Risk Factors of Hepatitis C Virus Transmission

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Author’s Contribution

1 Conception of study
2 Experimentation/Study conduction
3 Analysis/Interpretation/Discussion
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Abstract

Background: Hepatitis C is not only a globally prevalent disease but also a significant cause of death. It has multiple complications ranging from Hepatocellular carcinoma to decompensated liver disease. This study was planned to determine the frequencies of various risk factors in Hepatitis C positive patients presenting to a tertiary care health facility in Rawalpindi.

Material and Methods: This descriptive, cross-sectional study included 394 patients that presented to Liver Centre, Holy Family Hospital during the years 2015 to 2016. All these patients were confirmed cases of Hepatitis C. The data were collected from records of the liver center of Holy Family Hospital, Rawalpindi. Statistical Package for Social Sciences (SPSS), version 23 was used to analyze data, and descriptive statistics were calculated. All patients with any other comorbidity were excluded.

Results: Of the 394 patients included in this study, 197 (50%) males and 197(50%) females with an average age of 44.48. Out of these, 143(36.3%) had a history of previous surgery, 65 (16.5%) had a blood transfusion, 165 (42.19%) had a history of dental treatment, and 189(48.0%) had a history of injections (IM and IV). Ninety-two patients (23.4%) had a history of barber shave, four patients (1%) had tattooing, and 83 patients (21.1 %) had a history of ear piercing. Fifty patients (38.2%) had a family history of Hepatitis C. Only 23 (31.2%) patients had only one risk factor, while 271 (68.7%) had more than one risk factor before a diagnosis of disease.

Conclusion: The majority of the patients had more than one risk factor, with a history of injection use being the most common (intravenous and intramuscular). It was followed by the history of dental treatment, family history, and history of previous surgery.

Keywords: Hepatitis C, risk factors, surgery, blood transfusion, dental treatment.
Introduction

Hepatitis C is a significant cause of chronic liver disease and Hepatocellular carcinoma. Worldwide, 170 million people suffer from Hepatitis C virus according to World Health Organization.\(^1\) Hepatitis C can spread from person to person. A person suffering from hepatitis C virus can end up having any of the severe outcomes like chronic liver disease, liver cirrhosis, and eventually, liver cancer within a period as short as 20 years or more. Data shows that the acute infection of HCV has resulted in 54,000 cases of deaths and 955,000 cases of morbidity; however, it is the chronicity that causes a significant burden.\(^2,3\)

Besides lack of effective HCV vaccine, blood transfusion without prior screening, standard tattooing practices and that too without any aseptic measures, use of unsterile syringes and injections for drugs, unsafe sex have significantly contributed to increased risk of infection.\(^4,5\)

According to a study conducted by Nelson et al, 60-80% of IV drug abusers in 26 countries had anti-HCV.\(^6\) The increase in use of intranasal cocaine for recreational purposes, especially among the younger generation, has exposed them to HCV infection as its use probably promotes passage through vessels of the nasal septum.\(^7\)

The development of tests for HCV surrogate markers in developed countries and screening for blood transfusion has dramatically reduced the risk of Hepatitis C virus transmission to 0.001% per unit of transfused blood.\(^8\) Due to a lack of proper care and negligence in adopting optimal precautions, HCV is more likely to have a nosocomial transmission in developing countries. Unfortunately, in Pakistan, the risk of Hepatitis C virus transmission via blood transfusion is still high. Organ transplant and hemodialysis patients, infants born to HCV-infected mothers, health care workers are also at great risk.\(^9\)

According to a study, transmission via therapeutic injections, tattooing, shaving at barbers’ shops, and ear-piercing required further investigation.\(^10\)

Poor socio-economic conditions eventually lead to overcrowding, where non-infected family members have to live with HCV infected family members without any appropriate precautions. Such conditions add up to the already increased risk of transmission in developing countries. Household items like nail clippers, razor blades, toothbrushes, when shared, can also lead to virus transmission.\(^11\) However, still, there are many cases in which the source is not known.\(^12\)

Although different researches had been conducted in Pakistan to evaluate and assess the various risk factors of HCV in the past, this research will provide more updated data, which will help the local authorities and infection control departments in our community to use this information in controlling the spread of this infection and devising ways to prevent its spread in future.

The objective of this study is to determine the frequencies of various risk factors in Hepatitis C positive patients presenting to a tertiary health care facility in Rawalpindi.

Materials and Methods

This retrospective cross-sectional descriptive study was conducted on 394 consecutive Hepatitis C virus-infected patients who presented at Liver Centre of Holy Family Hospital, Rawalpindi from 2015-2016. Approval was taken from the institutional research forum before conducting the study. Using an anticipated proportion of 0.095, 95% confidence interval, and 0.05 absolute precision, the minimally required sample size according to the WHO sample size calculator was calculated to be 380, but 394 participants were included.

Patients of both genders who were confirmed cases of hepatitis C and above 18 years of age were included in the study after obtaining informed consent from them. While those with any other comorbidity or liver disease and history of alcohol use were excluded. Their data were obtained from the hospital record. Information regarding hospital identity number, gender, age, marital status, and the risk factors was recorded on a self-designed questionnaire which also included questions regarding any history of blood transfusion, surgical procedure, dental procedure, injections, sexual contact, ear piercing, tattooing, barber shave, or any family history of Hepatitis C infection.

Data were entered and analyzed using the statistical software program Statistical Package for Social Sciences, SPSS version 22. Qualitative variables like gender and each risk factor are presented as frequencies and percentages, while quantitative variables like age are presented as means and standard deviation.
Results

Out of the 394 patients, 197 (50%) were males, and 197 (50%) were females. The age of our patients ranged from 20 years to 90 years, with a mean age of 44.48 ± 11.96 years. One hundred and fifty patients (38.1%) had a positive family history of Hepatitis C infection. Further details about the patients are shown in Table 1.

Table 1: Characteristics of patients

| Characteristics         | Number of patients |
|-------------------------|--------------------|
| Age                     |                    |
| Mean age                | 44.48 ± 11.96 years|
| < 30 years old          | 100                |
| 31 – 45 years old       | 174                |
| > 45 years old          | 120                |
| Sex                     |                    |
| Male                    | 197                |
| Female                  | 197                |
| Region of residence     |                    |
| Rawalpindi              | 140                |
| Other areas of Punjab   | 184                |
| Other Provinces         | 70                 |
| Symptoms                |                    |
| Jaundice                | 250                |
| Any                     | 144                |
| Bilirubin level         | 4.63 ± 5.6 mg/dl   |
| Baseline ALT levels     | 1302.8 ± 865.2 IU/ml|

Only 23 (31.2%) patients had only one risk factor, while 271 (68.7%) had more than one risk factor before hepatitis C diagnosis. Results showed injection use as the most common risk factor, with 189 (48%) patients having a positive history. Among them, 92 were males, and 97 were females. Dental procedures were the second most common risk factor, followed by surgery, history of shave by the barber, ear piercing, and blood transfusion. Details about the risk factors are mentioned in Table 2.

Table 2: Table showing the frequencies of risk factors of Hepatitis C in the sample population

| Risk factors                  | N (% of patients) |
|-------------------------------|-------------------|
| Injection use                 | 189 (48%)         |
| Dental treatment              | 167 (42.4%)       |
| History of surgical procedures| 143 (36.3%)       |
| Barber shave                  | 92 (23.4%)        |
| Ear piercing                  | 83 (21.1%)        |

Blood transfusion 65 (16.5%)
Sexual contact with a HCV infected person 19 (4.8%)
Tattooing 4 (1%)

Discussion

It is seen that due to HCV, chronic liver disease and Hepatocellular Carcinoma is high in Pakistan. Among the provinces in Pakistan, Punjab, which is the most populated, is leading in the prevalence of Hepatitis in Pakistan. Hepatitis C is a significant cause of illness and death worldwide. Its prevalence varies across regions and populations. Hepatitis C infection is highly prevalent, but very few cases come under medical attention. Thus, the underlying disease burden is massive, as many cases are not reported.

In this research, data were collected from 394 patients. Possible risk factors like injection use, dental procedures, surgical procedures, blood transfusion, sexual contact, family relation, barber shave, ear piercing, and tattooing were considered in both sexes separately.

Prevalence of Hepatitis C increases with increasing age. Our research also showed the mean age of Hepatitis C patients to be 44. It can be correlated with a study done in the United States that showed that the highest rate of infection was observed among the age group of 45-49 years old individuals.

According to one study, the majority of patients had a classic parenteral transmission risk factor. This is consistent with our results where injection abuse (both IM and IV) turned out to be the major risk factor. Injections could be a very potent risk factor in transmitting HCV infection if used without taking appropriate precautions. An increase in the patients’ demand for injections due to common misconceptions like the injection pain is somehow related to greater efficacy, was also observed in a study. It was estimated that around 12 billion injections were given per year worldwide, and in some South-East regions, 80% of injections used might not be sterile. Pakistan, also a developing country, has a higher proportion of injections given per prescription. SIGN (Safe Injection Global Network) at the WHO recommends controlling their overuse, ensuring proper sterilization and disposal guidelines as three ways to reduce infection by injectables.

In another research conducted on the Han population, blood transfusion, operation and acupuncture were
determined as important risk factors with prevalence being 27.64 and 12.7% respectively. In comparison to it, our results showed their prevalence as 16.5% and 36.3%, respectively. Thus, Blood transfusion is also a significant risk factor. Blood donations in Pakistan are mostly done in replacement by the relatives and friends of the patient. To ensure safe transfusion, proper selection of donors and their screening is necessary.

Our study showed that razor shaving and ear piercing as important risk factors with 23.4% and 21.1% frequency, respectively. A positive history of barber shaving was found only in males. One study revealed that in developing countries, the barbers do not sterilize their tools as they do not have sufficient knowledge regarding the transmission of infectious disease and that is why they do not take any safety measures. It also showed that ear piercing was mostly a risk factor for females, as it can also be because of use of non-sterile instruments.

Transmission of Hepatitis C through family members and vertical transmission are also observed. In Pakistan, vertical transmission was observed in 8.6% of pregnant women in the Hazara division and in 1.8% of pregnant women in Karachi. However, our research showed only 38.1% of patients with positive family history.

A study in Ethiopia showed a history of hospitalization, tooth extraction and, blood transfusion to be major risk factors. Hospital-based factors like dental procedures, injection abuse and other surgical procedures act as substantial risk factors for HCV transmission. This is consistent with our research with injection abuse, dental procedures and surgical procedures being the top three contributing risk factors.

Hepatitis C infection is a serious disease which cannot be ignored. Knowledge about its transmission and risk factors can help in combating and preventing this disease. Therefore, public awareness is essential for this purpose. More research is required to be conducted in our region, and adequate measures need to be taken to eradicate this serious problem.

**Conclusion**

This study concludes that most patients have more than one risk factor, with a history of injection use (intravenous and intramuscular) being the most common. It was followed by the history of dental treatment, family history, some surgical intervention in the past, history of the shave by the barber, ear piercing, and blood transfusion.

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