RESEARCH PAPER

TITLE

PREVALENCE OF HEPATITIS C INFECTION IN MARDAN, KHYBER PAKHTUNKHWA: A HOSPITAL BASED STUDY

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Abstract

Hepatitis C virus (HCV) infection is a major public health burden in Pakistan, where it bears the highest prevalence rate 5%. It is estimated that about 10 million peoples in Pakistan diagnose with hepatitis C. To determine the prevalence of hepatitis C virus (HCV) infection in Madan region KPK, A cross-sectional study was conducted in the pathology laboratory, Mardan Medical Complex (MMC) in the month of Feb-2020. For a quantitative analysis, a total of 687 participant with age range from 1 years to 80 years olds (both male 345 and female 342) were selected, who provide their blood samples for HCV antibodies tastings. The sero-prevalence rate was found to be 3.20% (22/687). The majority of the seropositive patients were males i.e., 12 and were in the age group of 21-40 year. Prevalence of HCV in the present study revealed the need for proper screening and preventive measures to control this disease.

Key Words: Hepatitis C, prevalence, HCV

Introduction

The hepatitis C virus is what causes the liver infection known as hepatitis C. (HCV). A blood-borne virus called hepatitis C exists.

The majority of people who contract the hepatitis C virus typically share needles or other injecting equipment. The hepatitis C virus infects most people, between 70 and 85 percent, and causes a persistent condition that can be fatal. While hepatitis C infection is a minor condition for some, that lasts for a few weeks and resolves on its own (**Centers for Disease Control and Prevention 2019**) and 27% of cirrhosis sufferers worldwide. Over 350,000 people every year pass away as a result of HCV infection, which has an extremely high mortality rate. HCV has been found to be 10 times more common has infected about 170 million people because of which it has a huge effect on public health. It has been examined that it has caused 25% of hepatocellular carcinoma infectious than the human immunodeficiency virus (HIV). Toxicity, resistance, and cost of the treatment restrict the present treatment of HCV. To this date, no vaccine or

immunotherapy against HCV has been developed (**Afridi *et al.*, 2013).**

HCV belongs to the hepaciviral genus of the Flaviviridae family **(Ebrahim, 2011).** HCV is spherical in shape, enveloped, and has a single positive-stranded RNA. It has a diameter of 50nm. The RNA genome is made up of about 9,500 nucleotides **(Duberg 2009).** Due to great variation in its genotypes and its ability to mutate often, no vaccine against this virus has been developed yet **(Ali et al. 2014).**

HCV is only infectious to humans and chimpanzees. It mainly targets the hepatocytes of its host. There is a high chance i.e. 90% of recovery of patients infected with HCV genotypes 2 or 3 while 50% of patients infected with HCV1b won't get cured even after treatment **(Ebrahim 2011).**

Transmission of HCV from one person to another is mainly by the parenteral route. Injecting drugs, blood transfusion and unsafe medicinal injections are the main ways by which HCV is transmitted. Other ways of transmission of HCV include health-related practices, tattooing, taking medication or drugs by injection, from mother to baby, and sexual transmission. Although occupational, perinatal, and sexual practices are responsible for the

transmission of the disease, still these routes of transmission are less common as

compared to transcutaneous exposures **(Gupta *et al*., 2014).**

People with acute HCV infection are usually asymptomatic but some may have mild flu-like symptoms. Symptoms generally appear 2 to 24 weeks after getting exposed to HCV. The most common symptom is fatigue. Other symptoms are weight reduction, muscle or joint ache, nausea, loss of appetite, jaundice, dark urine, abdominal complaints, and depression. Most patients infected with chronic HCV have no specific symptoms. If tested, abnormal hepatic transaminase levels are found **(Mehta *et al.* 2017).**

Sievert *et al.* (2011) carried out a review study to find the epidemiology of HCV in Asia, Australia, and Egypt representing 40% of the global population. The authors reviewed a total of 7,770 articles. The authors estimated that 49.3-64.0 million people were positive for anti-HCV in the selected countries. A high prevalence rate was observed in Egypt (15%), followed by Pakistan (4.7%) and Taiwan (4.4%). In these countries, the reason for such a high prevalence rate was nosocomial infections, transfusion of blood before the screening, and injecting drugs. It was found in the study that in Australia, China, Taiwan, and other North Asian countries, genotype 1 was the most

prevalent, while in Vietnam and other Southeast Asian countries genotype 6 was the most common. Genotype 3 was found to be the most common in India and Pakistan, while genotype 4 was predominant in Middle Eastern countries.

Umar *et al.* (2010) Carried out a review study to estimate the sero-epidemiology of hepatitis C infection in Pakistan. The authors reviewed 132 published studies and 3 unpublished data sets. The study included data of 1,183,329 individuals. Most of them were blood donors (982,481) and general population (178,322). The results revealed the prevalence rate in blood donors as 3.0% and in the general population as 4.7%. Pregnant women showed a high prevalence rate of 7.3%. HCV prevalence observed in children ranged from 0.4% to 4.1%. The study concluded that the seroprevalence of hepatitis C in Pakistan was higher than its neighboring countries. **Arshad and Ashfaq (2017)** reported an overall 8.64% hepatitis C prevalence from all the provinces of Pakistan. A higher prevalence was reported from Balochistan (25.77%), followed by Khyber Pakhtunkhwa (6.07%), Punjab (5.46%), federally-administered tribal areas (3.37%), and Sindh (2.55%). **Waqar *et al.* (2014)** directed a study to truly estimate the prevalence of Hepatitis C infection in Khyber

Pakhtunkhwa. The authors' selected 399 HCV positive samples from various regions of the province for analysis. From the total of 399 samples, 40 of them were from Mardan, 65 from Lower Dir, 185 from Swat, and 100 samples were from Malakand district. The authors run the PCR for all the samples and 140 of them were found positive for HCV-RNA. Only the HCV-RNA positive samples were selected for further analysis. Of the total 140 positive samples, 81 were of males and 59 were of females. 16.67% of the total positive samples belong to the age group 0-20, 37.5% to the age group 21-40, 35.51% to 41-60, and 36% to the age group of above 60 years. Like other studies this study also reported the high prevalence from the age group 21-40 years. 36.2% of the total HCV-RNA positive samples were from Swat, 36% from Malakand, 38.4% from Dir, and 30% were from district Mardan. The study concluded that district Dir had the highest prevalence of HCV in KPK. Also due to exposure to HCV risk factors, the prevalence of infection was higher in males.

To determine the prevalence of HCV genotypes and its associated risk factors in the population of Mardan, Khyber Pakhtunkhwa, a research study was directed by (**Wahid *et al.* 2018).** From various regions of Mardan, a total of 1140 blood samples

were collected for analysis. Most of the samples were collected from internally displaced people (IDPs), refugees, and slum dwellers. **Khan *et al.* (2017)** used PCR for determination of HCV-RNA and viral genotypes. The study found out that genotype 3a was the most prevalent subtype in district Mardan. Genotype 3b was the second most common, followed by 2a, 2b, 4a, un-typable, mixed genotype, 1a, and 1b. The authors observed that mixed genotype was more common in males and that 3a + 1b was the most common mixed genotype. HCV prevalence was higher in the age group 41-49 years than younger and older people. The main routes of transmission of HCV in district Mardan were found to be the use of unsafe medical and dental instruments, injecting drugs, and blood transfusions. In a hospital-based population in District Mardan, this study sought to assess the prevalence of Hepatitis C in both sexes and across various age categories.

Materials and Methods

After clearance from the institutional review board, this investigation was conducted in the serology section of the pathology laboratory of the Marden Medical Complex, Marden. This study is cross-sectional in nature. Data are once-only collected at a single point in time for a cross sectional study, which is observational in nature. Patients who registered at the OPDs of this government hospital and were advised to undergo HCV antibody testing were included in this study. Patients demographic data including age clinical information, and anti-HCV antibody test findings, were gathered. Five milliliters of blood were drawn from the veins while taking the appropriate safety procedures in order to identify the anti-HCV antibody. In order for the blood to clot effectively, it was left at room temperature for 45 minutes. After centrifugation, the clotted blood was then separate. Numbers of samples collected were 687 that were taken over the period of one month i.e., February 2020.Patients' demographic data, including age, gender, clinical information, and anti-HCV antibody test findings, were gathered. Five milliliters of blood were drawn from the veins while taking the appropriate safety procedures in order to identify the anti-HCV antibody. In order for the blood to clot effectively, it was left at room temperature for 45 minutes. After centrifugation, the clotted blood was then separated.

For sample testing for hepatitis C, an Immuno-chromatographic test (ICT) was used which was then confirmed by enzyme-linked immunosorbent assay (ELISA). The

tested blood kit devices of the patients were then pasted on the patient's report forms for keeping a record. The reports of the results were written on the back of the individual forms. The data collected were statistically analyzed using Microsoft Office Excel 2010. Prevalence rates of hepatitis C were found out for both the sexes and different age groups and were then compared to gender-wise and age-wise.

Results and Discussions

A total of 687 blood specimens were collected from the patients visiting Mardan Medical Complex of 1 to 75 years of age from district Mardan, Pakistan. Out of the total 687 individuals, 345 were males and 342 were female. The blood specimens were then screened to detect the antibodies which are produced against HCV antigen through Immunochromatographic (ICT) test. The results show that out of the total 687 samples, 22 (3.2%) were found positive (antibodies are detected against HCV antigen), while 665 (96.8%) were found negative (antibodies against HCV antigen were not detected).

Table 1 demonstrates the age and gender wise distribution of patients tested for HCV. Out of the total 687 patients tested for HCV, the majority i.e., 345 (50.2%) of the patients were males and the majority i.e., 425

(61.86%) of the patients were in the age group of 21-40 years as depicted in the table. Figure 1 shows the seroprevalence of HCV among patients and out of the total 687 patients tested for HCV, 22 (3.20%) were found positive. In Pakistan hepatitis C is a huge health-related challenge. Both acute and chronic HCV infections are responsible for hepatic impairment, cirrhosis of the liver, and hepatocarcinoma. The United Nations has placed Pakistan rank at 134th of 174 countries due to its unsatisfactory educational and healthcare standard **(Arshad and Ashfaq 2017).**

Almost 3.3% of the world's population i.e., 200 million people have HCV infection. According to 2004 estimates of the World Health Organization, 308,000 and 785,000 people die annually because of liver cancer caused by HCV and cirrhosis respectively. There is a 5% prevalence of hepatitis C infection in Pakistan **(Waheed *et al.,* 2011).**

Mahmud *et al.* (2019) study revealed 0.9% to 7% of hepatitis C infection in different regions of Pakistan. The prevalence rate observed in Sindh was 7.0%, Khyber Pakhtunkhwa 6.6%, Balochistan 5.8%, and in Punjab it was 5.6%. The study revealed that the prevalence rate of HCV infection in Islamabad was very high i.e., 6.9%. The

prevalence rate for Azad Kashmir was at 5.8% and F.A.T.A at 0.9%. The pooled mean for Pakistan as a whole was 6.1%.

The present hospital-based study analyzed data of 687 samples collected in the month of February at Mardan Medical Complex, a government hospital in Mardan, Pakistan. The rate of samples tested positive for HCV was 3.20 %. Multiple studies done over the past 10 years in different regions of the country showed prevalence ranging from 1.60 % to 10.3%.

A prevalence rate of 1.60% was reported by **Anwar (2020)** in Swat, which is the lowest prevalence rate reported from any area in Pakistan. A prevalence rate of 3.45 was reported by (2013) in Hyderabad similar to the findings of the present study. Studies conducted regarding finding the prevalence rates of hepatitis C in the Lahore district of Punjab in the year 2014 by **Saeed** *et al.*

Table 1: Age & Sex wise distribution of patients tested for HCV

Age	Male		Female		Total	
	Patient	%	Patient	%	Patient	%
1-20	34	9.85	25	7.30	59	8.58
21-40	196	56.81	229	66.95	425	61.86
41-60	90	26.08	69	20.17	159	23.14
61-80	25	7.24	19	5.55	44	6.40
Total	345	100	342	100	687	100

(2016) and by Hameed *et al.* **(2019)** found seropositivity rates of 2.62% and 2.73% respectively and a rate of 3.45% in

Hyderabad district **(Tuni** *et al.* **2013).** Numerous other studies noted a seroprevalence rate of < 5% **(Karim** *et al.***, 2016; Jan** *et al.* **2020)**. This variation in
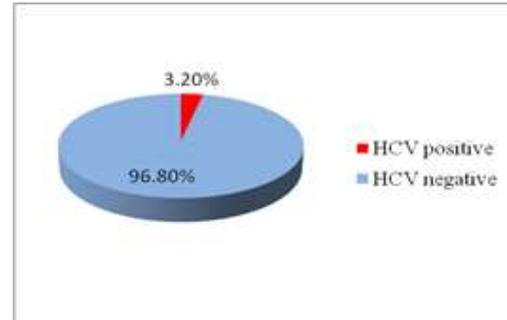
seropositivity rates of different regions could be attributed to the differences in the study settings, differences in data collection methods, differences in the diagnostic tools used, the differences in the profile of subjects, etc.

Figure 1: Seroprevalence of HCV among hospital-based population

Out of a total of 687 patients, 22 patients were reported to have anti-HCV antibodies. Out of the total 22 seropositive cases, the majority i.e., 12 (54.54%) of the positive were males. Also, the rate of seropositivity was higher among males (3.47%) compared to females (2.92%). The record of data is available in Table 2.

Seroprevalence rate in the present study was significantly higher in males (3.47%) in agreement with many other studies done in the past **(Jamil *et al.*, 2010; Ahmed *et al.,* 2012; Abbas *et al.*, 2013; Khan, Khan *et al.*, 2018; Khan *et al.,* 2020).** Higher infection rates in men could be attributed to their frequent exposure to risk factors such as injecting drug abuse, having multiple sexual partners, shaving at barber shops or other risk behaviors.

Table 3 shows the age wise distribution of seropositive patients. Out of 22 seropositive

Table 2: Gender wise distribution of seropositive patient

Gender	All	Seropositive	percentage
Male	345	12 (54.54%)	3.47
Female	342	10 (45.45%)	2.92
Total	687	22 (100%)	3.20

cases, the majority i.e., 15 were in the age group of 21 – 40 years, followed by 6 cases in the 41 – 60 years age group. Subjects below the age of 20 had no positive cases of hepatitis C. Data analysis showed that the frequency of seropositivity was directly related to age as shown in table3. With the present incidence of hepatitis C disease, Pakistan's rate is so high that it has surpassed the adjoining countries like India, Nepal, Myanmar, Iran, and Afghanistan. These statistics reveal that HCV is an epidemic in

Pakistan due to unawareness and lack of standard health-care tools. The hepatitis C virus (HCV) has spread in Pakistan because of no proper education system, ignorance of the common people about the disease, and lack of well-qualified health care workers **(Khan *et al.,* 2011)**.

In this study, the seropositivity was directly proportional to age groups and there were no positive cases in the age-group of 1-20 years. Like the present study, most of the previous studies observed the rate of hepatitis C infection maximum after the second decade of the person life because of their greater exposure and interaction in society as compared to children **(Abbas *et al.,* 2013; Nawaz *et al.,* 2015; Saeed *et al.*, 2016).** An increase in prevalence rate with

Table 3: Distribution of HCV positive patients with respect to age

Age in Years	All cases (n=687)	Seropositive cases	Rate of seropositivity (%)
1-20	59	0	0
21-40	425	15	3.52
41-60	159	6	3.77
61-80	44	1	2.27

increasing age may be due to their exposure and coming in contact with various HCV risk factors as evident from their social lifestyle.

Conclusions and Recommendations

According to the results of the current study, 3.2% of patients at Mardan's general

hospitals had HCV seroprevalence. Ages 21 to 40 years old have the highest risk of contracting HCV. Moreover, the findings demonstrated that males were more likely than females to have HCV. Because a vaccine against HCV has not been created, the virus can still be prevented by having blood tested for HCV before blood transfusion, refraining from sharing needles or any other injecting equipment, and engaging in safe sexual behavior. Also, to educate the general public on the risk factors and modes of transmission of HCV, awareness programs against hepatitis C infection should be frequently conducted.

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