RESEARCH PAPER

Transmission routes of hepatitis C virus in Rahim Yar Khan: hospital based study

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Abstract

Hepatitis C virus (HCV) is the dominant cause of chronic liver disease and responsible foraround eight million people in Pakistan as per national hepatitis survey. This study aimed atexploring causes and risks related to increasing rate of occurrence of disease and to explore the route of transmission of hepatitis C virus in patients visiting the Sheikh Zayed Hospital in Rahim Yar Khan. This cross-sectional study included 684paticipants, visiting Sheikh Zayed Hospital in Rahim Yar Khan. The questionnaires were filled by all participants and included information related to dietary pattern, disease history, risk factors and risk behavior like history of blood transfusions, surgical intervention, injection drug use, sexually transmitted diseases, accidental needle stick injuries treated by traditional doctors. Blood samples of the patients were collected to diagnose hepatitisC by immuno-chromatographic methods (ICT) and then further confirmed by PCR technique. Most common route of HCV transmission was unknownroute, 57.5 % (n=363) followed by dental procedures, 17.1% (n= 117) while third most common route of transmission was surgical procedures 12.0 %. The association between route of transmission and duration of disease was highly significant (p< 0.001).The study revealed that dental and surgical procedures were identified as main routes of transmission of hepatitisbut majority of patients were unaware of route of acquiring hepatitis C (HCV) infection. Hepatitis awareness programs, prevention and treatment plans should be communicated to general population for controlling enhanced burden ofHepatitus C in small cities like RahimYar Khan.

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Introduction

Hepatitis C virus (HCV) is a blood-borne pathogen and an important concern in terms of global health concern(Adeyemi *et al,* 2013).It usually starts as acute and asymptomatic in initial stages, but later on acute HCV infection may lead to chronic infections such as liver cirrhosis and cancer. According to WHO one seventy million people are living with chronic HCV worldwide Hepatitis C is estimated to cause 366,000 deaths annually globally (Akhtar *et al,* 2016). In China, the prevalence rate categorized from 1% to 31.86%, depending on the regions of lowest and highest endemic cities whilst the prevalence rate is 1.8% in Saudi Arabia (Al Kanaani *et al,* 2018). In Pakistan, around 08 million people have been currently suffered with HCV, according to reports have been shown in the National Hepatitis Survey. The reason of being having the world's outstanding burdens of viral hepatitis in Pakistan is that the majority of the people infected with HCV are totally unaware of their infection status leading to delayed diagnosis and treatment. Delayed diagnosis can have further consequences, including cirrhosis, decompensated chronic liver disease (DCLD) and Hepatitus HCC, eventually elevating the disease liability for a poor resource country like Pakistan(Akhtar *et al,* 2016). Pakistan has the second greatest HCV burden in the world, with the transmission being impelled by diversified risk factors, including community, such as barbering, ear and nose piercing as well as health care practice blood transfusion, medical injections and injecting drug use. According to recent estimates, 7.0 million persons were chronically infected with hepatitis C, with the implication that Pakistan puts up with one-tenth of the global burden of HCV (Ali *et al,* 2010).

All over the world the antenatal HCV infection rates have a variation, from 1% to 2.5% in the United States and Europe to over 10% in some sub-Saharan countries (Aziz *et al,* 2013). HCV is a leading cause of chronic liver disease, being associated with an estimated 180 million people infected worldwide (Bruggmanna and Grebely, 2015). Currently, hepatitis is the 7th preeminent cause of death globally (Hafeez-

ud-din *et al,* 2012). The risk factors linked to transmission of infection can help anticipate the prevalence of HCV in population(Jilan*et al,* 2017) There are various risk factors and possible transmission routes of Hepatitis C including HCV in blood and blood products as absolute source of infection (Khan *et al,* 2018). Injecting drug use is the chief route of transmission in most countries, as a blood borne virus (Kwon *et al,* 2014). The most common routes of HCV transmission in developing country are the re-uses of needles/syringes and unsafe injections (Lim *et al,* 2018). The chief transmission risk factor for HCV in the world are the intravenous drug abusers (IVDA). The dominant risk factors have been reported in our country include, injections, intravenous drug users (IDUs), surgical, dental procedures, tattooing, ear piercing and shaving by barbers (Mahmood and Raja, 2017).

In Pakistan, a huge fraction of rural population has a tendency to go to the barbers for facial shave (Mati Ullah *et al,* 2016). Most of the time barberdoes not use disposable razors which may be contaminated and usually may be reused (Mati Ullah *et al,* 2016).

The hepatitis C virus is resilient and is able of surviving on drug preparation equipment such as needles, syringes, filters and water for many days to weeks (Kwon *et al,* 2014). Only random checkups for various purposes detect individuals suffering from HCV infection, an important percentage of which are asymptomatic (Mohamed *et al,* 2015). As reported by a study HCV awareness was just 19.0% in the IDU population of Lahore and Quetta (Morozov and Lagaye, 2018). Public awareness programs are necessary to diminish the future burden of HCV infection in the Pakistani population (Mujtaba *et al,* 2011).

There are several studies which have shown a prevalence of Hepatitis C in Pakistan According to the data available from the Pakistani population, prevalence of hepatitis C is 4–6%, whereas one community-based study in Karachi have been shown that the prevalence of hepatitis is 6.6% (Nazir *et al,*

2017). In another study which was conducted in Hafizabad, Punjab, revealed 6.5% prevalence of hepatitis C in that city with total prevalence all over in general Pakistani population is 5.3%(Nazir *et al,* 2017).

However, there is no such study conducted to evaluate the transmission routes of Hepatitis C in local areas of Southern Punjab, especially in Rahim Yar Khan. Therefore, this study is conducted to determine the possible transmission factors responsible for Hepatitis C in District Rahim Yar Khan located in South Punjab.

Materials and methods

Study design

The current study is cross sectional study and was carried out at Sheikh Zayed Hospital located in Rahim Yar Khan. All the patients (age > 18) visited or admitted to the hospital were included in the study, which were referred to the lab for blood investigation. After obtaining written consent to participate in this study prior to enrollment, a questionnaire was filled by all the subjects.

The information recorded included dietary pattern, disease history, risk factors and risk behavior comprised a history of blood transfusions transplants, surgical intervention, infectious hepatitis C, injection drug use, sexually transmitted diseases, accidental needle stick injuries treated by traditional doctors, travelling outside tattoos, piercings or employment or any other risks or behavior recorded. Their weight, height, waist and hip circumferences were measured, and BMI (Body Mass Index) was computed. Each of the subjects provided written informed consent to participate in the study prior to enrollment.

The blood samples were collected in properly labeled containers. HbsAgand Anti HCV antibodies were initially tested by rapidimmuno-chromatographic methods (ICT) while all the positive samples were further confirmed by polymerase chain reaction (PCR).

Data was entered in SPSS-23 and statistical analysis was done to determine the frequency of descriptive variables. Predictive value model of Galen and Gambino was utilized to calculate sensitivity, specificity, positive predictive values of immunochromatographic assay in the diagnosis of HBV and HCV infections taking false positive, false negative, truepositive and true negative cases and using enzymeimmunoassay as gold standard globally(Hafeez-ud-din *et al,* 2012).

Results

During the study period of 6 months, several patients referred by doctors were tested for hepatitis C specific antibodies by Immunochromatographic technique (ICT). This test was positive in 625 patients, out ofthese 625 patients the diagnosis of hepatitis C was confirmed in 620 (6.6%) patients by PCR method.

The mean age of the patients participated in the study was 40.85 + 1.212 years. Fig. 1 shows a comparison of statistics of hepatitis between male and females. It shows that the ratio of occurrence of hepatitis C in males is 48.1% (n=329) as compared to females 51.9 %, (n= 355). The duration of a majority of the cases having hepatitis C was about one month, 26.6% (n= 182) followed by 12.3% (n=84) having hepatitis C since a year. Around 6.3% (n=43) were found to have hepatitis since 2 months. Around 9.9% (n=66) had hepatitis C since two years.

Table 1. Various routes and treatment observed in Hepatitis C.

Route	n	(%)	Treatment	n	(%)	P value
Unknown	393	57.5	Hakeem	81	11.8	
Dental	117	17.1	Injection	14	2.0	0.0001
Surgery	82	12.0	Nil	565	82.6	
Blood Transfusion	31	4.5	Tablets	23	3.4	

When patients were asked for the treatment taken as shown in Fig. 2, around 11.8% (n=81) were reported treatment by hakeem. The ratio of females (n=45) as compared to males (n=36) is more often than males.

The majority of the individuals 82.6% (565) reported nil treatment. Around 3.4 % (n=23) reported having taken tablets. Injection use was reported by only 2.0% (n=14) (2.0%).

Table 2. Correlation between duration and route of transmission of hepatitis.

Route	n	(%)	Duration	n	(%)	P Value
Unknown	393	57.5	1 M	182	26.6	
Dental	117	17.1	1 Yr	84	12.3	0.0001
Surgery	82	12.0	2 Yr	68	9.9	
Blood Transfusion	31	4.5	2 Months	43	6.3	

Regarding the route of acquiring hepatitis C, as shown in Table 1, the majority of the 57.5% (n=363)participants reported unknown route means they were unaware of any possibility of available routes experienced.

On the other hand, dental procedures were mentioned as second most common route of transmission of hepatitis by 17.1% (n= 117). The third most common route of transmission was surgical procedures, i.e. 12.0 % (n= 82). While the other common route of transmission was found to be Blood Transfusion for about 4.5% (n=31) participants. Smoking was also reported by 2.2 % (n=15) while drug addiction was reported by 8 (1.2%). The association between the route of transmission and the duration of disease was highly significant (p< 0.0001) as mentioned in Table 2.
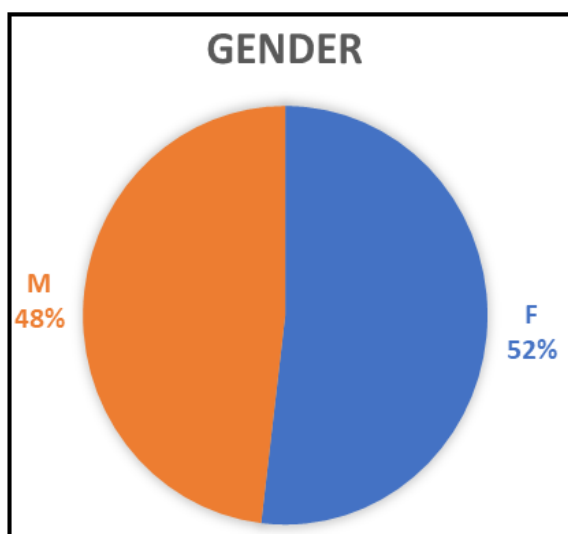

Fig. 1. Comparison of occurrence of hepatitis between males and females.

Discussion

Globally, around 170 million people are infected with Hepatitis C virus (HCV) (Rathore, *et al,* 2012). The global prevalence of HCV infection is established as 3%, while the prevalence in Asia is generally proclaimed to be 1-2%, with the exclusion of a few countries (Shon *et al*, 2015).   The chief source of hepatitis C virus (HCV) infection is the infected blood, its products as well as other body fluids (Umar and Bilal, 2012).

In our study similar to a study by Khan *et al*, the research subjects were initially tested on ICT followed by PCR method. Also in this study, the percentage of hepatitis C diagnosed on PCR method was 6.6%, little higher than the study by Khan *et al.*, 2018 being 2.66% (Waheed *et al*, 2017). The results of this study are similar to one study showing that the highly frequent risk factor was the use of injection present in 21 (77%) patients (Mujtaba *et al,* 2011).

According to the another study, the highly frequent risk factor was history of therapeutic injections in 454 (44.3%) cases (Waheed, *et al,* 2010).On the other hand, it was shown in one report that blood transfusion as one of the major routes of viral hepatitis (Adeyemi *et al,* 2013).According to a study by Adeyemi *et al,* the false negative results in the blood banking led to the transfusion of infected blood to an uninfected person. Our study was partially similar to study by Adeyemi *et al* as a history of blood transfusion was second most prevalent risk factor being in 11(40%) (Waheed *et al,* 2009).
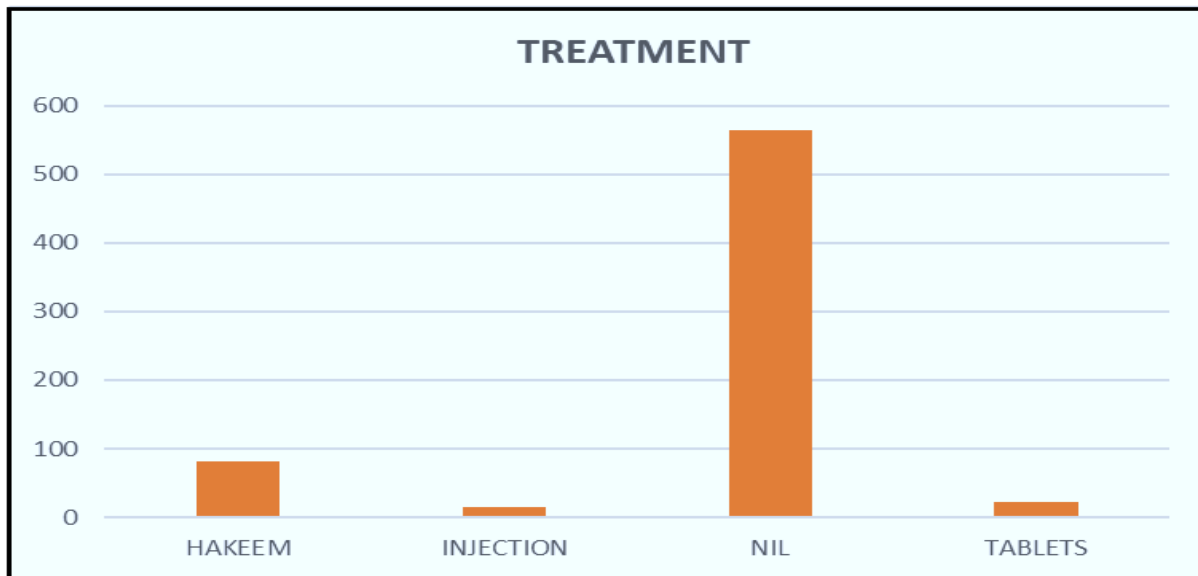
Fig. 2. Comparison of ways of treatment followed by patients.

Our study is moderately in concordance with one study which was conducted by Muhammad *et al* regarding the prevalence of HCV in relation to age groups and showed that high prevalence of HCV was among middle-aged (40-50 years) people (Yeung *et al*, 2014).Similar to this study, in our study also amongst the patients with HCV antibodies, second highest number of individuals fell in the age group 40-50 years. Our study revealed age group 10-20 years, having the minimum number of patients 3 (3.2%) with HCV antibodies similar to study by Mati Ullah et sal which showed, 3.61% prevalence among patients of age group 1-15 (Zameer *et al*, 2016).

Our study revealed a high magnitude of hepatitis C cases in Rahim Yar Khan Punjab. As the majority of the population is less educated therefore unsafe injection practices as well as poor sterilization techniques during dental procedures and surgeries have been found to be the chief modes of transmission of hepatitis C in Rahim Yar Khan. It is also shown in a study that majority of people do not know about the transmission routes and hence depicts overall poor knowledge about the prevention and treatment of hepatitis C among the general population. The transmission of infections via dental procedures and surgeries indicate that the use of preventive measures is very poor in Rahim Yar Khan. Safe disposal and incineration of syringes and other infected materialsin biohazard bags must be properly carried out in all hospitals in Rahim YarKhan.

It is also recommended that the practice of sterilization should be improved during dental procedures and surgeries in dental clinics and dental hospitals too. Specialized training workshops on preventive measures for HCV infection should be arranged for healthcare professional's as well general population to give awareness especially in small cities like Rahim Yar Khan.

Conclusion

This study was performed to explore the possible predominant routes of hepatitis C in patients visited a hospital in Rahim Yar Khan and it was found that dental and other surgical procedures were the most common routes identified while the majority of the patients were unaware of the route of disease due to lack of knowledge and education about the transmission and prevention of hepatitis C disease. It is suggested that awareness programs regarding the transmission pattern and prevention of hepatitis C need to be conducted more frequently to aware the general community of small cities.

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