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Research Article

INTERLINK BETWEEN HCV INFECTION AND GLYCEMIC CONTROL IN TYPE 2 DIABETES MELLITUS PATIENTS¹Dr. Sana Riaz, ²Dr. Amir Abbas, ³Dr. Aiman Shirin^{1,2,3}House Surgeon at Mayo Hospital, Lahore.**Abstract:**

Objectives: *Aspire of this document is to explain relationship between hepatitis C virus HCV and type 2 diabetes mellitus (T2DM) by referring the Glycemic control level.*

Study Design: *Descriptive and Cross Sectional*

Duration and Setting: *This study was carried out in 06 months containing period of June, 2018 to December, 2018. Research site was General Medicine OPD of the Mayo Hospital Lahore.*

Methodology: *Accomplishment of the subject study was done by endorsement of ethical committee of the hospital. The examination survey was done on as 216 patients of type 2 diabetes mellitus (T2DM). Addition and deletion of the proceedings of the study was carried by using the third generation ELISA and antibodies of anti-HCV. The samples of Anti-HCV antibodies were taken for the tests to determine the values of HbA1c and blood sugar. The patients of type 2 diabetes mellitus (T2DM) with the value of HbA1c \leq 6.5 % were of excellent Glycemic control and the patients with $>$ 6.5 % HbA1c values were pathetic Glycemic control.*

Results: *The genre of patients was the female and male of mean age group of 54.5 and Standard Deviation was of 24.6 years. The female patients were 118 and male were 98 among the total of 216 patients having the percentage of 54.63 % and 45.37 % respectively. Hepatitis C Virus (HCV) infection was noticed in 13.89 percent of patients that were 15 in number and type 2 diabetes mellitus (T2DM) is diagnosed in these patients. 71.29 percent patients (154) of the total were noticed with the low-level Glycemic control and 28.70 percent patients (62) were noticed with high level Glycemic control on the level of HbA1c. In contrast with patients having the low-level Glycemic control, the HCV infection ratio was high in the patients having good Glycemic control. Poor value was 0.2536 and it proves that such findings in statistics are of no consequence.*

Conclusion: *The patients of type 2 diabetes mellitus (T2DM) who have the low-level Glycemic control have extensive Hepatitis C Virus (HCV) infection rate rather than the patients have good Glycemic control.*

Keywords: *Hepatitis C Virus (HCV), Type 2 diabetes mellitus (T2DM), HbA1c, Glycemic Control.*

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INTRODUCTION:

Diabetes mellitus is increasing with considerable high rate of occurrence in all over the world and has the variable rate of occurrence in the different regions of the world. Effects of diabetes, commonly long-term health issues, are vascular complications in heart, kidneys, brain, eyes, and legs. Rate of occurrence of diabetes in the regions of the industrial states is 20% which is expected to increase at 60% by 2030 A.D in contrast with 2010 A.D. In the continent of Africa up to 2030 A.D. diabetes patients will attain the approximation of 18 to 24 million that will make upsetting circumstances [1].

In global survey, in 2014 AD, there were diagnostics of diabetes in the population of more than 287 million. Estimations are made that this will surmount the figure of 592 million in the 2035 AD. There is a remarkable increase in the spread of this disease. Diabetes was diagnosed in more than 287 million people back in 2014, whereas it is globally expected that the same number will cross the total of 592 million by the end of 2035. Hepatitis-C infection is associated with highly prevalence diabetes mellitus. Near about 170 million of population is victim of this disease worldly as it is predicted and among from them 80% population is identified chronically infected with this disease. Chronic infections of HCV can cause large scale of death cases where as its complication will create the morbidity of liver and kidneys. Furthermore, its associated diseases are cancer of liver and cirrhosis cancer [2].

There are several articles and publications are present on the link between hepatitis C virus HCV and type 2 diabetes mellitus (T2DM). As noticed, the risk of being infected by type 2 diabetes mellitus (T2DM) in the presence of HCV infection increased as compared to the non-HCV and vice versa [2, 3].

As it is earlier described that HCV is endorsed to liver and cirrhosis cancer, the study shows that near about 3% hepatitis C virus HCV has been diagnosed in 170 million populations of whole world. It is also very clear concept that liver is not the main reason of the hepatitis C virus HCV infection but some terminologies of supplementary hepatic nature are the foremost characteristic of this infection i.e porphyriacutaneatarda, sialadenitis and cryoglobulinemia. Contradiction in the diabetic rate of type 2 diabetes mellitus and non-diabetic rate of type 2 diabetes mellitus is also found in survey reports of the link between hepatitis C virus HCV infection and type 2 diabetes mellitus (T2DM). There are three research reports of the different regions of the world on the relation of diabetic and non-diabetic of type 2 mellitus. The first one study report is of the

Taiwan, which reveals that during the research on the link between hepatitis C virus HCV infection and type 2 diabetes mellitus (T2DM), when the seropositivity of hepatitis C virus HCV in patients of diabetic of type 2 is judged against the non-diabetic it is increased by 2.8 time as were found in non-diabetic patients. Approximately the same findings were there in the reports of the research survey in Italy i.e the seropositivity of hepatitis C virus HCV in patients of diabetic of type 2 was 3 times greater when it is judged against the non-diabetic with the prevalence of 2.3%. Very similar tendency is found in the study which was done in Pakistan that seropositivity was the 3.03 times greater with same above conditions [4].

As described that risk factor for prevalence of T2DM will increased with association of the HCV infection increases the risk or the glycemic control will be very poor with the associated T2DM and in this situation it is hard to maintained the controlled level of glycemic because this above situation make contribution to increase the insulin resistance. Such outcomes of the research studies can be use in the case handling and diagnostics of hepatitis C virus and its associated complications in the T2DM patients for the suppression of the morbidity rate and mortality rate. The research, cross-sectional in nature, was started after getting approval from the hospital's ethical committee. The population selected for the research was the 216 patients of T2DM and among them the female and male of mean age group of 54.5 and Standard Deviation was of 24.6 years. This research contained the period of 6 months starting from June, 2018 up to December, 2018 and research site was General Medicine OPD of the Mayo Hospital Lahore. The size of samples was designed according to the requirements of the WHO sample calculation. The patients selected for the collection of samples according to the successive non-probability sampling process. 95% level of confidence was guaranteed with 5% accuracy, estimated 7.6% peoples and confidence level [5, 6].

Both genres of patients were selected of such nature of disease that satisfied the requirement of the research. The female patients were 118 and male were 98 among the total of 216 patients having the percentage of 54.63 % and 45.37 % respectively. Range of age of the patients which were diagnosed with T2DM was 21-60 years and all patients are with this disease with period of less than 15 years. In this research exclusion of some patients is made having these details; patients with having a background cases blood transfusion, ketoacidosis presentation, tattooing on body, organs transplantation, intravenous drugs,

irregular lipid metabolism, positive B serology of Hepatitis and (ALT >double the normal range) and patients of Type 1 diabetes mellitus.

The diagnostic values for the type 2 diagnosis of mellitus type T2DM are; Normal fasting plasma glucose level is >126 mg/dl and random plasma glucose level is ≥ 200 mg/dL (11.1 mmol/L). Addition and deletion of the proceedings of the study was carried by using the 3rd generation ELISA and antibodies of anti-HCV. The samples of Anti-HCV antibodies were taken for the tests to determine the values of HbA1c and blood sugar. The patients of type 2 diabetes mellitus (T2DM) with the value of HbA1c ≤ 6.5 % were of excellent Glycemic control and the patients with > 6.5 % HbA1c values were pathetic Glycemic control. Collection of the data from the proceeding of the research is made by the questionnaires and different Performa's and all the data is recorded and examined through SPSS V.21. Statistical calculation of the qualitative variables of the data is by Mean and Standard Deviation SD in the tabulation. Collected data is tabularized and is with the graphical representations in numbers and in % for the better understandings and analysis to made the research upshots. The comparison of the HCV decease between good and poor levels of the Glycemic control having the p-value of < 0.05 as major concern [7].

RESULTS:

The genre of patients was the female and male of mean age group of 54.5 and Standard Deviation was of 24.6 years. The female patients were 118 and male were 98 among the total of 216 patients having the percentage of 54.63 % and 45.37 % respectively. Hepatitis C Virus (HCV) infection was noticed in 13.89 percent of patients that were 15 in number and type 2 diabetes mellitus (T2DM) is diagnosed in these patients. 71.29 percent patients (154) of the total were noticed with the low-level Glycemic control and 28.70 percent patients (62) were noticed with high level Glycemic control on the level of HbA1c. In contrast with patients having the low-level Glycemic control, the HCV infection ratio

was high in the patients having good Glycemic control. Poor value was 0.2536 and it proves that such findings in statistics are of no consequence.

Classification of the all data is done in tabular form.

In table 1 the classification of data is done by grouped frequency distribution method. Class interval is age distribution, total number of patients is 216 n=216 of HCV infection and Glycemic control.

Table No 1.1: Distribution of Age, HCV infection and Glycemic control (n=108)

Age of Patients in Years	No of Patients	Percentage
21-30	18	8%
31-40	48	22%
41-50	84	39%
51-60	68	31%
Mean \pm SD	54.5 \pm 24.63	

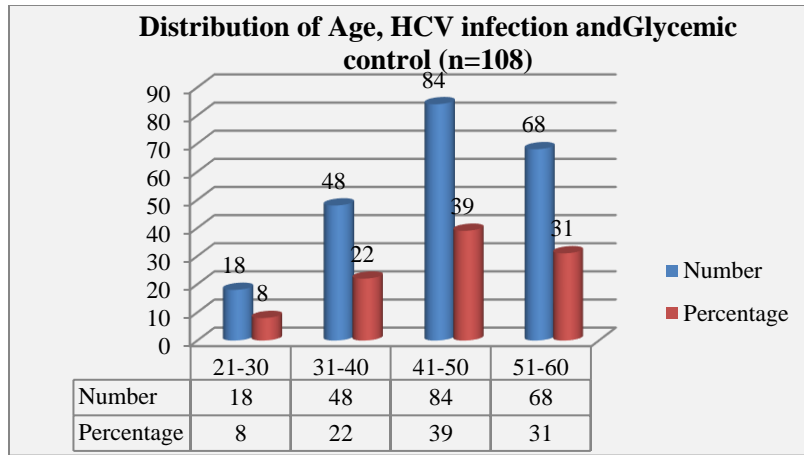


Table No 1.2: Gender wise Percentage

Gender of Patients	Number	Percentage
Men	98	45.37%
Women	118	54.63%

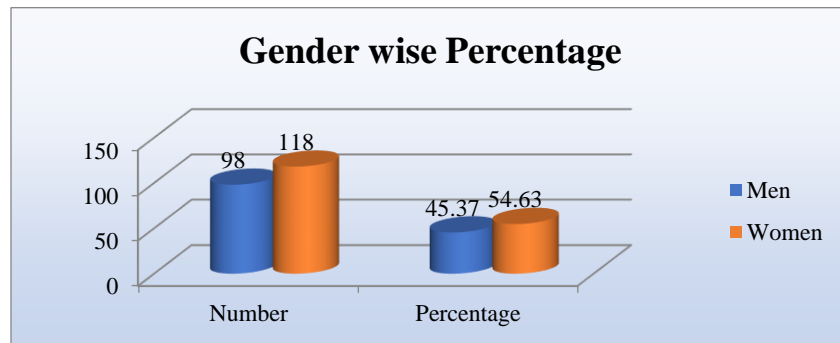


Table No 1.3: Glycemic Control

Glycemic Control	Number	Percentage
Good	62	28.5%
Poor	154	71.29%

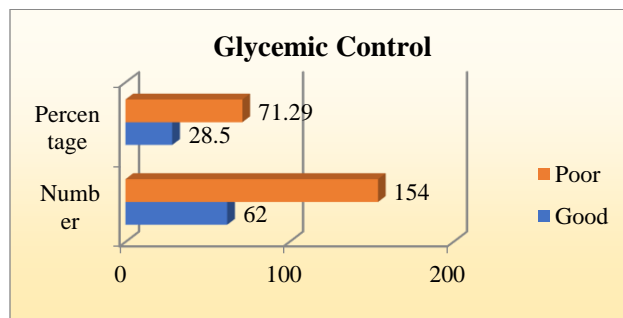


Table No02: Interlink of HCV with Glycemic Control

Good Glycemic Control	Poor Glycemic Control	Glycemic
Hepatitis-C	N=62	N=154

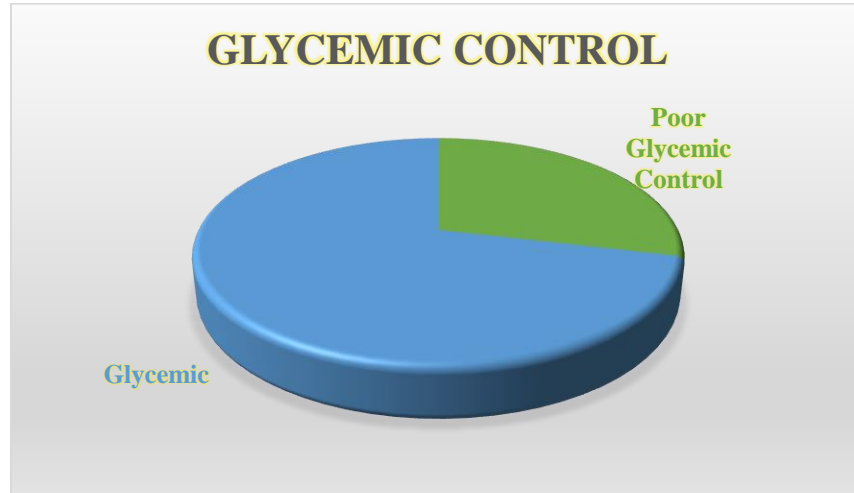
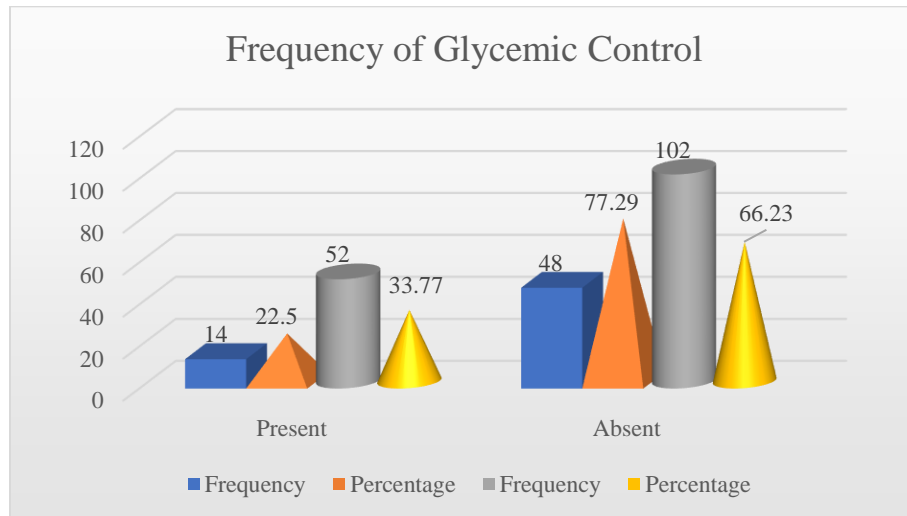


Table No 2.2: Frequency of Glycemic Control

Virus	Frequency	Percentage	Frequency	Percentage	P- Value
Present	14	22.5%	52	33.77%	0.2536
Absent	48	77.29%	102	66.23%	*
Total	62	100%	154	100%	-

**DISCUSSION:**

Both patients of the type 2 diabetes and the hepatitis C virus infection have ambiguity of pathogenesis and etiology. Further it is also important that the link

between the fibrosis and insulin resistance can never be neglected. The reasons that become the cause for the prevalence this wide spreading problematic concern are HIV co-infection, obesity, ageing, having the family history with diabetes mellitus and

distressed everyday life [8,9]. These patients of diabetes have metabolism by the reaction of the homeostasis and abnormal balancing of glucose and homeostasis. In all over the world the type 2 diabetes mellitus is becoming the hot problematic concern in the field of medical [10]. Several research reports show that near about 171 million population of the world is the victim of the diabetes and main threatening condition is that this number is not freeze at this value but is it increasing day by day. In our country circumstances are not different from the rest of the world. The 3% to 7.2% population is affected by the diabetes mellitus. This ratio of effected peoples by this disease in the region of south Asia is approximately 4% to 6% [11, 12].

The study reports of this research prove that age factor make a main contribution in the prevalence of the HCV infection. The old age factor makes a great contribution as comparison to the young age factor and furthermore other concerned literature and journals also comments the same approximation [13].

There is another fact which declares that prevalence of the hepatitis C virus is also gender based. Men are the easy target for the infection of HCV and decease of type 2 diabetes mellitus instead of women and as per analysis men have the greater rate of victimization of infection of hepatitis C virus. Among from the 15 patients with +ve HCV infection there will be 9 male patients and 6 female patients having the percentage of 60% and 40% respectively and ratio of men vs women will be 60:40. Same estimations for the men patients of +ve HCV are also made by Caronia et al. Result can be derived that men have greater ratio of infection of the HCV than the women [14, 15, 16].

Profound interlink is present in earlier researches and literature on the subject matter that hepatitis C virus HCV infection has direct impact on type 2 diabetes mellitus. A number of opinion and facts reinforce the link between these two diseases; e.g. shortcoming in the emission of insulin has a link with the HCV pathophysiology that directly causes diabetes of type 2. High insulin resistance and hepatic glucose are the other reasons for infection of hepatitis C virus. Some other reasons are also which may be a cause of +ve HCV i.e family history and ageing factor in type 2 hepatitis patients. Current research results have also the matching figures with the previous ones as just mentioned the infection of hepatitis C virus were found in the patients is 13.89% for the Type 2 diabetes mellitus and the 84.26% were declared -ve. And currently noted records were also matched with the previously noted ones. Some earlier researches also reveal that in the type 2 diabetes patients there is

the greater prevalence rate of hepatitis C infection due the link between these two. Another dramatic and interesting situation is that there was surprising dissimilarity had found in the diagnostic of Type 2 diabetes in blackish and whitish people. This surprising dissimilarity was as blackish patients were victim of Type 2 diabetes with 28% and whitish patients with 12% [18]. In the perspective of Glycemic control level, a great quantity of patients was made a diagnosis with poor Glycemic control, out of total reported cases 154 patients having the percentage of 71.29% was record. While on the side with the perspective of the HbA2c level out of total the 62 patients having the percentage of 28.78% were recorded with good Glycemic control and hepatitis C infection had the high ratio than the good Glycemic control with the percentage of 28.70% since 33.77% patients was with poor Glycemic control. According to the results there was noticeable great rate of Glycemic control patients was manifested in a large quantity [17].

A significant large prevalence of hepatitis C infection is present in the patients who have dealt with poor control and poor management of the diabetes. On account of strict HbA1c, the rate of hepatitis C infection was recorded having percentage of 33.77% in contrast with patients that had good Glycemic control. Similar frequency of HCV was observed as 22.58% in the patients who had the good Glycemic control [18]

If good and standardized health care amenities are provided to the general community of the prevalence of the diabetes cases and the death cases due to this decease can be minimized in a large stuff. And the prevalence of the diabetes can also be minimized by prompt treatment in the early stage of this disease. Amenities for the treatment of the diabetes for the general community are comprises on some available factors and some prerequisites; i.e provision of insulin injections, adherence and awareness, HbA1c tests and blood glucose level monitoring system [19].

CONCLUSION:

HCV and T2DM are both the chronic diseases that have widespread occurrences with a large global prevalence. The findings of this document provide evidence that prejudice of glucose accompanied with HCV infection because it has great prevalence in the patients of T2DM with poor Glycemic control. As per the research results it has been proven that underscore glucose prejudice in the patients of Hepatitis C because it has greatly prevalent in the patients of T2DM of pathetic Glycemic control. As an example, pathophysiologic relation is available in

the interlink of problem in the insulin emission and HCV that may become the reason for the T2DM disease. There is another cause of this matter is massive insulin resistance and hepatic glucose that causes the core-coding in the expanse of hepatitis C that produce the noticeable insulin resistance directly or indirectly. Some other reasons are also which may be a cause of +ve HCV i.e family history and ageing factor in type 2 hepatitis patients.

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