

Risk factors of hepatitis C in Pakistan

Abstract

Pakistan is facing an epidemic of hepatitis C in the country. Almost 10 million people are affected with hepatitis C in Pakistan. Most of the people are unaware of their health status because the disease is asymptomatic in its initial course. The major causes of disease spread are unsafe blood transfusions, re-use of therapeutic syringes, unsafe medical and surgical practices, shaving at barbers, ear and nose piercing. Pakistan is a middle income country and has limited resources. Therefore, it should more focus on devising and implementing the effective preventive strategies to reduce the disease burden of hepatitis C.

Keywords: prevention, hcv, Pakistan, risk factors, prevalence, disease patterns

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Hassan Mahmood,¹ Riffat Raja²

¹Pakistan Health Research Council (PHRC), Pakistan

²Consultant Radiologist, Islamabad, Pakistan

Correspondence: Hassan Mahmood, Medical Officer for Viral Hepatitis, Pakistan Health Research Council (PHRC), Islamabad, Pakistan Independent Consultant, Cooperative Agreement, TEPHINET-CDC, Pakistan, Tel +92-300-5416871, Email hassanmahmood@hotmail.com

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Introduction

Hepatitis C virus (HCV) infection is major causes of infectious disease morbidity and mortality globally, most morbidity and mortality is due to sequel of chronic infection such as hepatocellular carcinoma (HCC) and decompensated cirrhosis.¹ WHO estimates that 170 million people are living with chronic HCV worldwide.^{2,3} Hepatitis C is estimated to cause 366,000 deaths annually.⁴

Pakistan has one of the world's largest burdens of viral hepatitis.² According to a National Hepatitis Survey, approximately 08 million people are living with HCV in Pakistan.⁵ Most of the people infected with HCV are not aware of their infection status resulting in delayed diagnosis and treatment.⁶ Delayed diagnosis can result in sequel such as cirrhosis, decompensated chronic liver disease (DCLD) and HCC, ultimately increasing the disease burden for a poor resource country like Pakistan.⁶

Many studies have been conducted to evaluate risk factors for transmission of HCV. One study conducted in 1994 in Pakistan found that household members who had received four or more injections per year have 9–11 times greater chance of being infected with HCV.⁷ Bari et al.⁸ found that increased use of unsafe injections and receiving shave from barbers are significant risk factors⁸ Shah et al.⁹ found that blood transfusions, surgical procedures, therapeutic injections by quacks, dental procedures, and shaving from barbers were important risk factors for hepatitis C.⁹ Rehman et al.¹⁰ showed that health care workers (HCW) are at high risk of suffering from hepatitis.¹⁰ Akhtar S et al.¹¹ determined that patients with history of hospitalization or those who have received multiple therapeutic injections are at high risk of getting the disease.¹¹

Public health importance

WHO named HCV as a “viral time bomb” because 170 million people are infected with HCV infection worldwide.¹² Out of these, 130 million are chronic carriers of the disease and at risk of developing complications of infection particularly chronic liver disease (CLD), such as chronic hepatitis, liver cirrhosis hepatocellular carcinoma.¹² HCV seroprevalence was found to have a range from 1 % to 12% in South Asia.^{13,14} There are three to four million incident cases annually and 70% of them are at risk of developing chronic hepatitis. In developed countries, two third of liver transplant and 50-76% of liver cancers are caused by HCV infection.¹² According to World Health Statistics 2008, liver cirrhosis was the 18th commonest cause

of mortality worldwide and if it remains uncontrolled, by 2030, it will become the 13th commonest cause of mortality.¹⁵

It is said that about 20 to 30 % patients with chronic HCV infection will develop cirrhosis over a period of 20 years. Thus the quality of life of these patients is greatly impaired due to the complications caused by cirrhosis like; encephalopathy, ascites, coagulopathy, spontaneous bacterial peritonitis, variceal bleeding and hepatocellular carcinoma (HCC). Some of HCV related mortality statistics by worldwide region are as follows (Table 1).¹⁵

Global prevalence of HCV infection

Prevalence of HCV varies in different parts of the world because of different medical, social, cultural, political and behavioural practices. Following Table 2 shows HCV prevalence submitted to WHO by different countries.¹⁶

Table 1 HCV related mortality statistics worldwide

Region	No. of HCV related deaths in 2002
Africa	8,000
America	7,000
South East Asia	14,000
Europe	4,000
Eastern Mediterranean	5,000
Western Pacific	14,000

Incidence of HCV

Incidence rate of HCV fluctuates greatly owing to the asymptomatic and latent course of infection.¹⁷ Much less data are available about the incidence of HCV infection because of silent nature of the disease.¹⁷ A difficulty in establishing the incidence of HCV infection leads to difficulties in monitoring the effectiveness of primary preventive measures since prevalence data are not enough for this. However, the reported incidence rate for HCV seroconversion is 11-29/100 persons/year.¹⁸ Seroconversion is termed as the development of detectable specific antibodies to microorganisms in the blood serum as a result of infection. HCV is found in the blood at low levels and routine serological tests are not very reliable to detect the disease.¹⁹ Therefore, more sensitive and specific tests like polymerase chain reaction (PCR) and enzyme linked immunosorbent assay (ELISA) are required to confirm the diagnosis.¹⁹

Table 2 Global prevalence of HCV

Region	Total population (Millions)	Infected population (Millions)	Prevalence (%)
Africa	602	31.9	5.3
America	785	13.1	1.7
Eastern Mediterranean	466	21.3	4.6
Europe	858	8.9	1.03
South-East Asia	1500	32.3	2.15
Western Pacific	1600	62.2	3.9
Total	5811	169.7	18.7

Demographic features of Pakistan

Pakistan has a population of 173 million people with the highest fertility rate of more than four children per woman.^{2,20} It is a developing country with population of low socioeconomic status and poor education. According to human development index of the United Nations, it was ranked 134th out of 174 countries.²⁰ It covers an area of 796,096 sq. Kilo-metres and is divided into four provinces (Figure 1); Punjab, Sindh, Khyberpakhtunkhwa (Previously known as NWFP), and Balochistan as well as federally administered areas including the capital (Islamabad).²

**Figure 1** Map of Pakistan.

Current situation in Pakistan

HCV infection is endemic in different parts of the world.⁵ However, prevalence and incidence of HCV considerably changes with geographic and temporal variation.² Although HCV is becoming a major threat to public health, yet there is very limited information about prevalence and incidence of HCV in Pakistan as compared to most of the developed countries (e.g. UK and USA) of the world where there is enough information about the prevalence and incidence.²² However, attempts have been made to measure seroprevalence of HCV in Pakistan for example; it is found that frequency of HCV infection ranges from 0.4% in Karachi (Sindh) to 33.7% in Jarwar. The mean frequency is 4.7% with 95% confidence interval (CI) 4.6 - 4.8.¹² It is more common among males. In males it mostly occurs between 40-49 years of age while in females between 50-59 years of age.

Different studies show that therapeutic use of contaminated needles in medical care, unsafe blood transfusion; intravenous drug abuse, non sterile surgical and dental procedures are major factors responsible for transmission of HCV.²³ Prevalence of HCV varies in the four provinces of Pakistan being highest in Punjab. According to

a recent survey conducted by Pakistan medical and research council, the prevalence of HCV in four provinces of Pakistan is as follows;^{1,24}

- Punjab 6.7%
- Sindh 5%
- Balochistan 1.5%
- Khyberpakhtunkhwa (Previously known as NWFP) 1.1%
- Why is it a major public health problem in Pakistan?

More than 10 million people are infected with HCV in Pakistan.²⁵ Data suggest that 60-70 % patients who present with chronic liver disease (CLD) are anti HCV positive.²⁶ Nearly 50 % patients with liver cell carcinoma or hepatocellular carcinoma (HCC) are anti HCV positive.²⁷

Major factors responsible for this high disease burden in Pakistan are;

- Unnecessary prescription and use of therapeutic injections.¹²
- Lack of screening of blood and blood products.²⁸
- Reuse of syringes.²³
- Injecting drug users (IDUs).²⁹
- Unsafe practices by dentists and barbers.²⁹
- Inadequate regulation against hakeems (traditional healers) and quacks.³⁰
- Lack of operational research including monitoring evaluation and follow up.³¹
- Underreporting of infected cases.³²
- Lack of organization and fragmented health services.³³
- Lack of education and risk awareness.³⁴
- Corruption.³³
- Negligence of higher authorities.³⁵
- Natural disasters for example floods and earthquakes.³⁶

In developed countries, more concerns and efforts have been made to control the transmission of HCV infection. As a result the incidence and prevalence of HCV infections has decreased for example prevalence of HCV infection in England is 0.4%.³⁷ But it still remains a big problem in developing countries like Pakistan because of factors mentioned above.

Common risk factors for HCV transmission in Pakistan

Risk factors for HCV transmission in Pakistan are different as compared to the developed world.³⁸ In developed countries, IDUs are recognised as major risk factor for transmission of HCV infection.³⁹ Murphy et al.³⁹ conducted a study in USA and found IDUs as a major risk factor for HCV transmission with a seroprevalence of 51%. Other important risk factors were blood transfusions (17%), no known risk factor (10%), body piercing (9%), sex with IDUs (6%), prisons (3%), needle stick injuries (2%) and immunoglobulin treatment (1%) as shown in Figure 2.³⁹

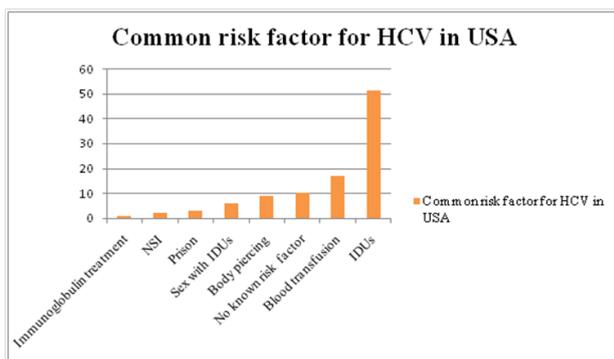


Figure 2 Prevalence (%) of HCV in USA as per risk factors showing risk factors on horizontal axis and percentage of prevalence of HCV on vertical axis.

But this is not the case in Pakistan. Several studies have shown that multiple and unnecessary use of injections, unsafe medical/surgical procedures, use of contaminated razors by barbers, ear, nose piercing, blood transfusions and needle stick injuries (NSI) are major risk factors for HCV infection in Pakistan.²⁹ Following Figure 3 shows the prevalence of HCV infection in Pakistan due to different risk factors ranging from 27% because of multiple use of needles to 2% due to needle stick injuries.²⁹

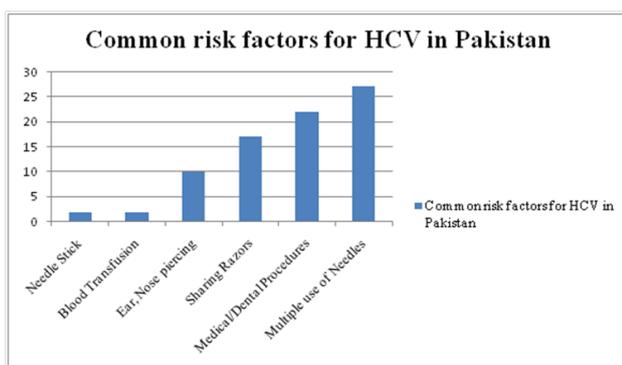


Figure 3 Prevalence (%) of HCV in Pakistan as per risk factors, showing risk factors on horizontal axis and percentage of prevalence of HCV on vertical axis.

a) Unnecessary therapeutic injections: Pakistan was reported as one of the countries with the highest frequency of injection use in the world with an average of more than 9 injections per person annually.^{23,34} Furthermore, it has been reported that almost 50% of the patients receive unnecessary therapeutic injections without any safe medical practices including reuse of syringes.⁴⁰ Another survey, published by Ministry of Health Pakistan, mentions that 72% of the therapeutic injection and 50% of immunization injections used in the public health care are unsafe and a major risk

factor for transmission of HCV infection.⁴⁰ Use of multiple dose vials and recycled syringe is very common in both government and private health sectors of Pakistan contributing a major role in the transmission of HCV infection.⁴¹

Reuse of syringes for therapeutic purposes was found to be the most significant factor associated with the transmission of HCV infection.⁴² A large number of patients, almost 26% got the infection because they were administered intravenous injections from the GP clinics, which were recognized for reusing the syringes.²⁹ People who got the injections were more likely to get HCV infection as compared to those who did not get the injections as shown in Table 3.⁴³ Also, household members who received more than four injections per year were 11.9 times more likely to be infected than others with a *p* value of 0.02.⁷

b) Unsafe medical and surgical practices: Another common factor strongly associated with HCV infection is unsafe practices during major or minor surgeries and dental procedures. These unsafe practices are recognised as major threat to the health of both the health care providers and patients. Seroprevalence of HCV infection was found to be 5.5% in health care workers.² These practices include unsafe operating procedures, dental procedures and use of unsterilized instruments in operation theatres, outpatient departments (OPD), medical and surgical wards and emergency departments of hospitals.⁴⁴

Several studies show that factors responsible for unsafe medical and surgical practices are: poor knowledge,⁴⁵ poor skills,⁴⁶ lack of risk awareness,⁴⁷ variance of interests,⁴⁵ not wanting to offend patients,⁴⁸ lack of equipment,⁴⁹ and time, uncomfortable personal protective equipment, inconvenience, work stress and perceiving a weak organizational commitment to safety climate.^{45,46,49}

In Pakistan, poor qualifications, lack of training, lack of knowledge, absence of a system for prevention of blood borne pathogens and post exposure prophylaxis at health care facilities are the most common factors responsible for increased transmission of HCV infection.³¹

c) Sharing of razors by barbers: Daily shaves from barbers was found to be significantly associated with HCV infection.^{50,51} In Pakistan, most of the barbers especially in rural areas are unaware of the risk factors of blood borne infections; hence, they do not sterilize their instruments. Most men aged 20 years and above go to barber shops for shave. The higher incidence of HCV in males than females can be due to contact with unsterilized and used razors.²⁹

d) Blood transfusions: Due to screening of blood donors and by performing the tests for HCV surrogate markers, the risk of HCV transmission has decreased to 0.001% in developed countries. However, in Pakistan, risk of HCV is unknown but it is considered to be high due to lack of proper screening of blood donors and blood transfusion products.⁵²⁻⁵⁴ In Pakistan, the mean frequency of HCV infection among blood donors was found to be 3.0% (95% CI: 3.0- 3.1).¹²

e) Needle Stick Injuries (NSI): Needle stick injuries (NSI) are potential risk factor for HCV transmission in Pakistan. Mostly NSI occur during injecting or drawing of blood, surgeries and suturing, recapping and handling uncooperative patients as shown in the following Figure 4.³²

f) Injecting Drug Users (IDUs): According to the year 2000 National Assessment Study of Drug Use in Pakistan supported by

the United Nations Office of Drug Control and Crime Prevention (UNODC), it was found that there were 500,000 heroin addicts in Pakistan, of whom 75,000(15%) were regular IDUs and 150,000(30%) were occasional IDUs.⁵⁵ It was revealed that seroprevalence of HCV was higher (89%) in IDUs (as compared to general population (6.5%).⁵⁶

g) Perinatal transmission of HCV infection: Perinatal transmission of HCV infection from HCV positive mother to new born babies is recognised as a major risk factor. Khan et al.⁵⁷ reported a 4.1% perinatal transmission of HCV in children of HCV- positive mothers in Lahore, Pakistan.⁵⁷ Previous history of blood transfusions, surgery and gynaecological procedures are most significant risk factors for HCV infection in pregnant women.^{58,59}

h) Other Risk Factors: Other less common risk factors include ear, nose piercing and sexual contact.^{12,29,60} These factors are also recognised to be responsible for HCV transmission but they are not as common as the other risk factors mentioned above.

i) High risk population: People at risk of developing chronic HCV infection are;

- a) People who had blood transfusion
- b) People who had history of surgical, medical or dental procedures
- c) Health care workers, doctors and nurses exposed to HCV positive blood after sharps or needle stick injury
- d) Diagnosed cases of chronic liver disease
- e) Intravenous drug users

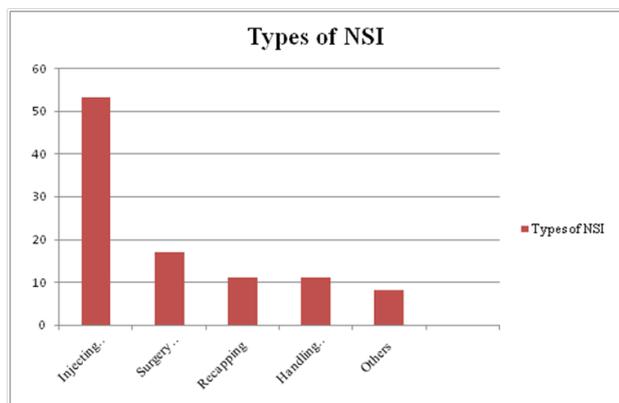


Figure 4 Sharp injuries by injury circumstances in percentage.

Table 3 Relationship between therapeutic injections and HCV infection

Average no. of injections annually in last 10 years	HCV positive	HCV negative	Odds ratio
1	0	8	0
02-4	2	13	1.54
05-9	2	8	2.5
>10	9	13	6.92

Natural history of the disease

Natural history of HCV is not completely understood as the

disease may take different courses among infected individuals.⁶⁰ HCV can lead to;

- a) Asymptomatic acute infection
- b) Persistent infection following acute infection
- c) Persistently elevated or fluctuating ALT levels
- d) Generally slow but variable disease progression

The appearance of anti HCV antibody may take 5 to 12 weeks after exposure but HCV RNA can be detected as early as 1 to 2 weeks following exposure.⁶⁰

Chronic effects of HCV infection

As mentioned earlier, chronic infection by HCV causes slow progression of liver disease that leads to liver cirrhosis, CLD and hepatocellular carcinoma(HCC) over a period of 30 years.⁶¹ Chronic liver hepatitis is the 5th most common cause of death worldwide.⁶² The mean seroprevalence of HCV infection in the above mentioned diseases is shown in the following Table 4.¹²

Table 4 Prevalence of HCV in patients with liver diseases

Type of the disease	Mean seroprevalence of HCV infection (%)
Liver cirrhosis	44.9
Chronic liver disease (CLD)	52.9
Hepatocellular carcinoma (HCC)	50.6

Above table shows the high prevalence of HCV in different hepatic (Liver) diseases. These diseases are the end stage of HCV infection and can lead to many complications which cause a great number of deaths in Pakistan.¹² The mean age for developing CLD is lower in Pakistan than any other developed country, revealing that individuals are infected at an early age in this region of the world.⁶³ Thus, if patients are provided proper preventive measures and timely diagnosis, they can be saved from such complications.

Conclusion

Reducing the incidence of HCV infection without preventive interventions, can be a major public health challenge.⁶⁴ Therefore, more focus should be on primary prevention to control the disease burden of hepatitis C.⁶⁵

Majority of patients only discover that they are infected with HCV, when the disease expresses itself after a long period of time with all its complications. At that point of time, majority of the patients are beyond the scope of treatment and cannot even bear the expenses of treatment. Therefore, developing effective primary preventive measures is vital in order to prevent and control disease transmission.

Conflicts of Interest

None.

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