

Research Article

Incidence of Hepatitis C virus infection in surgery patients of District Swat, Pakistan

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Abstract

Hepatitis C virus (HCV) infection is predominantly recognized as a major public health concern in Pakistan. The prevalence of HCV infection and its major risk factors have been found out in different populations of various districts of Khyber Pakhtunkhwa (KPK), Pakistan. However, its incidence in surgery patients remains a mystery; thus, the current study aimed to investigate the incidence of HCV infection among the surgery patients in the district Swat. A total of 304 blood samples (n=500) were collected from the different hospitals of district Swat, especially from Saidu Teaching Hospital, from April 2020 to September 2020. The blood samples were screened through HEALGEN SCIENTIC LLC strips for serological analysis of HCV antibodies. The average incidence of HCV in surgery patients was 6.6%. While the incidence of HCV in surgery patients was higher in females (8%) than in males (6%). We also found that the rate of infection was high in the age group of more than 40, which was 17%, and least in the age group less than 40 years of age which was 3% (P-value <0.191, Odds ratio (OR)=0.442). Furthermore, the sero-incidence of hepatitis was higher in the blood transfused patients 13%. Our results concluded a high incidence rate of HCV infection in the Swat region's surgery patients. To prevent the risk of high incidence, further research on a regional scale is recommended.

Keywords: Chronic hepatitis; Hepatitis C virus; Incidence; Risk-factors; Surgery

Introduction

Hepatitis C virus (HCV) is an RNA virus belonging to the *Flaviviridae* family, about 40-50 nm in diameter, an important pathogen for non-A and non-B parenteral hepatitis. While it was discovered by colleagues from the Choo and Chiron team in 1989 as a potential viral agent for non-A, non-B hepatitis [1-3]. Hepatitis is a remarkable public health challenge. Approximately, 200 million individuals are infected by the HCV,

constituting about 3.3% of the world population [4, 5]. Among them, 2 million cases of HCV were reported in Japan, 2.7 million were in the United States, 5 million were in Europe, and about 10 million were in Pakistan [6]. The country with the highest HCV prevalence rate is Egypt. Where infection rate steadily increases with age, and the infection rate is high among people of all age groups [7, 8]. This pattern shows a high risk in the distant past and the subsequent

ongoing high risk of acquiring HCV infection, though there are regional differences in average overall prevalence [7, 9]. Determining the incidence of HCV infection (i.e., the newly acquired infection rate) is difficult because most acute infections are asymptomatic, and the available testing methods cannot distinguish acute from chronic or resolved infections. In most countries/regions, there is no systematic collection of data on acute disease cases. Even in countries with well-developed surveillance systems, the acute disease reporting systems underestimate the incidence of HCV infection [10-12]. For some countries, mathematical models have been used to infer incidence trends based on the assumption that the current prevalence of a particular age reflects the cumulative risk of infection. Also, worldwide, 50% to 80% of people develop chronic infections [13], resulting in a large number of lives lost every year [14]. Chronic liver disease may develop for many years after infection, and the past morbidity is the main determinant of the future burden of HCV-related complications [15]. In the United States and other countries/regions where HCV infection has recently occurred, the infection time of most infected people has not reached the time point when chronic liver disease complications usually occur [16, 17]. In countries where HCV infection has occurred in the distant past (such as Japan and Italy), the burden of HCV-related chronic diseases may have reached the greatest extent. However, changes in disease transmission methods have led to young people becoming infected with age, which may lead to an increase in chronic diseases [18].

According to a cohort study (a prospective study) and a case-control study (a retrospective study) of patients with acute diseases (or infections), risk factors related to infections include blood transfusion and blood transfusion, and solid organ

transplantation from infected donors. Injecting drugs, unsafe therapeutic injections, occupational blood contact (mainly contaminated needle sticks), an infected mothers birth, and sex with an infected partner, and sex with multiple partners [19, 20]. Among them, the most important are the blood transfusions of unscreened donors, the use of injected drugs, and unsafe therapeutic injections. Although, the degree of influence of these risk factors on HCV transmission varies in time and geography.

However, the global epidemiological study of hepatitis A and B has been well established. However, little data are available about HCV in some regions of the world, predominantly in Pakistan. In Pakistan, where there has been an ongoing high risk for decades, the high magnitude of the current burden of HCV disease is predicted to continue into the future. Thus current study aimed to determine the incidence of HCV in surgery patients in the northern area of Pakistan in district Swat and HCV infection-related risk factors.

Materials and Methods

Study area

The samples were collected from various hospitals of Swat (Fig.1), specifically from Imperial Hospital, Saidu Teaching Hospital, Central Hospital, and SENA Medical Complex.

Study duration

The current study was conducted from April 2020 to September 2020.

Sample size: About three hundred and four patients were selected for the current study, including males and females.

Selection criteria

Patients of both genders were chosen, and the main selection criteria was a surgery patient.

Collection of data

Data collection was achieved by means of a questionnaire. A particular questionnaire was created and filled out by numerous surgical patients. The basic questions were related to their personal information, i.e., gender, age,

marital status, education, blood transfusion, knowledge of HCV.

Collection of blood sample

About 5ml of blood was collected in an Ethylene Diamine Tetra Acetate (EDTA) tube for screening from each patient after the questionnaire session. For further processing, the sample was swiftly transferred to the laboratory of the Swat University, Center for Biotechnology and Microbiology.

HCV antibody detection procedure

The HEALGEN SCIENTIC LLC Cassette was used for the rapid HCV diagnosis. At first, blood taken from the patient was centrifuged for five minutes, and serum was isolated from blood. Then placed the cassette on a clean and level table. Hold the dropper vertically and transfer one drop of serum

about 30 microliters, then we add one drop of 40 microliters of buffer quickly. After this, wait for the colored line for 15 minutes. When both C (control) and T (Test) lines appear in the kit, it indicates a positive result. When only the C line appears, it indicates a negative result. In case there was no C line developed, this will indicate an invalid result.

Statistical analysis

All the statistical analysis was done with the help of Statistical Package for the Social Sciences (SPSS) software and an excel sheet.

Ethical Consideration

The ethical committee of Saidu Teaching Hospital Saidu Sharif Swat approved the current study, and each patient signed a consent letter before data collection.

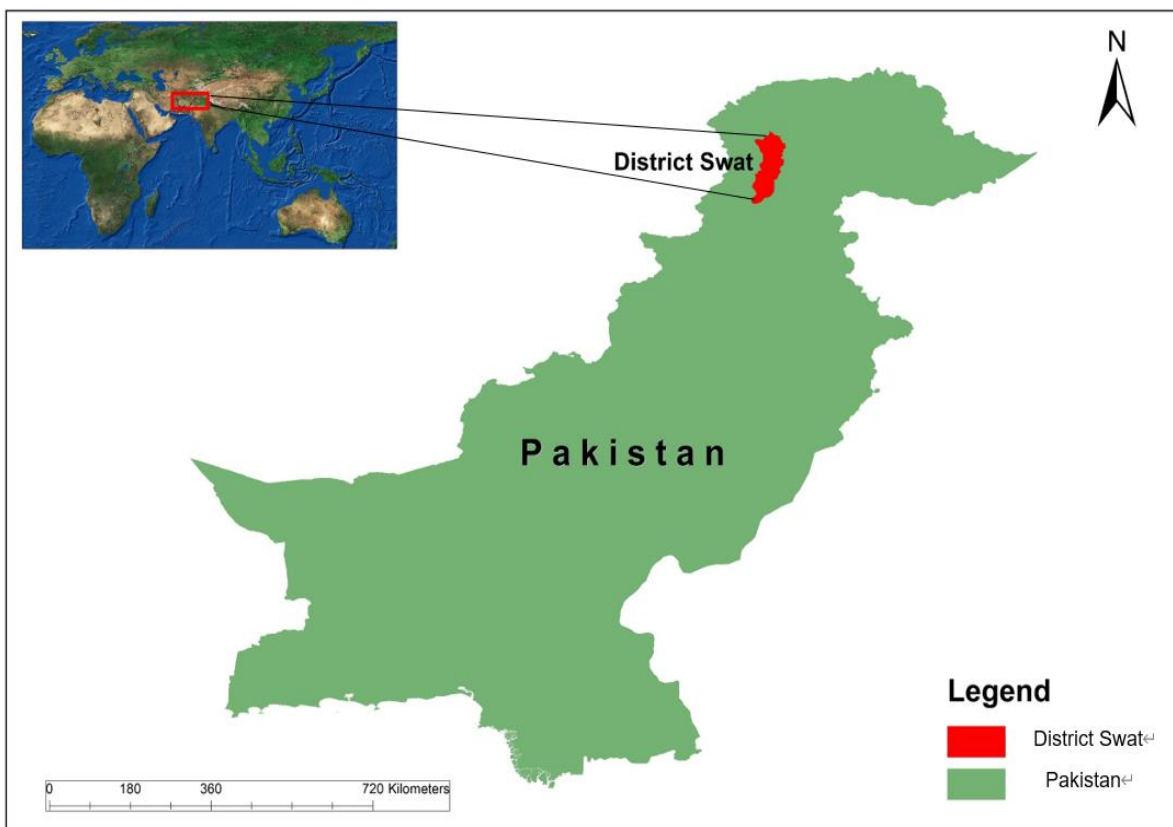


Figure 1. The district Swat, Pakistan

Results

HCV Infection and its association with gender

The (Table 1) shows HCV infection and its association with gender. Three hundred four patients were selected for the study. Out of 304 patients, 204 (66.6%) patients were male,

and 100 (33.4%) patients were female. In male patients, 12(6%) out of 204 were HCV positive, while 188(94%) were HCV negative. Similarly, 8(8%) were HCV positive in female patients, while 92(92%) were negative.

Table 1. HCV infection and its association with gender

Age	Positive	Negative	Total	Chi-square 1.708	P-value 0.191	Odd ratio 0.442
More than 40	17(7.6%)	217(92.4%)	234			
Less than 40	3(4.3%)	67(95.7%)	70			

HCV Infection and its association with age

The (Table 2) shows HCV infection and its association with gender. Patients ages were noted in the study, and it was found that those patients whose ages were greater than 40 years were 234(76.6%) in number, among which 17(7.6%) patients were HCV positive while 217(92.4%) patients were HCV

negative. Similarly, those patients whose ages were less than 40 years were 70(23.4%) in number, in which 3(4.3%) patients were HCV positive while 67(95.7%) patients were negative. Patients ages ranged from 15 to 70 years were included in the study. The mean age of this study was 40 years.

Table 2. HCV infection and its association with age

Gender	Positive	Negative	Total	Chi-square 0.490	P-value 0.484	Odd ratio 0.719
Male	12 (6%)	192 (94%)	204			
Female	8 (8%)	92 (92%)	100			
Total	20 (6.6 %)	284 (93.4%)	304			

HCV Infection and its association with marital status

The (Table 3) shows HCV infection and its association with marital status. The marital information was also collected and included

in the study, which shows that 259 (85%) patients were married, of which 19(7.3%) were HCV positive. 45(15%) patients were un-married, in which 1(2.2%) patient was positive.

Table 3. HCV infection and its association with marital status

Marital Status	Positive	Negative	Total	Chi-Square 1.631	P-value 0.202	Odd ratio 4.586
Married	19(7.3%)	240 (92.7%)	259			
Unmarried	1 (2.2%)	44(97.7%)	45			
Total	20 (10%)	284 (90%)	304			

Infection and its association with blood transfusion history

The (Table 4) shows HCV infection and its association with blood transfusion. In the present study, about 254(83.5%) patients have a blood transfusion history, of which

13(5.2%) were HCV positive, and 241(94.8%) were HCV negative. Similarly, 50 (16.5%) patients do not have any history of blood transfusion, in which 7(14%) patients were Hepatitis C virus (HCV) positive, and 43(86%) were negative.

Table 4. HCV infection and its association with blood transfusion

HCV Status	Transfusion YES	Transfusion NO	Chi-square 5.362	P-value 0.021	Odd ratio 3.018
HCV Positive	13(5.2%)	7(14%)			
HCV Negative	241(94.8%)	43(86%)			
Total	254	50			

Awareness wise distribution of the patients

The (Table 5 & Fig. 2) shows awareness of persons about HCV infection .284(93.4%)

patients have awareness while 20(6.6%) have no awareness about HCV.

Table 5. HCV infection and its association with awareness

Awareness YES	Awareness NO	Chi square 11.820	P- value 0.001	Odd ratio 0.167
284(93.4%)	20(6.6%)			

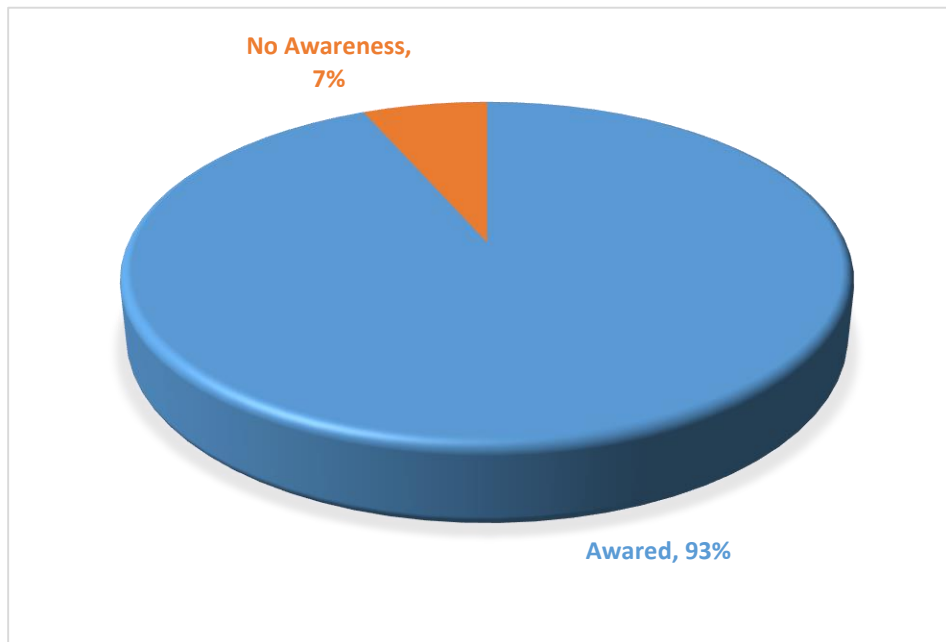


Figure 2. Hepatitis C virus (HCV) infection and its association with awareness

Educational wise distribution of selected patients

The (Table 6 & Fig. 3) show the education level of selected persons in which 234

(76.6%) patients were found illiterate and 70(23.4%) patients were literate out of 304.

Table 6. Educational wise distribution of the selected patients

Illiterate	Percentage	literate	Percentage	Chi square	p- value
234	76.6%	70	23.4%	6.404	0.041

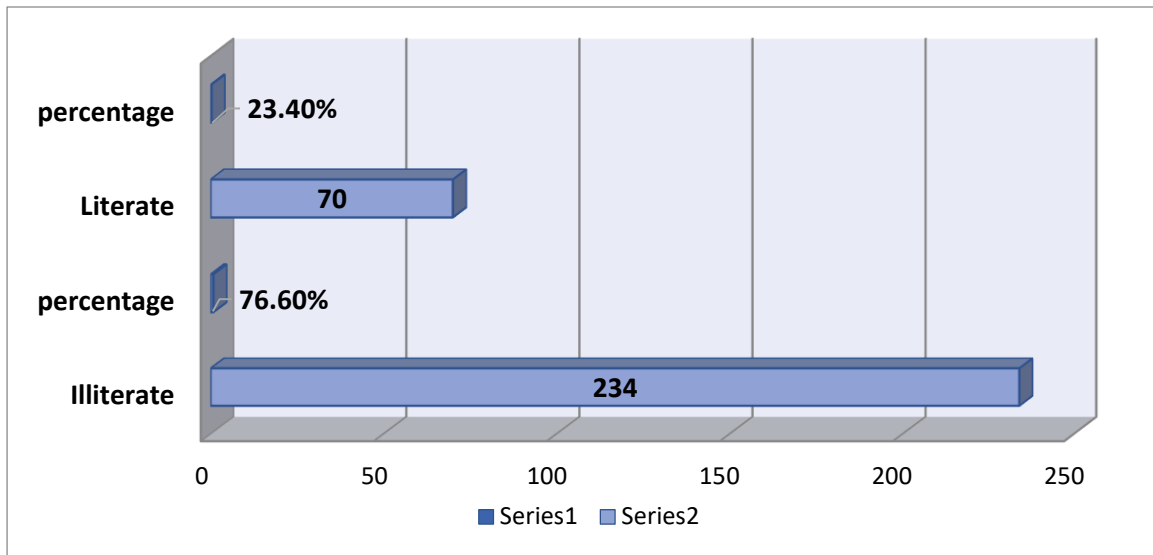


Figure 3. Education-wise distributions of the selected patients

Discussion

Hepatitis C is an infectious disease caused by HCV that was primarily affecting the liver. During the initial symptoms, people have mild or no symptoms at all, occasionally a fever, dark color urine, abdominal pain, and yellow tinged skin color [21-23]. According to many reports, blood-borne infections are increasing day by day, and there are many reasons behind it. However, one of the primary causes is unsterilized equipment used during surgery [24]. Dialysis centers are also the big cause of blood-borne infections such as HCV. We investigated the incidence of HCV infection in patients to obtain some basic information and evaluate the assessments of infection control measures. The incidence of HCV infection is different in different countries of the world; the present study aimed to determine the incidence of HCV in surgery patients of district Swat. For this purpose, a total of 304 samples were examined for HCV infection. In the current study, most of the patients had acquired HCV infection by surgery. Many studies suggest that surgery is a high-risk factor for HCV transmission because of unsterilized equipment used for surgery or other medical procedures [25]. In the current study, the

HCV positive male was (12%), and HCV positive female was (8%). According to our data, the highest rate of infection was found in those people whose ages were ranges from (61 to 70); these results are in agreement with the previous study of High *et al.* [26], who reported that patients having ages (55 to 70) have the highest incidence of HCV.

Moreover, we also found that the majority of positive patients in our data belonged to urban areas. These results were in line with the results reported by [27]. In our study, it has been reported that apart from surgery, there are a lot of other factors that can be associated with Hepatitis C virus prevalence, such as blood transfusion from an infected individual to a healthy individual, dental procedure, low socioeconomic status, drug through an infected or unsterilized syringe. A similar study also reported from India that patients have a high prevalence of Hepatitis C virus infection undergoing hemodialysis [28]. The current study has few confines. First, we could not collect samples from all surgery hospitals of district Swat; secondly, confirmatory techniques such as polymerase chain reaction (PCR) were not done in the present study.

Conclusion

The present study was conducted to find out the potential causes of HCV in patients who undergo some surgery. This study concluded that the potential causes of HCV infection in surgery patients are blood transfusion, unsterilized equipment, unsterilized beds, sheer ignorance of medical practitioners during surgery or any other medical procedure, etc. The current study recommends confirmation of HCV RNA using Real-Time Polymerase Chain Reaction (Rt PCR) and genotyping method. Our study also recommends HCV sequencing and mutational analysis for the antiviral therapy response.

Authors' contributions

Conceived and designed the experiments: N Zaman & Z Khan, Performed the experiments: N Zaman, U Ahmad, A Khan & M Rizwan, Analyzed the data: Z Khan, D Ualiyeva, SA Khan & S Ali, Contributed materials/ analysis/ tools: S Ali, N Zaman, M Rizwan & SA Khan, Wrote the paper: U Ahmad, Z Khan, A Khan & N Zaman.

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