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## Diabetes and Hepatitis C: Two sides of a coin

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### Abstract

**Background:** Hepatitis C virus or HCV is a blood borne pathogen, transmitted primarily via blood, body secretions and by piercing through skin (percutaneous), veins and mucosal surfaces. Prevalence of HCV in Pakistan is 4.5-8%. The prevalence of HCV in diabetic patients is reported to be 14.9% in 2016. Different studies show different prevalence of Hepatitis C in local population of Pakistan. This study was designed to find out the prevalence of HCV in diabetic patients of different age groups and gender.

**Methods:** Blood samples from 259 diabetic patients were collected at Diabetes Testing and Screening Camp arranged by Akhuwat Health Services (AHS) at Township, Lahore. People of all age groups and gender were invited. Results were entered in MS Excel and analyzed on SPSS 19.

**Results:** Out of 259 patients, 53% were females while 47% were males. This study shows the prevalence of HCV in Diabetic Patients as 8%. It was observed in diabetic patients, that females and patients from age group 30-40 years had high prevalence of HCV.

**Conclusion:** The prevalence of Hepatitis C is high in the diabetic patients as compared to general population. HCV has a greater incidence in diabetic females of age group (30-40 years).

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## Introduction

Viral hepatitis is one of the most serious pandemic disease. Many viruses cause hepatitis, but only few of them are medically important, which include HCV, HBV, HAV, HEV and HDV [1-3]. Number of studies have been done to find out the prevalence of HCV in Pakistan and worldwide [4, 5]. To check the variations in prevalence of HCV in the world, countries are grouped into Global Burden of Disease regions. The highest prevalence of HCV is reported to be in Central/East Asia (3.8%) and North Africa/Middle East regions (3.6%) [6]. HCV is an emerging major health issue of developing countries, including Pakistan having a prevalence rate of 4.5% to 8% (second highest prevalence rate of hepatitis C among developing countries). Prevalence rate of HCV is as high as 25% in rural and underdeveloped peri-urban areas and 40% in small targeted groups including drug abusers, blood donors, chronic liver disease patients and healthcare professionals. However, literature is still not conclusive to portrait the real image due to its limitation on identifying the incidence in healthy individuals [4, 7, 8]. Recent studies show that there are 130-175 million people suffering from HCV out of which 350,000 die annually [6]. The prevalence of Hepatitis C in adult male of Punjab and Northern Pakistan is 4.5% and 4.0% respectively [9, 10]. The prevalence of Hepatitis C in Type 2 Diabetes Mellitus is 14.9% [11].

HCV is a small, enveloped single stranded RNA virus; two types of glycoproteins (E1 and E2) are present on its surface. E2 glycoprotein binds the host cell through the interaction with scavenger receptor class B type I (SR-B1) and CD81 thus, target the neutralizing antibodies [12-14]. HCV is a blood borne pathogen, transmitted primarily via blood, other body secretions and by piercing through skin (percutaneous), veins and mucosal surfaces [2,3,15]. The major modes of transmission of HCV are; through unsafe therapeutic injections usage, transfusion of blood and blood product, shaving with unsterilized instruments by barbers, tattooing, transmission from mother to child, unsafe sexual intercourse, hemodialysis, needle-stick injuries among health professionals, and poor personal hygiene habits [16-19].

Re-use of contaminated needles or surgical instruments and improper screening of blood are the major risk factors [15]. Low socioeconomic status and

poor hygienic environment are considered to be other major factors of such high rate of HCV infection [20]. Approximately, 67% population in 148 countries are infected with HCV through injecting drugs [21]. Globally, reuse of unsterilized injections leads to approximately 2-5 million HCV infections, which lead to the high burden of morbidities and mortalities [22, 23]. HCV infection has serious sequel; it can lead to acute and chronic hepatitis, liver diseases, liver cirrhosis or hepato-cellular carcinoma (HCC). Acute Hepatitis C clears within 6 months in 20% cases and about 80% cases become chronic and may progress in chronic liver diseases [2, 7, 24].

The aim of this study was to find the prevalence of Hepatitis C in diabetic patients in different age groups and gender.

## Methods

In this cross sectional study, blood samples from 259 diabetic patients were collected at Diabetes Testing and Screening Camp by Akhuwat Health Services (AHS) at Township, Lahore. People of all age groups and genders were invited. Blood was collected in evacuated tubes containing EDTA as an anti-coagulant. Tubes were centrifuged at 3400-4000 RPM for 5-10 minutes to collect plasma, which was stored at -2°C ice bags. Samples were taken to the laboratory, where HCV screening test was done on Immuno-chromatographic Kits of RapiCard™ InstaTest (Reference Number 118773-1-44) by Diagnostic Automation/Cortez Diagnostic Incorporation USA. Results of the laboratory tests were stored in Microsoft EXCEL and analyzed using the Statistical Package for Social Sciences (SPSS 19.0.verison).

## Results

### Distribution of Diabetic Patients

In this cross-sectional study, total 259 patients were screened. Out of 259 patients, 53% (138/259) were females while 47% (121/259) were males. Frequency of different age groups <20, 20-30, 30-40, 40-50 and >50 years were 7% (17/259), 13% (35/259), 25% (64/259), 27% (69/259) and 28% (74/259) respectively (Table 1).

### Distribution of HCV Positive Diabetic Patients

The prevalence of HCV in Diabetic Patients was 8% (21/259). Out of 21 HCV positive patients, 62% (13/21) were females while 38% (8/21) were males. The

proportion of HCV positive patients on their age groups <20, 20-30, 30-40, 40-50 and >50 years were 5% (1/21), 24% (5/21), 33% (7/21), 14% (3/21) and 24% (5/21) (Table 2).

Age Groups	Frequency (n=259)	Percentage
<20	17	7%
20-30	35	13%
30-40	64	25%
40-50	69	27%
>50	74	28%

Table 1: Different age groups of diabetic patients

Age Groups	Frequency (n=21)	Percentage
<20	1	5%
20-30	5	24%
30-40	7	33%
40-50	3	14%
>50	5	24%

Table 2: Different age groups of HCV positive diabetic patients

When the frequencies of age and gender of positive cases of HCV were checked, there were remarkable difference seen in both gender and age groups. Prevalence of HCV was significantly high in diabetic females (62%) as compared to diabetic male (38%). It was also observed in the results of this study that the prevalence of diabetes was high in 30-40 years age group i.e. 33% as shown in table 2.

## Discussion

This study was conducted to evaluate the prevalence of Hepatitis C in diabetic patients of different age and gender. Current study estimates the prevalence of HCV as 8% in diabetic patients. Hussain *et al*, also reported a high prevalence (14.9%) of HCV in diabetic patients in 2016 [11]. Findings of other studies done in Pakistan, UK, USA also support result of current study [25-28]. L. K. Chen *et al* in 2005 reported that a prevalence of HCV in diabetic patients which he reasoned might be the complication of diabetic therapy [29]. Result of current study are comparable to the studies done in Saudi Arabia [30] and Greek [31] and in Islamabad [32], Multan [26], Jhelum [33], Faisalabad [34] and Wah Cantt [35].

Results of this study revealed that hepatitis C is highly prevalent in diabetic females as compared to diabetic males. In 2016, same results were reported in the study of Essa [30] and Kanwal [36]. There was no significant difference seen in the study of Jadoon and Ndako

[26,37]. In contrary, Rehman *et al* in 2017 reported the highest prevalence of HCV in diabetic males [38].

The result showed that adults (30-40 years) have high frequency of HCV that was 33%. Same results were showed in the study of Rehman (2017) and Bostan (2016) [38, 39]. Ahmad *et al* in 2010 reported the same kind of results that frequency of HCV infection in people ≤ 40 years of age was higher than those people > 40 years of age in Lahore [40]. Results of this study are in conflict with the previous studies of N. Muhammad *et al* in 2005 which showed that prevalence of HCV in Pakistan is more frequent in > 50 years of age [41]. Previous studies showed that the prevalence of HCV was high in 45-55 years of age groups [37, 42]. This might be due to an early diagnosis and increasing awareness of HCV in urban areas of Pakistan [16]. N. H. Saleem *et al* in 2008 showed that the modes of transmission of HCV were more significantly linked with age groups however other risk factors like blood transfusion, dental surgery and road accidents equally distributed in all age groups [43].

The prevalence of Hepatitis C is high in the diabetic patients as compared to the general population of Lahore, Pakistan. Diabetic patients of age group (30-40) years have the highest risk for HCV. In diabetic patients gender is also a risk factor for the Hepatitis C. Further studies are needed to find out the basics behind these high prevalence.

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