

## REVIEW ARTICLE

# Prevalence of Hepatitis B&C in Pregnant females & Transmission through Sporadic Source and Dental Source among Pakistani Population: A Brief Review

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## ABSTRACT

**Background:** Hepatitis refers to liver inflammation because it can be caused by drugs, chemicals, heavy alcohol consumption and due to some medical disorders. The hepatitis B (HBV) is a double stranded DNA virus having multiple serological indicators whereas hepatocellular carcinoma is assumed to be significantly influenced by hepatitis C viral infection.

**Aim:** To evaluate the frequency of hepatitis B & C in pregnant females as well as how many people were affected through dental clinics and sporadic sources in Pakistan.

**Methods:** All the data for this review article was collected from different databases such as Google scholar, PubMed, Pak Medinet and Medline.

**Findings:** In Pakistan, the occurrence of hepatitis B infection is alarmingly rising, ranging from 2 to 8% in various populations. 20.2% in urban, while 79.8% in rural region whereas HCV affects almost 8.74 million people in Pakistan.

**Practical Implication & Conclusion:** The foremost purpose of this systematic review was to assess the frequency of hepatitis B and C among Pakistani population from already reported data and concluded that the rate of spread of hepatitis B, C through sporadic sources and dental source is also a well-known factor in Pakistani population. So as this review would be helpful for those researchers who work on the hepatitis control program in Pakistan.

**Keywords:** Barber source, Dental source, Hepatitis B, Hepatitis C, Prevalence, Transmission

## INTRODUCTION

Hepatitis refers to liver inflammation because it can be caused by chemicals, drugs, some medical disorders, and heavy alcohol consumption. The hepatitis B virus (HBV) is a partly double stranded DNA virus having multiple serological markers, including HBsAg and anti-HBs, HBeAg and anti-HBe, and anti-HBcIgM and IgG<sup>1</sup>. Only 0.5% of transient infections result in deadly, fulminant hepatitis, although they can still cause significant sickness. Chronic infections can also have detrimental effects: roughly 25% of them lead to liver cancer that is incurable<sup>2</sup>. People with HBV infection have symptoms including weariness, loss of appetite, nausea, and jaundice. The hepatitis B virus does not cause cytopathogenic liver damage, and it may be controlled<sup>3</sup>.

Hepatitis (both acute and chronic) and cirrhosis are primarily driven by the hepatitis C virus (HCV), a positive-sense single-stranded RNA virus. The hepatitis C virus infection may just be the source of 21% of all mild viral hepatitis cases in the United States, according to the Centers for Disease Control and Prevention. In 67% of all instances, the liver becomes chronically ill and the liver enzymes rise along with it. Hepatocellular carcinoma is also assumed to be significantly influenced by hepatitis C viral infection in which patients may develop symptoms of the digestive and respiratory systems, such as malaise, exhaustion, muscle aches, dyspnea, nausea, and/or vomiting. Additionally they could suffer from mild weight loss, headaches, rhinorrhea, fever, pharyngitis, and cough<sup>4</sup>.

**Route of Transmission:** It spreads when body fluids like blood, semen, or other bodily fluids from an infected individual come into contact with an uninfected person. This may occur via sexual interaction, the sharing of needles, syringes, or other injectable tools, or even from the mother to the child after delivery<sup>3</sup>. The most common parenteral ways via which the HCV is spread are blood transfusion and intravenous medication delivery. Other prospective means by which the HCV may be transferred include tattooing, the use of intranasal cocaine, body piercing, and unintentional injury with contaminated needles. Unexpected skin puncture may result in the virus being spread to healthcare workers; however, chance of happening is lower for hepatitis C than it is for type B hepatitis<sup>5</sup>.

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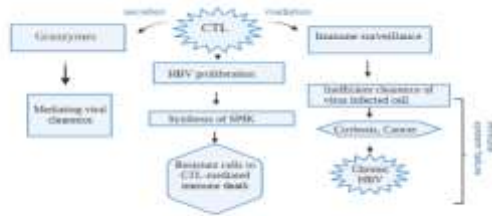
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Figure 1: Transmission of HBV and HCV



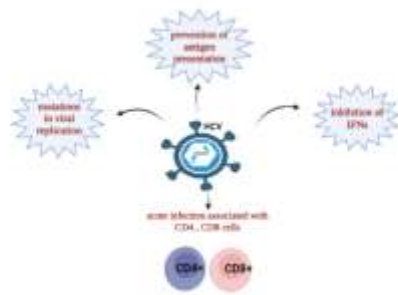
**Pathogenesis:** The Cytotoxic T lymphocytes (CTL) mediated immune response is strongly linked to the development of HBV. Granzymes (A class of serine proteases having ability to induce the cytotoxicity of invasive, diseased, or cancerous cells<sup>6</sup>) A and B, which cause infected cells to apoptose, are two key serine protease granzymes secreted by CTL cells as part of their role in mediating viral clearance. HBV proliferation, though, has the ability to surge the synthesis of apoptosis inhibitors such as serine protease inhibitor Kazal (SPIK), making the cells resistant to CTL-mediated immune death. Hepatitis B cirrhosis and hepatocellular cancer can occur as a consequence of the immune system's failure to eliminate HBV-infected cells, which can also cause chronic hepatitis B<sup>7</sup>.

Fig. 2: Development of HBV infection



Although HCV is not cytopathic, liver damage carried on by persistent infection, caused by the host's immune response in an effort to fight the virus. While the perseverance of HCV even after such feedback is likely due to: 1) comprehensive mutations throughout HCV replication, resulting in multiple viral species in single patient; 2) mutations that avert antigen presentation; and 3) the inhibition of intracellular interferon (IFN). Acute self-limiting HCV infection is associated with a strong and consistent multispecies CD4+ and C8+ T cell responses beside the epitopes of viral proteins<sup>8</sup>.

Figure 3: Pathogenesis of HCV infection



**Mortality and Prevalence Rate:** According to earlier research, viral hepatitis caused 470,000 cases of hepatocellular carcinoma and 720,000 cases of chronic liver disease worldwide. HBV affects 4.55 million individuals in Pakistan, whereas HCV affects 8.74 million people. The frequency of HBV and HCV is rising in Pakistan amidst the government's efforts to regulate and prevent infection. It can be a result of a huge population with HBV and HCV infections, which are spreading and infecting the general populace<sup>9</sup>. According to a study, between 1.2% and 15.9% of people have HCV (5). In Pakistan, the frequency of hepatitis B infection is alarmingly rising, ranging from 2 to 8% in various populations. 20.2% of the district is urban, while 79.8% of the region is rural<sup>10</sup>.

**Hepatitis B and C in pregnant females:** Millions of people worldwide die each year from viral hepatitis, even pregnant women. Hepatitis B and C virus (HBV and HCV) perinatal and vertical transmission rates are quite high in Pakistan. The incidence of mother problems during pregnancy, such as preterm labour, placenta previa, gestational diabetes, and death, is highly correlated with viral hepatitis<sup>11</sup>. Pregnancy's physiological effects may contribute to several liver problems. Gallstones (or "cholelithiasis") can occur in roughly 6% of women with hepatitis during pregnancy<sup>12</sup>.

In Pakistan, public hospitals don't frequently test patients for hepatitis B and C. It is usually administered to those who have a history of jaundice or certain liver diseases. Sadly, the vast majority of people don't have jaundice, and carriers often don't show any symptoms. Hepatitis B and C prevalence in pregnant women is also influenced by low socioeconomic position, poor hygiene, and low levels of education<sup>13</sup>.

According to studies by Ehsan A. and her associates, 10% of babies born to women with acute hepatitis virus infection within the first trimester of pregnancy are HbsAg-positive at birth, and 80% to 90% of new - borns become HbsAg-positive without prophylactic therapy if the actual maternal infection manifests during the third trimester of pregnancy. HBV infection from the mother to the child is passed on through the placenta during pregnancy, nately at birth, and postnatally through breastfeeding<sup>14</sup>. The probability of HCV spread from viremic mothers to their newborns is 3.2%; however, if the mother also has HIV, the risk rises to 7.9%. Additionally, co-infection with HBV and HCV increases the risk of developing cirrhosis, hepatocellular cancer, and chronic hepatitis<sup>15</sup>.

Numerous studies have demonstrated a reduction in the biochemical indicators of liver damage in pregnant HCV positive women. The transaminase levels quickly restored to pre-pregnancy levels following delivery, which allowed researchers to detect this process during hemodilution in pregnancy. The interplay between HCV and pregnancy-related immunological alterations might be quite important. While liver dysfunction markers have resolved, a constant rise in HCV viral load has been seen throughout pregnancy, in contrast to these findings. Furthermore, due to the possibility of teratogenic/abortifacient effects, interferon and ribavirin are prohibited during pregnancy<sup>16</sup>.

A study was conducted at department of Obstetrics and Gynecology, People's Medical College Nawabshah, in which three thousand and twenty pregnant women were screened for HCV antibodies and one hundred and two were found positive. Ages ranged from 17 to 35 in which 71.52% of pregnant women with HCV tested positive for HCV-RNA. 7.84% of HCV-infected females also tested positive for HBsAg as 3.44% of pregnant women had HCV<sup>17</sup>. Ahmad R khan and his collaborators presented a cross-sectional study at the Department of Medicine, Hayatabad Medical Complex, Peshawar, total of 442 pregnant women having acute hepatitis were selected. The lowest age in this study was 17 and highest age was 50. In 11.5% of the patients, HBsAg was found, and in 30.3% of patients, HCV was found. It has been shown that the first prenatal appointment should be the time to re-evaluate regular viral hepatitis screening in pregnant women<sup>18</sup>. A cross-sectional study was administered by Ahmad I to evaluate the frequency of hepatitis B and C infection amongst pregnant women in the Peshawar district of Pakistan. 10,288 blood samples from pregnant women were obtained, and the ICT method was used to assess them for HBV and HCV infection. The study's age range covered 20 to 40 years. HBV infection was present in 1.16% of the population overall, whereas HCV infection was present in 1.42% of pregnant women<sup>19</sup>.

An observational study was carried out at the Obstetric/Gynecology ward of Saidu Teaching Hospital, Swat, where 5607 pregnant women underwent rapid immunochromatographic ICT techniques screening for hepatitis B and hepatitis C. The results of those who tested positive were verified by ELISA. The age range of all pregnant women was 14 to 49. Hepatitis B and C were found to be common (3.98%), and of those, (1.37%) tested positive for HBsAg, (2.52%) tested positive for anti-HCV, and (0.09%) tested positive for both viruses<sup>20</sup>.

According to research by Ambreen Ehsan and her associates, 70 to 85% of HBV and HCV infections progress to chronic disease and entail a pattern of mild to severe histopathological damage necessitating medical intervention. In many areas of Pakistan, information regarding viral hepatitis during pregnancy is difficult to come by. The purpose of this study was to describe the frequency of hepatitis B and hepatitis C seropositivity during antenatal screening of pregnant women aged 20 and over. Out of 1769 pregnant females, 129 (7.299%) participants in a cross-sectional research at the Obstetrics and Gynecology department of the Combined Military Hospital (CMH) in Hyderabad had serum antibodies for hepatitis B and C. Out of one twenty nine positive cases, 99 (76.7%) had antibodies against the hepatitis C virus (HCV), while 30 (23.3%) had antibodies against HbsAg. 23 patients (38%) had a typical vaginal birth, whereas 62% of patients

underwent a caesarean section. There were 110 (85.3%) more multipara patients than primigravidas 2%<sup>14</sup>.

**Hepatitis B and C in dental Patients:** Through close interaction with oral fluids, blood, droplet splashes, propellant, and other methods, viral hepatitis B and C can spread through the dental profession in a number of ways. Blood transfusions and unsterilized contaminated dental equipment are common risk factors. The majority of these people offer a larger risk of contaminating society and medical and dental personnel in particular. The saliva and blood of patients at dental clinics expose dental staff to a wide range of bacteria. Patients can spread these illnesses to healthcare professionals, other patients, and in rare cases, other patients at dentistry and medical offices. According to several publications, dental professionals may have a noticeably greater frequency of HBV and HCV. A significant prevalence of HBV notably among dentists, periodontists, and oral surgeons<sup>21</sup>.

It is anticipated that the establishment of vaccination programmes and carrier pool reduction in blood banks during the previous 10 years will lower the rate of HBV and HCV infection. According to a research by Razzaq A. et al, dental patients had a sero prevalence of HBV and HCV of 4.0% and 4.5%, respectively. As far as the Naurang area is concerned, there are many incompetent medical practitioners, particularly quack dentists, practising there who are ignorant of science and sterilization/barrier measures, increasing the likelihood of cross contamination. They showed that dentistry in the surrounding regions of district Bannu, particularly at the level of primary healthcare centers in rural areas, is dismal and that there is a severe lack of personnel, equipment that must adhere to sterilizing protocols, and cross-infection risks<sup>22</sup>.

Due to the high prevalence of HBV and HCV, M. Fayaz and his colleagues recommend routine screening for HBV and HCV on every dental patient before performing any procedures. A study conducted at the Ayub Teaching Hospital in Abbottabad's dentistry department, in which 3549 dental patients were included. 66% of patients had hepatitis C, 32.7% had hepatitis B, and 1.3% of patients had both viruses<sup>23</sup>.

According to research by J.A. Qazi, 60–70% of individuals with HCV infection are asymptomatic. The presence of HCV-RNA in saliva provides the biological cause for saliva as a possible source of HCV infection. Report on 4976 patients was presented by J.A. Qazi at the oral diagnostic and oral medicine department of the Khyber College of Dentistry. Before beginning dental treatment, all patients were checked for HBs Ag and anti-HCV by using the (ICT) technique, and mild or positive cases were then verified by ELISA. The patients' ages ranged from 5 to 65. In all age groups, there were 175 (3.5%) HBV positive in both sexes. There were 56(2.7%) females and 119(4%) males, with a maximum of 45(1.5%) men in the age group of 21 to 30 years and a maximum of 14(0.6%) females in the age group of 11 to 20 years. However, 137(4.6%) of the male patients were HCV positive, with the highest prevalence in the age group 21–30 (1.1%), and 128(6.3%) of the female patients were HCV positive, with 47(2.3%) in the age group 31–40 years<sup>24</sup>.

At the KGN Teaching Hospital's dentistry department, a descriptive cross-sectional study was done to determine the prevalence of HBV and HCV infection. Total 198 individuals who came for tooth extractions were included. The range of ages was 18 to 65. Out of 198 participants, 116 (58% of the total) were men and 84(42% of the total) were women. HBV and HCV prevalence were 4.0 and 4.5%, respectively<sup>22</sup>. A study conducted by Huma Qureshi and her associates that included 1050 patients with chronic HBV or HCV. Out of 1050 patients, 327 (aged 15 to 60) and 723 (aged 15 to 60) had chronic hepatitis B and hepatitis C, respectively (age range 16-65 years). Dental extractions, fillings, and scaling in the past were much more common (38%) in HCV and HBV infected individuals.

A report documented by Khan C et al at Sandeman Provincial Hospital Quetta, in which total of 3431 dental patients were screened for HBV and HCV. 95 of them (2.7%) tested positive for HBV, while 54 (1.5%) had HCV diagnoses. 4.3% of the population

that were tested had HBV and HCV infections, totaling 149 cases<sup>25</sup>. According to a nationwide survey done by Qureshi et al, Balochistan has the highest incidence of HBV, at 4.3%. Khyber Pakhtunkhwa has the lowest frequency of HBV (1.3%), according to that survey. Sindh and Punjab have been reported to have prevalence rates of 2.5% and 2.4%, respectively<sup>26</sup>.

It is also reported that, dental surgeons are more likely to be exposed to aerosols during ultrasonic scaling than other medical experts. For this reason, they should place a specific priority on hepatitis prevention and protection. A required screening of every patient before beginning dental treatment will be recommended due to the incidence of HBV/HCV<sup>24</sup>.

**Transmission of Hepatitis B,C through Sporadic Sources:** Around two forty eight million people and seventy one million people are perennially infected with HBV and HCV globally, with awidespread deviation. In a pursuit for those concealed sporadic sources of infection (as show in figure no. 4), salvage of needles for ear and nose piercing, unsterilized medical instruments, recycle of injections, haircutting and cutting by barbers are reported to be the main hazardous factors for HBV and HCV infection in numerous studies<sup>27</sup>.

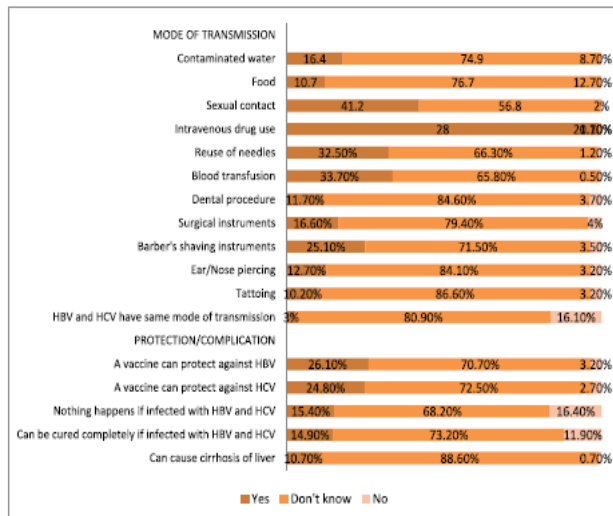
Furthermore, HBV and HCV have also been associated as an occupational threat of the barbers' trade in developing countries. Several of the barbers reuse scissors and razors on many patrons without any proper sterilization, indicative of their stunted level on awareness about viral hepatitis and the hazard of spread of transmissible agents<sup>28</sup>. Razor shaving by barbers has been well-known as a crucial risk factor for transmission of HBV and HCV<sup>29,30</sup>.

In the spread of hepatitis B and C there is a major issue of barber's attitude and knowledge in Pakistan because due to lack of education most of the labor did not aware about the hazardous factors of hepatitis. As according to the past study of the different researchers the major cause of hepatitis is the reuse of blades. In 2010 Johkio and his colleagues conduct a study on Hyderabad barbers in which they concluded that only 36.6% knew that hepatitis can be transferred via shaving tools. Only 3.2% of one eighty six barbers were vaccinated for HBV<sup>31</sup>.

Abbasi and his fellows observed that frequency of HBV among barbers was 2.1% as they work on the cross sectional study of prevalence of hepatitis B in the Sindh. The barbers' information on HBV and its spread was poor<sup>32</sup>. As well as a cross sectional study was focused by Waheed and his coworkers on 508 barber's shops in which only 39.6% knew that hepatitis B virus (HBV) and hepatitis C virus (HCV) were viral diseases, 26.6% knew that it can lead to cancer, 90.7% thought that hepatitis could be transmitted by blade sharing, 47.8% knew that a vaccine for HBV was available, and 43% had education till the primary level<sup>33</sup>.

A comparative cross sectional survey was conducted on the barbers of city and town areas of Rawalpindi and Islamabad in 2015 which predicts that awareness about hepatitis B & C was good in urban areas (92%) as compared to those working in the rural areas (68%). Using new blade for every customer was seen in urban (100%) and rural (93%) area<sup>34</sup>.

Figure 4: Mode and percentage of hepatitis B, C through sporadic source of transmission<sup>27</sup>



There lies a great difference and incomplete information about epidemiological behavior of hepatitis B incidence in various communities of Pakistan<sup>35</sup>. There has been seen a rapid rise in the Hepatitis B & C in last two decades. The frequency and incidence of both types was first reported in a complete national survey in 2007–2008<sup>36</sup>. Afterwards there was the launch of a national hepatitis observation system in June 2010 which however due to limitations regarding the infrastructure and inadequate services was confined to regional capitals and Islamabad<sup>37</sup>.

Viral hepatitis B & C has infected globally around 350 million individuals among those 170 million with hepatitis C. Pakistan has a variable prevalence rate of both diseases as HCV can go undetected without any symptom. In the last decade about 9 million HBV & 14 million HCV carriers in Pakistani population were reported<sup>38</sup>. The prevalence of HBV in Karachi 4.5%, Rawalpindi 2.3%<sup>39</sup>. Although, the reported data shows that a great number of population of viral positive patients are unaware of their serostatus in developing countries, particularly those who belong to low socioeconomic status<sup>40</sup>. Moreover, community based data depicts there's inadequate screening uptake and significant figures of dropouts in both HBV and HCV (WHO, 2015).

The Global Health Sector Strategy (GHSS) on viral hepatitis strains the need for hostile objectives to get rid of viral hepatitis as a community health hazard by 2030 and has projected a target of a 90% reduction in incidence and 65% reduction in mortality due to chronic HBV and HCV contagions (WHO, 2014). Principal causative agents for spreading the deadly diseases include unsecured usage of therapeutic injection, razors from barbers, tattoo, transfused blood or mother to child transmission and unsafe sexual practices. Re-use of the tools like razor from the barbers is one of the major risk factor reported for Hepatitis B and C among Pakistan<sup>41</sup>. Above and beyond injections, Shaving the face & armpit is also predominant cause. Various treatments and services which are offered in Pakistan barbering profession include hair wash & haircut, face & scalp massage, nail trimming, pedicure, and manicure. Furthermore, a few rural areas also provide services for circumcision and incision /drainage of abscess. Many health conditions of skin and communicable diseases have seen to be derived from barbers<sup>42</sup>.

The usual practice of barbers to dispose of used blades in public waste puts sweeper's health at a great risk during garbage sweeping. Infected blades can lead to injuries to healthy people. During the treatment, potash alum stone (locally known as Phatkari) is used on facial cuts so as to stop bleeding. The multiple usage of a single stone becomes a risk for transmission of Hepatitis which gets higher at times when there is more workload than usual such as at weekends, holidays or festive occasions<sup>43</sup>. In Muslim community, circumcision is typically performed by barbers

all over the country. During the process, the regular utilization of same tools on multiple individuals lead to contamination and transmission of viral Hepatitis. Due to lack of information such practice makes infants prone to blood borne viral pathogens<sup>44</sup>.

According to a KAP study on barbers conducted by Shah et al., 2015 disease awareness of population lies as (urban 92% and rural 68%). Usage of new blade (urban 100% and rural 93%) awareness of the pattern or signs of disease (urban 81% & rural 93%) with poor vaccination trend for Hepatitis<sup>45</sup>. It has been reported that reutilization and repacking of used syringes and needles by many small groups is one of the contributing factors towards higher prevalence rate of HCV where public remains unaware either the needles being used are sterilized or not<sup>46</sup>.

Ahmed et al., 2013 reported the attributable risks of people for hepatitis transmission, higher no. of >10 of therapeutic injections 3.5%, reuse of syringes had a 2.7% risk, shaving by barber 2.1%, and ear/nose piercing 1.4%<sup>47</sup>. Pakistan has reported the estimated number of injections/individual/year to be between 8.2-13.6, being the highest among developing countries. Household members who received 4 injections per year were 11.4% more prone to HCV as compared to those without injections<sup>48</sup>. Asad et al., reported the frequency of viral hepatitis (41%) where history of injections was present in all, visit to barbers 58.6%, dental procedures seven(24%) and 15(13%) patients of hepatitis B and C<sup>49</sup>. A cumulative sum of HBV and HCV in different regions of Pakistan is shown in table 1.

Table 1: Prevalence of HBV and HCV in different regions of Pakistan

Regions	Prevalence	
	HBV	HCV
<b>Pregnant females</b>		
Peshawar	11.5%	30.3%
Swat	1.37%	2.52%
Hyderabad	23.3%	76.7%
<b>Dental patients</b>		
Peshawar	3.5%	4.6%
Bannu	4.0%	4.5%
Quetta	2.7%	1.5%
<b>Sporadic source</b>		
Karachi	4.5%	-
Rawalpindi/ Islamabad	25.10% of both viruses	

## CONCLUSION

The foremost purpose of our scientific study is to assess the frequency of hepatitis B and C among Pakistani population and it is concluded that the ratio of Hepatitis B and C virus (HBV and HCV) perinatal and vertical transmission rates quite high in Pakistan pregnant females. As well as if we talk about the rate of spread of hepatitis B,C through sporadic sources and dental source is also a well-known factor in Pakistani population because of the lack of education and information about the hepatitis among barbers and drug addicted patients. So, this review would be helpful for those researchers who work on the hepatitis control program in the Pakistan.

**Conflict of interest:** Nil

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