CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.1297645

Available online at: http://www.iajps.com Research Article

CORRELATION BETWEEN HEPATITIS C AND DIABETES MELLITUS: A CROSS SECTIONAL STUDY

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Abstract:

Objective: *The aim of our study was to establish any co-relation between Hepatitis C and Diabetes Mellitus.* ***Methodology:*** *We collect our data from Madina Teaching Hospital and Allied Hospital Faisalabad during period of April to June 2014, with the help of questionnaire method. We did a cross sectional study on 100 patients in which 50 were diabetics and 50 were HCV positive. We did not include HBV infected patients and Type 1 diabetes patients.* ***Results:*** *According to our study results, 19% patients were co-infected with both diseases. Among them, 34% diabetics developed HCV infection and 4% HCV positive developed diabetes later in life. Moreover, 26% of co-infected patients had positive family history for both diseases. 58% of the co-infected patients were taking injectable therapy for diabetes mellitus and 53% of them had the average glucose level >300mg/dl. There were 42% patients who developed hypertension, 11% developed lung diseases, 5% developed heart diseases while 42% had not developed any other disease.* ***Conclusion:*** *So, it can be concluded that there is a co-relation between type 2 diabetes and HCV infection but it is undetermined either HCV leads to diabetes mellitus or vice versa.*

Key Words: *Diabetes Mellitus, hepatitis C, correlation.*

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Please cite this article in press Aaisha Arif et al., ***Correlation between Hepatitis C and Diabetes Mellitus: A Cross Sectional Study,*** *Indo Am. J. P. Sci, 2018; 05(06).*

INTRODUCTION:

Hepatitis C virus (HCV) infection and Type 2 Diabetes are two worldwide major public health problems with increasing morbidity and mortality rate. Hepatitis C virus (HCV) has been identified as one of the leading causes of chronic liver disease with serious sequel as the end stage of cirrhosis and liver cancer. While Diabetes mellitus is a chronic disease of metabolism causing abnormal glucose homeostasis. The third Health and Nutrition Examination Survey (NHANES III) showed that among persons ≥40 years of age, those with HCV infection were more than three times more likely than those without HCV infection to have Type 2 Diabetes [1].

Infection with HCV affects not only the liver but the extra hepatic tissues as well. A number of extra hepatic manifestations have been recognized including Diabetes mellitus type 2. It is possible that HCV may serve as an additional risk factor for the development of Diabetes mellitus type 2, beyond that attributable to chronic liver disease alone.

TNF-α may be the link between HCV infection and Diabetes mellitus type 2. HCV patients have insulin resistance and specific defects in the insulin signaling pathway. Activation of tumor necrosis factor- α system has a pivotal role in the inflammatory process of chronic hepatitis C and TNF- α levels correlate with degree of inflammation. TNF-α is known to cause insulin resistance, with similar defects in insulin signaling pathway to those describe in HCV infection. HCV replication may be favored by hyperinsulinemia and/or the increased serum levels of free fatty acids observed in patients with Insulin resistance and Type 2 DM [2]. Recently, a threefold increase in the prevalence of glucose abnormalities was observed in HCV-positive subjects compared with HCV-negative subjects. Also, patients with HCV and its complications can be predisposed to impaired glucose intolerance because of corticosteroid and hydrochlorthiazide therapy or hemochromatosis. Thus HCV promotes IR mainly interfering with insulin signaling pathway in hepatocytes, increasing inflammatory response with production of cytokines such as TNF-α and IL-16 and increasing oxidative stress. And individuals with type 2 Diabetes mellitus is more prone to develop HCV infection mainly because Type 2 DM is, to some extent, associated with an immunocompromised state, which leads to derangement of immune function. Both Insulin Resistance and Type 2 DM may play a role in the alteration of the natural course of HCV infection, thus leading to enhanced steatosis, steatohepatitis and liver fibrosis. Risk is increased because of their low immunity and more parentral exposures because of use of finger prick devices.[3]

The world health organization has estimated that 180million people are infected with HCV in 2009. The global prevalence of HCV infection is 2.3-3% in the US and Europe, prevalence is 1.6-1.8% and 1-2.3% respectively. Burden of disease is greatest among developing countries, the highest reported prevalence are in China(3.2)Egypt(22%)Pakistan(4.8%) [4]. Pakistan is the 6th most populous country in the world with an estimated population of 16,094,300. Within Pakistan the HCV prevalence rate varies between the four provinces, prevalence rate reported in Punjab is 6.7%, in Sindh 5%, in Balochistan 1.5% and in Khyber Pakhtunkhwa 1.1%. High prevalence area of HCV in Punjab are Vehari,Okara,Jhang,Islamabad,attock,Raheem Yar Khan,Mandi Bhauddin,Gujranwala(6.3%) and Mianwali [5]

Globally, it is estimated that 382 million people worldwide have Diabetes Type 2 with a prevalance of 8.3%. In 2004, an estimated 3.4 million people died from the disease. WHO projects that Diabetes will be the 7th leading cause of death in 2030 [6]. Diabetes has become an important public health problem in Pakistan with 7.1 million diabetics in 2010 expected to rise to 13.8 million in 2030 when the country will rank fourth in terms of number of patients aged 20-79 with diabetes.

The rationale of this study is the high prevalance of HCV and Diabetes in our country. Hence the co-infection of Type 2 Diabetes and HCV has been established to worsen these conditions, with this scenario it has become very necessary for screening exercise to determine the relationship between diabetes and hepatitis C so as to increase awareness of the population and health practitioners on the dangers of co-infectious state of this virus with Diabetes.

MATERIALS AND METHODS:

Setting: Madina Teaching Hospital Faisalabad And Allied Hospital Faisalabad
Duration: April to June (2014)
Inclusion Criteria: HCV positive patients and Type 2 Diabetic patients
Exclusion Criteria: HBV positive and Type 1 Diabetic patients
Study Type: Descriptive Study
Sample Size: 100 patients
Objectives:

The main objective of our study is

1. To identify the prevalence of co infection of Hepatitis C and Type 2 Diabetes mellitus.
2. To identify impact of these two diseases on life.
3. To promote health education and to improve quality of life.

RESULTS:

According to our study results, 19% patients were co-infected with both diseases. Among them, 34% diabetics developed HCV infection and 4% HCV positive developed diabetes later in life. Moreover, 26% of co-infected patients had positive family history for both diseases. 58% of the co-infected patients were taking injectable therapy for diabetes mellitus and 53% of them had the average glucose level >300mg/dl. There were 42% patients who developed hypertension, 11% developed lung diseases, 5% developed heart diseases while 42% had not developed any other disease.

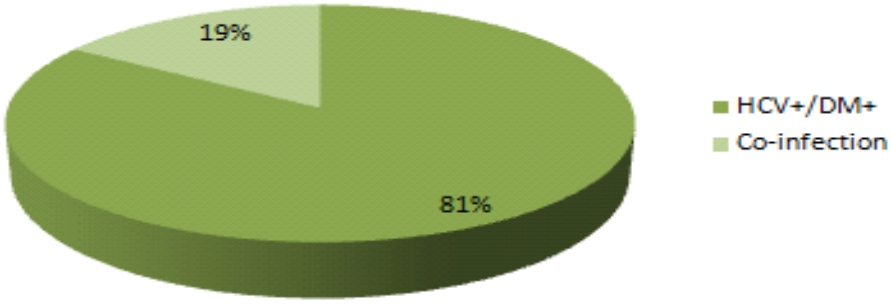

Fig.1 Frequency of co-infection in either HCV+ or Diabetic patients

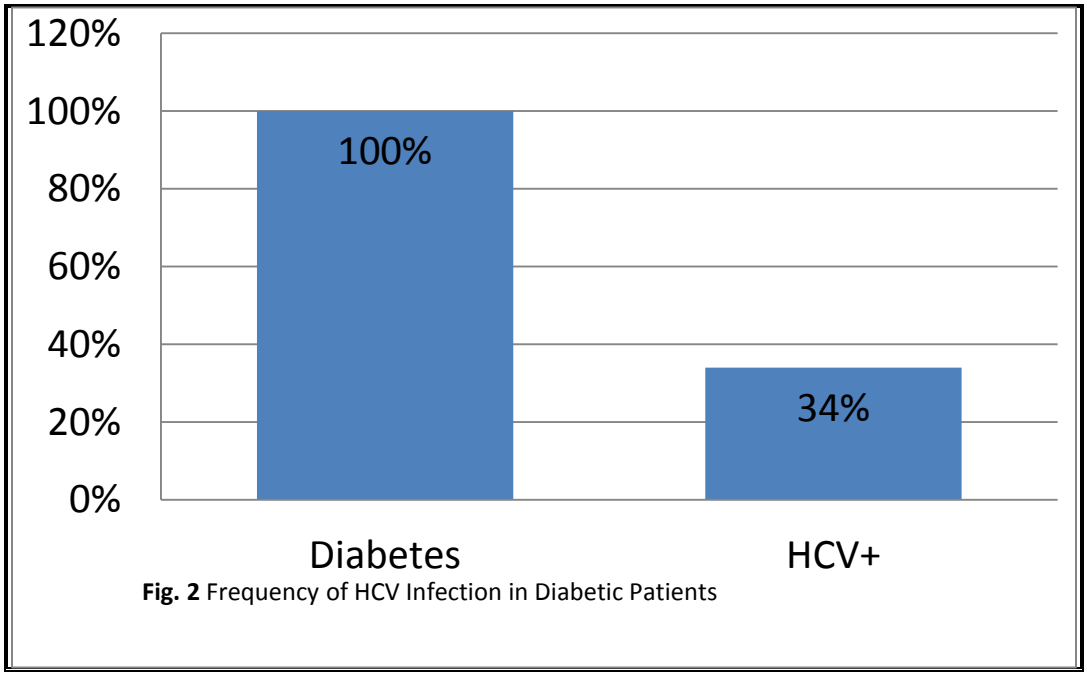

Fig. 2 Frequency of HCV Infection in Diabetic Patients

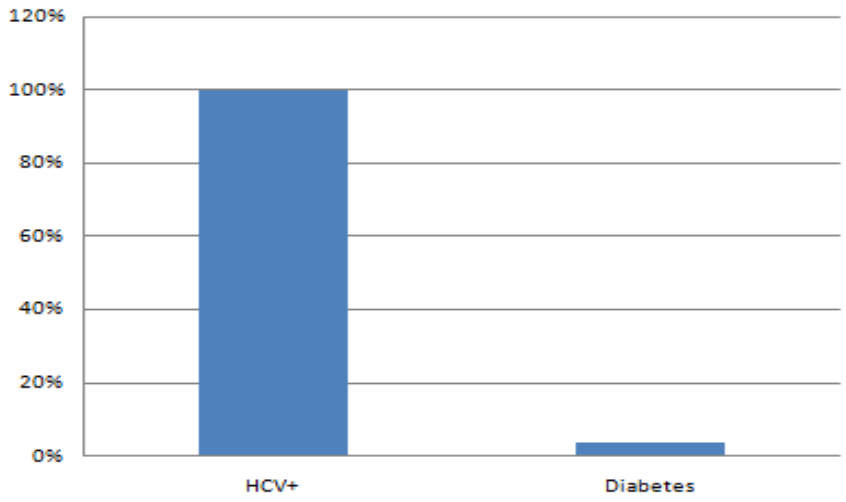

Fig. 3 Frequency of diabetes In Hepatitis C Patients

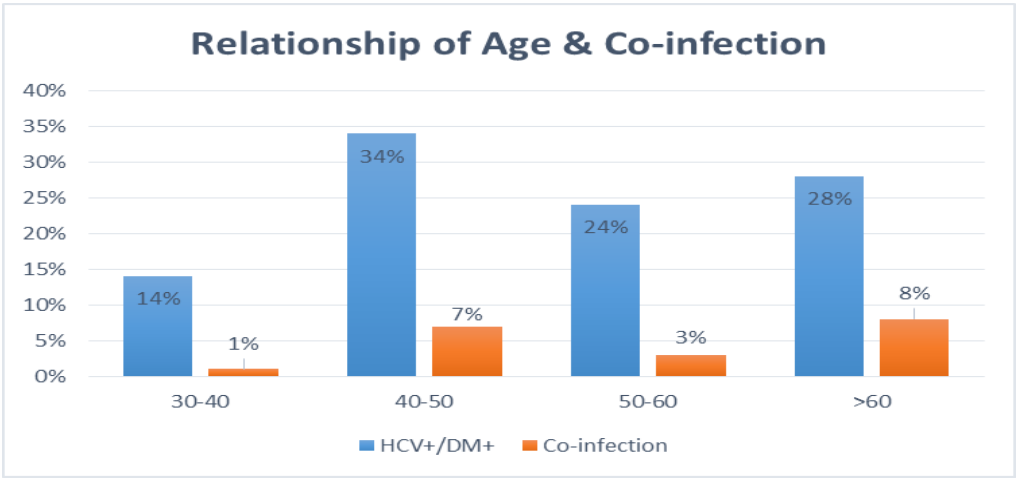

Fig. 4 It shows that Risk of co-infection increases with age.

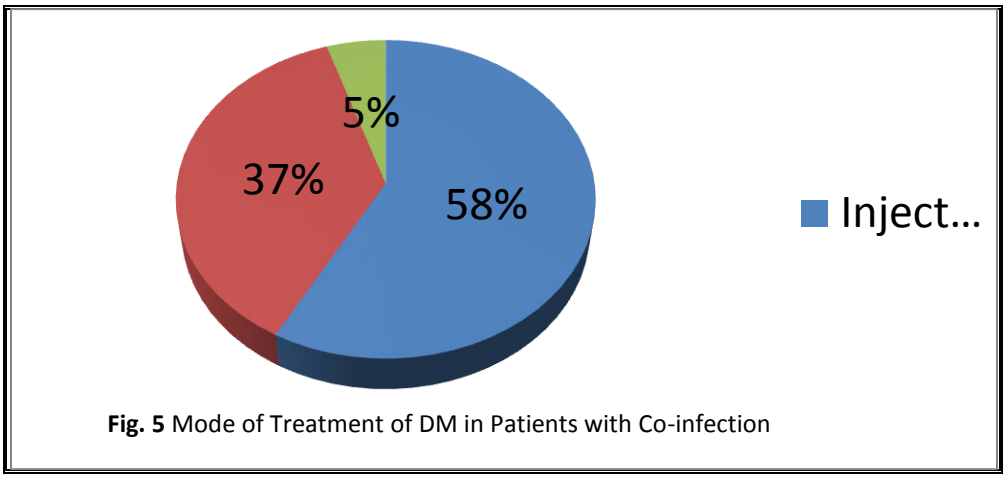

Fig. 5 Mode of Treatment of DM in Patients with Co-infection

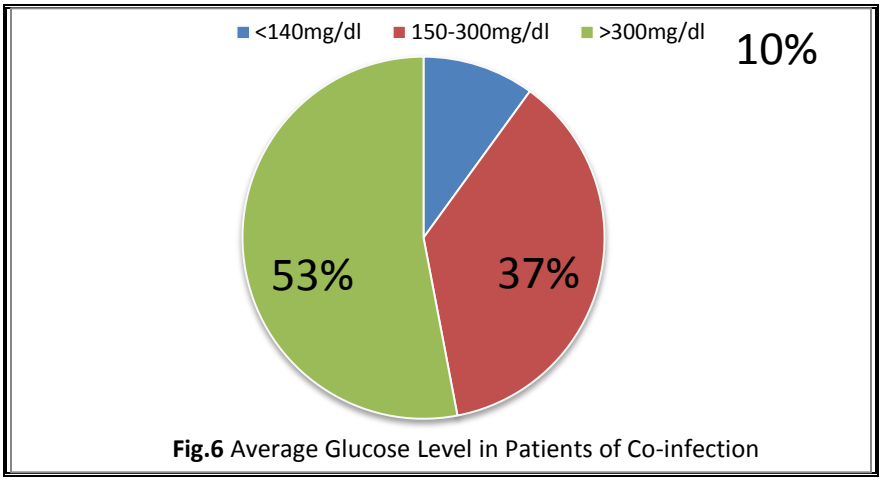

Fig.6 Average Glucose Level in Patients of Co-infection

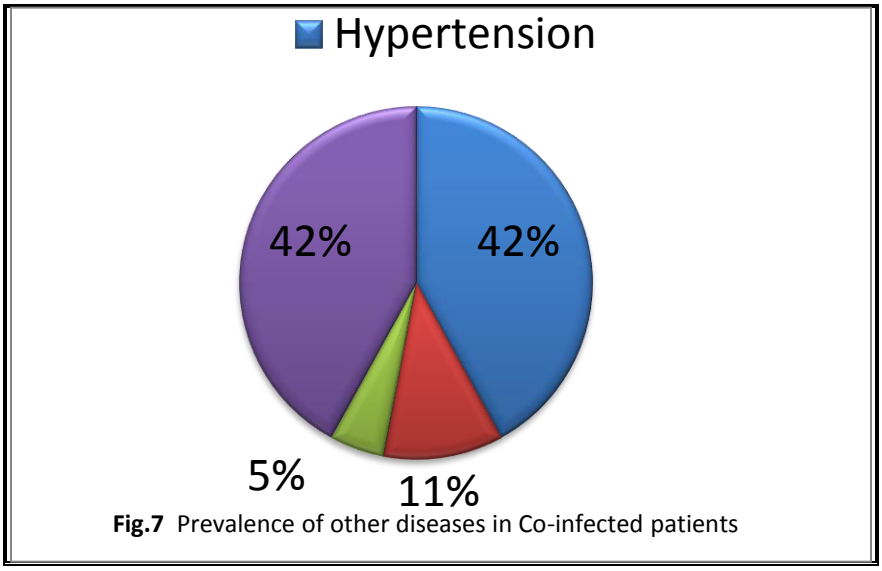

Fig.7 Prevalence of other diseases in Co-infected patients

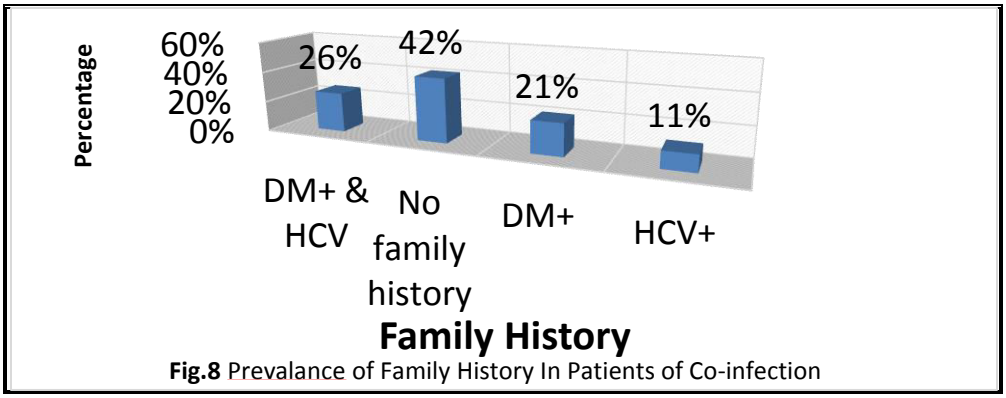

Fig.8 Prevalance of Family History In Patients of Co-infection

DISCUSSION:

We conducted a study to find out any correlation between Hepatitis C and Diabetes. The aim of this study was to evaluate relationship between Type 2 Diabetes Mellitus and HCV infection and to examine whether Type 2 Diabetes Mellitus enhances the risk of HCV infection compared with the risk in general population and vice versa. Both diseases present a large health care burden. Moreover, HCV infection and type 2 Diabetes mellitus may coexist in an individual. HCV infection and Type 2 Diabetes are two major public health problem associated with increasing complications and mortality rates worldwide.

This study provides epidemiological data to link HCV infection and diabetes. The study was conducted on 100 individuals, of which 50 were HCV+ve and 50 were known Diabetics. According to the study results out of 100 individuals either HCV+ve Or DM+ve, 19% were co-infected (Fig. 1). Patients who were first diagnosed as diabetics, 34% of them have had developed HCV infection later (fig. 2) while on the other hand, patients who were HCV+ve first, 4% of them have had developed Diabetes Mellitus later in life (Fig. 3). A case control study design was conducted at JIMMA University in 2010, according to that research, the prevalence of HCV infection in type 2 diabetes sufferers was 9.9 % [7]. According to another research conducted in America in February 1999 on "association of Diabetes mellitus and Chronic Hepatitis C Virus Infection", Diabetes was observed in 24 % of HCV infected patients as well as more than 20% diabetics had developed HCV infection later [8].

According to our study, the risk of co-infection increases with age (Fig. 4). According to The Third National Health And Nutrition Examination Survey, held in 1988-1994, persons 40 years of age or older with HCV infection were more than three times more likely, than those without HCV infection, to have Type 2 Diabetes [9]. While another study conducted in USA, when patients were segregated by quintiles for age, an increased frequency of Diabetes was observed in patients with HCV infection in all but the youngest age range. In support of this finding, Fraser et al. also documented that both HCV infection and increasing age were independent risk factors for Diabetes [10].

According to our study results patients of DM who developed HCV infection later in life, 37% of them had not received any type of treatment for Diabetes. However, from the remaining 63%, 58% were receiving treatment by parenteral route and 5% by oral route (Fig.5). In support of this finding, another study states that most patients with diabetes often withdraw blood and perform glycemic assessments so, diabetic patients should be highly careful about the risk factors associated with viral hepatitis e.g. needle prick, transfusion, hospitalization and surgical procedures.

According to our results, patients who developed co-infection, 53% of them have average glucose level of >300mg/dl, 37% have between 150-300mg/dl and only 10% have <140mg/dl (Fig.6). It suggests that bad glucose control increases the risk of HCV infection. Another study, conducted by Morbitzer KA, et al. in August 2014, demonstrated that Diabetes is strongly associated with an increased risk of Hepatitis C Virus-related fibrosis development and good glycemic control may reduce this risk.

In our study while finding the prevalence of other diseases in co-infected patients we had found that 42% of them have developed Hypertension, 11% lung diseases and 5% heart diseases while 42% have developed no other significant ailment (Fig.7). According to another study, conducted in 1992 by Epstein M, the incidence of Hypertension rises upto 70% at 40 years of age in patients of Diabetes. According to another study, published in Journal of Viral Hepatology in 2010, HCV infection is associated with both obstructive and restrictive lung diseases [11].

According to our study results, 42% of co-infected patients have had no family history of HCV or DM. While 26% of them have family history of both diseases and 21% and 11% have positive family history for Diabetes and HCV infection respectively (Fig.8). According to another study, conducted in Batna in July 2010, a family history of Diabetes appeared to be matched, of the subjects infected with HCV, 35.5%. Patients with family history of Diabetes were more likely to have DM compared with those without family history. For patients with a family history of DM, the prevalence of Diabetes was significantly higher in subjects with HCV infection [12].

There are some limitations in our study. Our sample size consisted of 100 individuals only, that is why, we cannot apply our study results on the whole population. As we performed a cross-sectional type of study and time period was also shorter, it might create bias. We collected our data by questionnaire method and we did not perform any lab investigations e.g HCV RNA detection and as most observational studies have the potential for

ascertainment bias, particularly studies in which Diabetes status was defined via self-report, so actual cause and effect relationship cannot be established in our study. Finally, because consistent data regarding patient level were not available for each study, we were unable to make further inferences regarding important factors such as genotype which were not included in most of the primary studies.

Despite these limitations, the current study has a few advantages and provides an insight for future study. For example, there were other factors related to either liver disease or diabetes that were not satisfactorily addressed in this study, e.g. data concerning increased body mass index, cirrhosis of liver, anti-viral treatment, viral genotype and evidence of non-alcoholic steatohepatitis were not derived for the study, which are associated with type 2 diabetes. Another variable not addressed in this study was alcohol consumption on the assumption that the prevalence of alcohol abuse is not so prevalent in our society. Nevertheless, HCV infection cannot be considered to be a cause of diabetes and vice versa without establishing a temporal relationship for the development of each disorder and prospective studies are clearly needed to clarify these issues.

CONCLUSION:

In conclusion, we have established a relationship between type 2 Diabetes mellitus and HCV infection. It remained undetermined whether HCV leads to diabetes or vice versa, but it can be argued that Diabetes increases the risk for the development of HCV infection and HCV infection can make an individual more prone to develop diabetes mellitus. The current analysis also reflects the need for more extensive and detailed studies.

REFERENCES:

1- Andrew L. Mason., et al. 1999,Hepatology,"Association of diabetes mellitus and chronic hepatitis C virus infection" p. 328-333, vol. 29, No. 2
2- H. Knobler, A. Fchattner "TNF Alpha, chronic hepatitis C and Diabetes: A novel triad" QJM, http//..qjmed.oxfordjournals.org
3- Allison MED Wreghitt T, Palmer CR, Alexander GJM. Evidence for a link between Hepatits C virus infection and Diabetes mellitus in a cirrhotic population. J Hepatol 1994;21:1135/1139
4- Epidemiology of Hepatitis C: current prevalence rates,World Health Orgnization. http//..www.who.com
5- Epidemiology of Hepatitis CinPakistan:prevalenceinPunjab. http//..www.mpsonline.com
6- Epidemiology of Hepatitis C: current prevalence rates,World Health Orgnization. http//..www.who.com
7- Solomon Ali, Solomon Abeera, Adane M, Tamrat A. Association of hepatits C virus infection with type 2 diabetes in Ethiopia: ahospital based case control study. Interdisciplinary Perspectives on Infectious diseases 2012;1-7
8- Andrew L Mason. Et al. 1999; Association of diabetes mellitus and chronic hepatits C virus infection.29:328-333
9- Petrides As. Liver disease and Diabetes mellitus. Diabetes Rev 1994;2:2-18
10 Fraser GM, Harman I, Meller N, Niv Y, Porath A. Diabetes mellitus is associated with chronic hepatits C but not chronic hepatitis B virus infection. Isr J Med sci 1996; 32:526-530
11- Niedereau C, Fischer R, Sonnenberg A, et Al. Survival and causes of death in cirrhotic and non cirrhotic patients with primary hemochromatosis. N Eng1 J Med 1985;313:1256-1262
12- Nwankiti, O. O. et Al. Hepatitis C virus infection in apparently healthy individuals with family history of Diabetes in Vom, Plateau State Nigeria. Virol J6, 110(2009).