often in patients of long term diabetes.

Observed retinopathic changes with P-value less than 0.001 in all those patients who were having diabetes for more than 20 years in Type-I group. Whereas, found retinopathic changes much less with P-value less than 0.02 in Type-II group patients having diabetes over 20 years as only 77.33 % patients involved in it.

In Type-I group found no patient having retinopathy with HbA1c level as less than 7 percent which is a very significant finding. On the other hand, 42.42 % (14) patients of IDDM faced this problem having HbA1c level >10 % with P-value less than 0.01. observed matching findings Type-II group also which was as 66.7% patients having dietary treatment and/or oral hypoglycaemic agent with poor glycemic control having HbA1c level more than 10 % in singe of DR and 86.6 % patients taking insulin treatment with poor glycemic control having HbA1c level more than 10 % in singe of DR. there was just no subject having HbA1c level less than 7 % in Type-II group. In this Type-II group with insulin treatment observed more diabetic retinopathy as clarity described below in the table.

**Table No 2: Occurrence of DR with Type of Treatment**

Type of Therapy	DR Percentage (%)	DR Frequency
Type-I (n=33)	60.600	20
Type-II Insulin (n=32)	53.125	17
Type-II Oral (n=43)	25.581	11
Overall Patients (n=108)	44.445	48



### DISCUSSION:

The main reason of loss of vision and blindness in young patients of diabetes having age as >40 years is progressive rise in Diabetic Retinopathy (DR) [2].

Changed patterns of living styles of diabetic persons might be the reason of this increase. Diabetes duration and type, overall glycaemic control as well as presence of other comorbid and therapy mode

directly affect the occurrence of DR [16]. According to the findings of this study occurrence of DR is higher as 60 % in Typ-I group as compared to Type-II group which showed 37 % occurrence rate. These results are similar to the findings of Henricsson et al research according to which patients having DR in Type-I were 63.9% and 36.01 % were there in Type-II [17]. Our findings were a little higher than those of Romero Aroca study (27.5%) [18]. According to the results of present research study in Type-I group found occurrence of DR at very high ratio in women than men that was 54.5% while in Type-II group it was 1:1. Similar findings shown by Naem MK et al and Pradeepa R et al in their research papers [20, 21] and also supported by a study done at Bahawalpur which showed similar findings without concerning to diabetes type [19].

Amongst 108 patients of this study total of 65 patients were receiving insulin treatment of both groups and among them 56.9 % (37) patients faced DR. this analysis clearly represent that DR have a huge concern with insulin treatment. In sub groups of Type-II groups those who were receiving insulin, 53.09 % suffered from DR as in comparison to oral hypoglycaemics.

According to the findings of Henricsson et al 16% patients of Type-I group who were having diabetes for less than 5 year suffered from DR [17] and in current study the result was 12.6%. A sharp increase in the occurrence of DR observed from five year to ten year and > 90% after 15 years of time period according to international data analyses. Whereas, findings of our study clearly show that after the 20 years duration of diabetes, DR was present in every patient. Matching results also shown by some other studies as EURODIAB study there was >82% prevalence of DR and according to Goldstien et al it was in 100% patients [22, 23]. Patients who got well glycaemic control faced lesser microvascular problems as observed by Karamanos et al [24].

Over 20 years and < 5 years duration of diabetes, evidence of DR seen in 17.72% and 77.76% of patients of Type-II group with P-value less than 0.02. Matching data is there as 16.1% and 71.9% in Henricsson et al study [17]. With reducing glucose levels, the microvascular complications also reduce according to the findings of Cahill in 1976 [25]. Higher development of DR and poor glycaemic control are directly proportional to each other according too many researchers [26, 27, 28]. Poor glycaemic control resulted in increase of DR as imitated by extreme values of HbA1c as in Type-I and Type-II groups it showed 87.5 % and 86.5 %

respectively. This result was similar as per findings of Monique SR et al [16].

Significantly linked complications with cruelty of DR shown as insulin therapy, glycosylated hemoglobin (HbA1c), duration of diabetes and male gender according to the Chennai Urban Rural Epidemiology Study (CURES) held by Pradeepa R et al, some other studies also showed the same relations [21]. Present comparative research held in Lahore is unique of its kind and recommends the results of previous held studies and its data information may also be the road map for diabetologists and doctors about DR. But results may not work for public as the size of sample was too much small, so as, to find out the inter connection of DR to these risk factors bigger scale researches are necessary for the actions.

### CONCLUSION:

After the analyses of the data of present comparative research study concluded that frequency of DR increases in patients using insulin for diabetes irrespective of type and poor glycaemic control and lengthy diabetes durations clearly linked with DR.

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