



## A clinical manifestation of Hepatitis C among the population of Hyderabad, Pakistan

MAIRAJ BIBI, ASGHAR ALI SHAIKH\*

Department of Chemistry, Government College University Hyderabad, Hyderabad 71000, Pakistan

### Abstract

Hepatitis C is a noteworthy public health issue around the globe, resulting in liver-related problems. Almost 80% of HCV patients suffer from chronic circumstances and are probable to have liver ailments. Approximately 6% population of Pakistan is infected with HCV. In this study total 510 samples were collected from May 2020 to September 2020 from Hyderabad and adjacent areas. 291 out of 510 samples were affected from HCV. The collected samples were screened on the basis of ELISA using recombinant HCV antigens. Biochemical and hematological factors were performed on HCV-infected patients. RBC, Hemoglobin, WBC, MCV, MCHC, and PLT were observed normally in all age groups. But WBC and PLT are high in the 10-20 age groups. Hematocrit and MCH were decreased as compared to normal levels. Bilirubin, SGPT, and Alkaline phosphate were high in some age groups but normal in other age groups. Albumin was found normal in all patients. These parameters were correlated to each other to know the causes and prevention of HCV. The purpose of present study was to investigate the evaluation, and prevalence of HCV through measurement of biochemical and hematological parameters in patients of hepatitis C among different gender, age groups, etc. in the local population of Hyderabad, Sindh, Pakistan.

**Keywords:** Hepatitis C virus, HCV Screening, Hematological, Biochemical

### INTRODUCTION

Hepatitis C virus (HCV) is the utmost major contributing agent to enduring viral liver infections worldwide (Qamar, Anwar, Ahmad, Haq, Khan, Hussain, Shahzad, Ahmad, Malik, & Khan, 2021). Almost 80% of HCV patients suffer from chronic circumstances and are probable to have liver ailments (Al Kanaani, Mahmud, Kouyoumjian, & Abu-Raddad, 2018; Alter, 2007). Approximately 5% of chronic disease are eventually fatal due to liver failure related to hepatocellular carcinoma or cirrhosis (Rytsareva et al., 2017). The death rate of HCV patients is significantly high about 350,000 individuals expire each year after receiving HCV infection (Mostafa et al., 2016). It was reported by WHO, that the disease of HCV infection has a great influence on public health, almost 170 million persons are affected by HCV infection globally (Organization, 2017). Pakistan is the second highest HCV infected country in the world (Z. Khan et al., 2021) with approximately 10 million infected individuals (Mehmood et al., 2020). This occurrence is not constant throughout Pakistan but fluctuates in numerous areas of the country (Muzaffar, Hussain, & Haroon, 2008). HCV in Pakistan is highly endemic, almost 6% Pakistani populations is infected actively with HCV (Umer M, 2016).

### Cite this:

Mairaj B., and AA Shaikh, (2023). A clinical manifestation of Hepatitis C among the population of Hyderabad, Pakistan. Sindh Uni. Res. J. (SS)

### Corresponding author

[dr.asghar.ali@gcu.edu.pk](mailto:dr.asghar.ali@gcu.edu.pk)



Copyright: © 2023 by the authors. This is an open access publication published under the terms and on conditions of the Creative Commons attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Pakistan is under developed country around 170 million people have not enough health and literacy facilities. According to WHO's data report, in Pakistan around 10 million people were suffering from HCV during 2019 (Asif & College, 2019). In Pakistan, unhygienic medical treatment have been recognized as a main causes of infection (Mahmood & Raja, 2017; Moin, Fatima, & Qadir, 2018). Some other causes for spreading of HCV are re-usage of dental and surgical instruments, needles and syringes of infected patients, shaving from barbers and transfusions of unscreened blood (Organization, 2017; Waheed & Siddiq, 2018). On World Hepatitis Day 2019, Government of Pakistan publicized the Prime Minister's Plan, aiming to reduce the incidence and chronic cases of hepatitis C 30% (Lim et al., 2018). In order to obtain this target, sufficient awareness about HCV among the people regarding indications of the disease, mode of transmission, imperative vaccination and suitable treatments.

According to the census of Pakistan in 2017 (Pakistan, 2017) Hyderabad is considered as the second largest city of Sindh province having the population of 2.2 million, which 83.35% are the urban population, which make it the second most urbanized district of Sindh province after Karachi.

The purpose of Present study to investigate the evaluation, prevalence of HCV through measurement of biochemical and hematological parameters in patient of hepatitis C among in different gender, age groups etc. in local population of Hyderabad, Sindh, Pakistan, Furthermore, to establish accurate diagnosis for Hepatitis and its variants, important for planning of appropriate management. Early diagnosis of Hepatitis patient will help to prevent the transmission of diseases and reduces the financial burden on the population. From our knowledge, this is the first detail report about HCV prevalence association with biochemical and hematological reports in Hyderabad and adjacent region of Sindh.

## **MATERIALS AND METHODS**

The present research work reported in this paper was carried out jointly at Medical and Environmental Biotechnology Research Laboratory, Institute of Biotechnology and Genetic Engineering (IBGE), University of Sindh, Jamshoro, Pakistan and Diagnostic and Research Laboratory, ISRA University Hospital, Hyderabad, Sindh, Pakistan. (1) informed consent was obtained from each patient included in the study and (2) the study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki.

### *Selection criteria and history of HCV infected patients*

Both males and female patients from the age of 20-80 years were selected. The patients who denied to offer their approval were omitted. A detail questionnaire was formulated to investigate complete history of patients. The information obtained from the patients on the basis of their age and gender. The collected information about HCV patients is not reported here.

### *Collection of blood samples*

Blood Sample of Hepatitis affected Patients were collected from ISRA University Hospital, Hyderabad. Patients were belonged to Hyderabad and five adjacent areas (Tando Muhammad Khan, Matiari, Tando Jam, Jamshoro, and Hala).

From each patient, 10 ml of blood was collected from a sterilized disposable syringe. The collected blood sample was immediately shifted to a tube containing an appropriate amount of anticoagulant. Each tube has given name of patient, date and number and transferred to the Diagnostic and Research Laboratory ISRA University Hospital, Hyderabad. 6ml out of 10ml collected blood of each patient was centrifuged at 35000 rpm for 5 minutes. Plasma, obtained from centrifugation was transferred to Eppendorf tubes and preserved in freezer for the procedures of Complete Blood Count (CBC).

### *Determination of complete blood count (CBC)*

The stored samples of blood were used to test seven hematological parameters, including Hematocrit (Hct), Hemoglobin (Hb), Mean corpuscular hemoglobin (MCH), Mean corpuscular hemoglobin concentration (MCHC), mean corpuscular volume (MCV), white blood cell count (WBC) and red blood cell count (RBC) were analyzed using a fully automatic Hematology Analyzer (Nihon-Kohden MEK-6318 K, Tokyo, Japan).

### *Separation of serum and determination of liver function test (LFT) and albumin test*

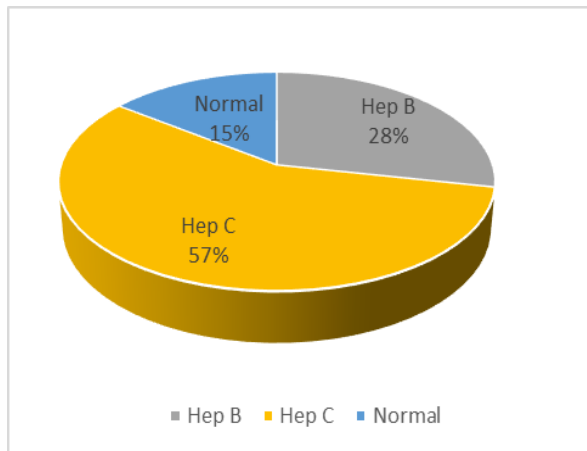
4ml out of 10ml collected blood was transferred separately into the Gel Tube (an anticoagulant free test tube) and subsequently centrifuged at 35000rpm for 5minutes. Blood serum collected in cups and placed in Roche Automatic Analyzer (Cobas c 311 analyzer, Roche UK), which automatically measures the serum Alanine transaminase (ALT), Alkaline phosphatase (ALP), Albumin and Bilirubin.

### *Detection of hepatitis B and C virus*

Hepatitis B virus (HBV) and Hepatitis C virus (HCV) tests were performed through the instrument COBAS e411, Elecsys, Roche UK. Monitor using serum samples.

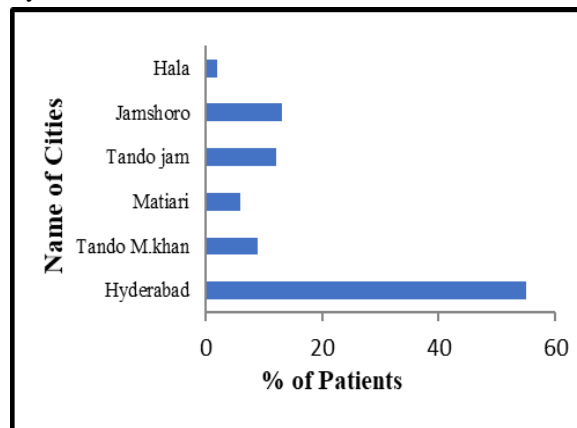
## RESULTS

Viral hepatitis has become main health issue in Pakistan. A cross-sectional survey of the sero prevalence of HBV and HCV antibodies were detected through ELISA. The total 510 patients were examined in present study which were obtained from Diagnostic and Research Laboratory, ISRA University Hospital, Hyderabad, Pakistan during May 2020 to September 2020. According to results presented in Figure 1, Out of 510, the prevalence of HBV recorded 144 (28%) and HCV 291(57%) and Normal individuals 75(15%) respectively.



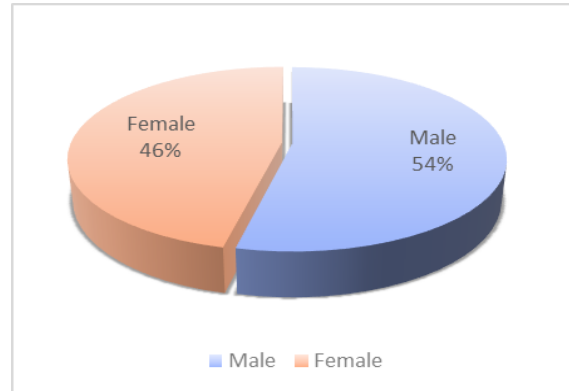
**Figure 1.** Ratio of different Hepatitis patients

The samples of HCV patients were collected from Hyderabad and its adjacent areas. Among them 57% patients were from Hyderabad, 14% from Jamshoro, 12% from Tando Jam, 6% from Matiari, and 2% from Hala as exhibited in Figure 2. It was noted that the percentage of Hyderabad HCV patients were highest as compared to HCV patients of adjacent areas of Hyderabad.

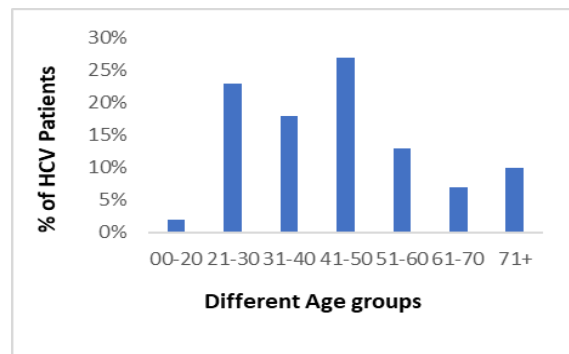


**Figure 2.** % of HCV patients of different areas.

The 291 patients of HCV were categorized on the basis of gender. Out of them 157 (54%) patients were males and 134 (46%) were females as depicted in Figure 3.

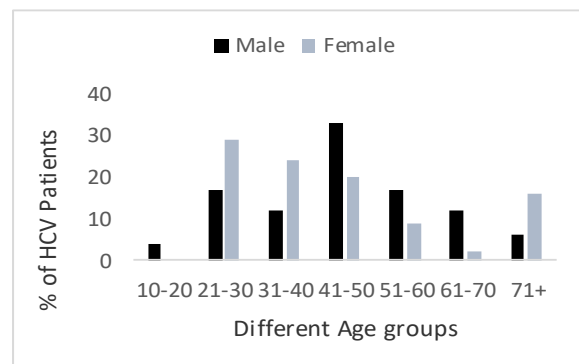


**Figure 3.** Distribution of HCV patients on the basis of gender



**Figure 4.** Distribution of HCV Patients by Age groups

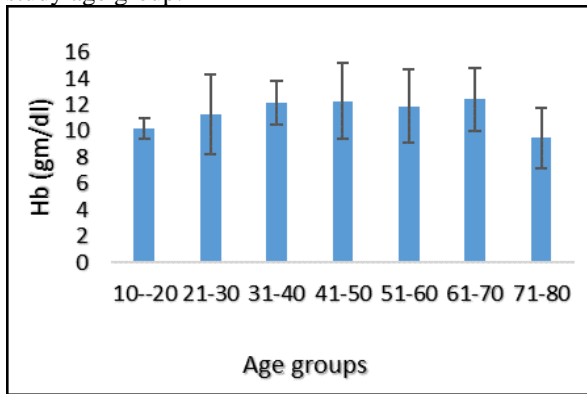
On basis of different age, HCV infected patients were divided into 7 age groups (10-20, 21-30, 31-40, 41-50, 51-60, 61-70 and 71-80 years old) as shown in Figure



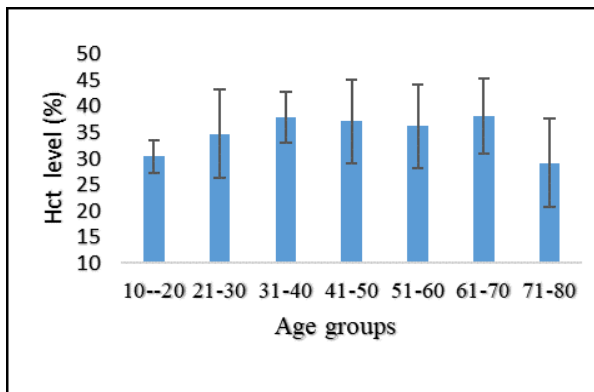
**Figure 5.** Distribution of HCV Patients in different age groups and gender

4. A part from 291 patients the prevalence of HCV infected individuals noted different variations in age, the highest incidence was shown for the age group 41-50 years (27%), second highest age group examined 21-30 years (23%) and the lowest prevalence was

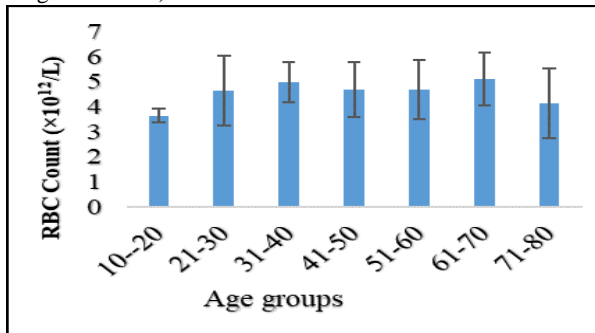
recorded 10-20 years (2 %) as compared to other under study age group.



**Figure 6.** Hemoglobin (Hb) concentration in HCV Patients (Normal Range= 11.5-16.0 gm/dl)

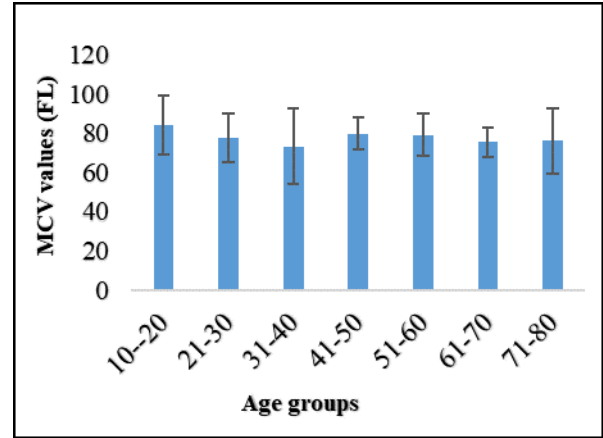


**Figure 7.** Hematocrit (Hct) level in HCV Patients. (Normal ranges=42-52%).



**Figure 8.** Red Blood Cells Count (RBC) in HCV Patients (Normal ranges= (3.4-5.5 $\times 10^{12}/L$ ))

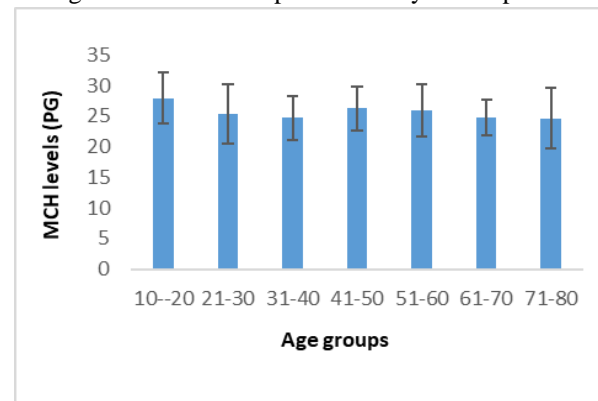
A part from 291 HCV Male and female patients of different age groups affected individuals were also further distinguished according to gender. In male the maximum occurrence was found 33% in the group of age 41-50 years and lowest 4% in the age of 10-20 years as compared to other male age groups. In female the maximum occurrence was observed 29% in the age of 21-30 years and lowest percentage 2% in the age of 61-70 years correspondingly as summarized in Figure 5 in comparison to other age groups of females. While no



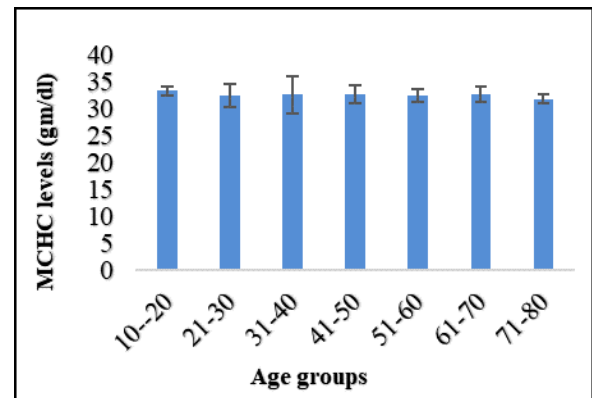
**Figure 9.** Mean Corpuscular Volume (MCV) levels in HCV patients

female was found infected in the age group 10-20 years.

Usually, patients of Hepatitis C have normal hemoglobin levels. In present study as depicted in

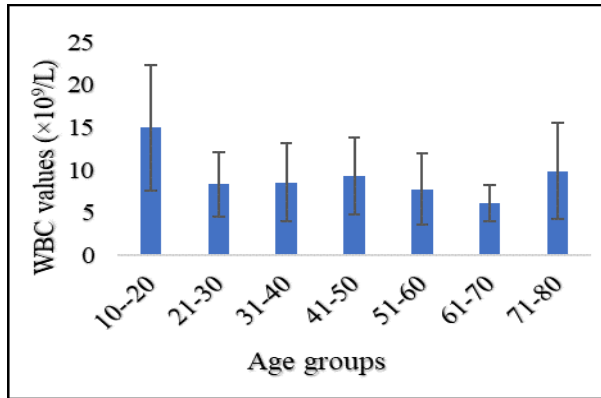


**Figure 10.** Mean Corpuscular Hemoglobin (MCH) levels in HCV patients

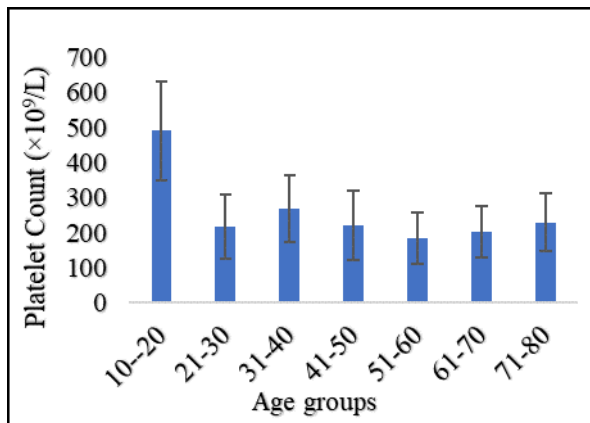


**Figure 11.** Mean Corpuscular Hemoglobin Concentration (MCHC) in HCV patients (Normal range= 30-35 gm/dl)

Figure 6, 20 to 70 age groups showed normal hemoglobin concentration 11.29gm/dl, 12.15gm/dl, 12.26gm/dl, 11.85gm/dl, 12.42gm/dl, but in 71-80 age



**Figure 12.** White Blood Cells (WBC) values in HCV patients (Normal ranges:  $4.0-11.0 \times 10^9/L$ ) group showed slightly reduce hemoglobin 9.45gm/dl



**Figure 13.** Platelet Count in HCV patients (Normal ranges:  $150-400 \times 10^9/L$ ).

and second reduce hemoglobin 10.15gm/dl in 10-20 years age group.

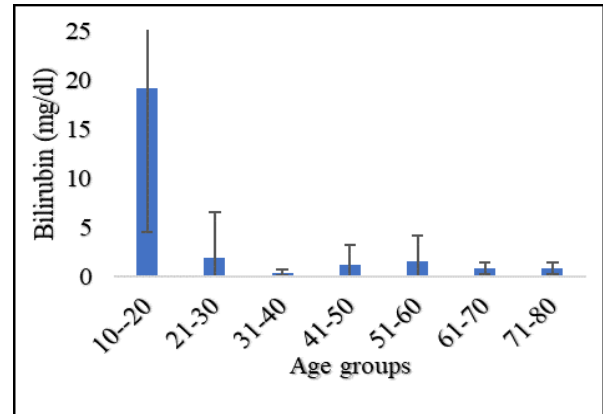
According to Figure 7, all patients of HCV infected showed low hematocrit (Hct) level. However, 71-80 age group showed significantly lowest Hct 29.1% and second lowest Hct 30.4% in 10-20 years age group as compared to other age groups Hct of Hepatitis C affected patients.

The Figure 8, exhibited the level of red blood cell count (RBC) in all HCV patients observed in between normal ranges ( $3.5-5.5 \times 10^{12}/L$ ) in all age groups.

In patients of HCV infection, MCV (Mean Corpuscular Volume) of following age groups: 10-20, 21-30, 41-50 and 51-60 years were mate with normal range (76-96 FL). Whereas, 31-40 age group illustrated MCV value (73.1FL) which was below the normal range, however last two age groups 61-70 and 71-80 are adjacent to the normal MCV range as shown in Figure 9. Mean Corpuscular Hemoglobin (MCH) was approximately in slightly reduced in patients of HCV in current study except age group 10-20. The lowest MCH as detected in 31to 40 (24.75PG) and 61 to 70 (24.77PG) age

groups. While only 10 to 20 age group showed normal MCH (27.95PG) in their blood (Figure 10). Mean Corpuscular Hemoglobin Concentration (MCHC) in all age groups of under study HCV patients showed in normal ranges i-e 30-35gm/dl (Figure 11).

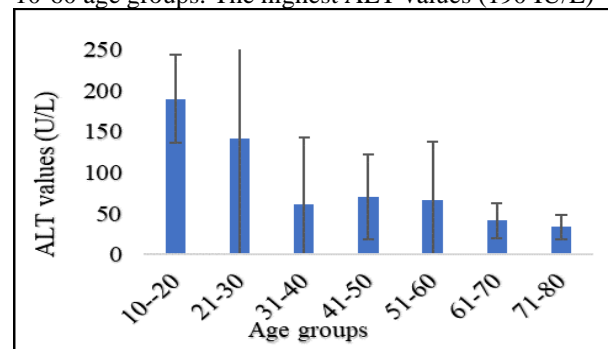
White Blood Cell (WBC) was found normal ( $4-11 \times$



**Figure 14.** Bilirubin value in HCV patients (Normal ranges:  $0.2-1.2$  mg/dl).

$10^9/L$ ) in the patients of HCV in 21 to 80 years age groups. Whilst only 10 to 20 age group, Hepatitis C patients' WBC examined higher ( $14.97 \times 10^9/L$ ) as compared to other age groups as reported in Figure 12. Platelet count was found approximately normal ( $150-400 \times 10^9/L$ ) in all patients of HCV in 21 to 80 years age groups. While in 10 to 20 age group showed highest ( $490 \times 10^9/L$ ). Platelet as compared to normal (Figure 13).

The ALT values in patients of HCV were found high in 10-60 age groups. The highest ALT values (190 IU/L)



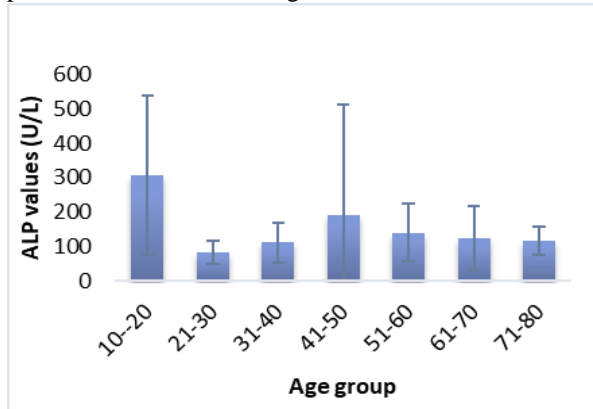
**Figure 15.** Alanine Aminotransferase (ALT) values in HCV patients (Normal ranges:  $00-41$  U/L)

were found in age group 10-20 followed by age group 21-30 (141 IU/L). While only age group 71-80 showed below normal (33.6 IU/L) ALT value as depicted in Figure 15.

According to Figure 16, HCV infected patients of age group 10-20 possessed abnormally high ALP value (308 IU/L) followed by age group 41-50 (192 IU/L). While other age groups showed normal ALP range.

## DISCUSSION

In Pakistan, [Hepatitis C virus (HCV) infections are considered the primary public health apprehensions. This viral infection spreading promptly in the general public of Pakistan owing to several economic and

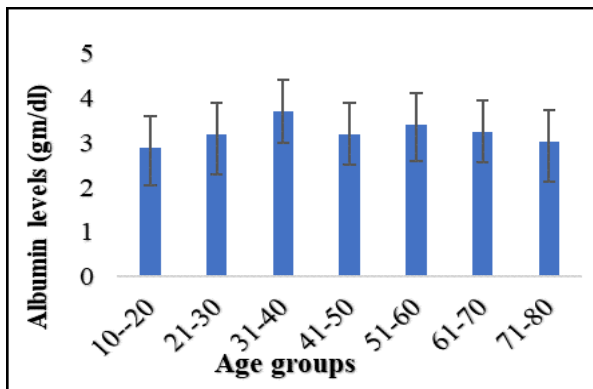


**Figure 16.** Alkaline Phosphatase (ALP) values in HCV patients (Normal ranges: 40-129 U/L)

social factors.

Although several potent antiviral treatments are available in the country the disease liability in general public has not dropped. This may be due to asymptomatic nature of this infection that consequences in early detection of the virus. For an efficacious control of the infection in the population of Pakistan, a scientific analysis is required.

Hyderabad is considered as the second largest and populated city of Sindh province of Pakistan. The present study investigated the evaluation prevalence of HCV through measurement of biochemical and hematological parameters in patient of hepatitis C in local population of Hyderabad, Sindh.



**Figure 17.** Albumin levels in HCV patients (Normal ranges: 3.4-5.0 gm/dl)

According to existing results, out of 510 participants prevalence of HBV antibodies was found 144 (28%) and HCV 291 (57%) in all age groups. In reported literature of different cities of Sindh (Larkana, Thatta, Nousheroferoz, and Karachi), Pakistan, it was revealed by Samo et al., (Samo, Laghari, Baig, Khoso, &

Hygiene, 2021) that HCV prevalence ranges from 3.2% to 25.1%, while, in Nawabshah city HCV 14.3% and HBV 6.7%. However, in current result about HCV prevalence is compatible with reports from other cities of province Khyber Pakhtunkhwa, Pakistan, such as, Mardan, HCV prevalence was 11.7% (Desikan & Khan, 2017), Peshawar where the HCV prevalence was 12.9% and in Tehsil Daggarr District Buner 34.1% individuals were recorded in all age groups (Qamar, Anwar, Ahmad, Haq, Khan, Hussain, Shahzad, Ahmad, Malik, Khan, et al., 2021). Furthermore, Farash town located in Islamabad, capital of Pakistan prevalence of Hepatitis B virus was 9% and that of Hepatitis C infection was 33% (M. Asad, F. Ahmed, H. Zafar, & S. J. P. j. o. m. s. Farman, 2015). The results of our findings are quite higher (HBV 28% and HCV 57%) as compared to all above reported studies as well as also in another study conducted in 2009 at Liaquat University Eye Hospital, Hyderabad (S. A. Junejo, N. A. Khan, & A. A. J. P. J. M. S. Lodhi, 2009) which showed 4.6% patients were infected from HBV and 13.3% from HCV. In this connection our results are quite alarming and proved that the prevalence of Hepatitis B and Hepatitis C spiked up in Hyderabad since last decade. The increased rate of HBV and HCV prevalence may be caused of transmission due to the lacking of public consciousness (Abbasi, Fatmi, Kadir, Sathiakumar, & health, 2014) and might be increased of population. Several reports (Ambreen, Younas, Rasool, & Ali, 2016; Muhammad Naveed, Muhammad, & Umar Farooq, 2016) have been published that highlight growing occurrence rate of these viral diseases since years. However, variation in reported results available in literature exhibited very unpredictable verdicts possibly because most of the reports were revealed by consideration of small terrestrial constituency or containing only a precise population and small size of sample (Khalid et al., 2015). On the basis of detail study, it was revealed that HCV infection rate in males were higher (54%) than females (46%) giving preponderance of male over to female. Similar findings reported by different workers that higher prevalence in males than females were proved with results obtained by (I. Ullah et al., 2021) that hepatitis C infection was more common in males 53.58% than females 46.42%. (Jan, Awan, Awan, & Biology, 2020) in Bannu KPK (male 64.44% and female 35.56%), (N. Ullah et al., 2021) in Mardan KPK (61.38% vs. 38.62%), (M. Khan, Jalil, Din, Ali, & Ahmad, 2018) from Takht Bhai, Mardan, Pakistan (76.47% vs. 23.53%), (M. Khan, Khan, et al., 2018) from Bathkhela, Malakand District, Pakistan (56.52% vs. 43.48%), (S. A. Junejo, N. A. Khan, & A. A. Lodhi, 2009) also reported high prevalence in male 53.4% and in female 46.6%, (M. Asad, F. Ahmed, H. Zafar, & S. Farman, 2015) have revealed that 52% males and 48%

females were diagnosed Hepatitis C in Pakistan. Dissimilar results have also reported about male and female Prevalence of HCV from other cities of Pakistan such as in Nawabshah the prevalence of HCV in male participants was 15.5% where as in female participants was 12.9% (Samo et al., 2021), in Swat District (Z. Khan et al., 2021) have established that infection rate in males were higher 11.8% with HCV than females 10.9%, however, these observation proved that the percentage of male is higher than female but results of both are low than present findings. It is suggested that the reasons of higher prevalence of HCV in male than female may be due to more social contacts of male than female in our culture, also cause the response of unsafe blood transfusion, unhygienic usage of razor and syringes (Raja, Janjua, & Infection, 2008). The least frequency of HCV in females may be associated to less exposure with HCV risk circumstances due to male influencing society of the area and also the estrogen hormone in females is deliberated to perform a key role in the spontaneous elimination of HCV infection (Alric et al., 2000).

The dominance of HCV in Male over female may be caused their more therapeutic consultation and due to more self-motivation and vigorous role of the male in the society. In addition, it is difficult to predict confidentially that the greater number of HCV occurrence in male is due to bias of the gender for the infection process or otherwise, if a primary hematological-survey should be accomplished.

On the basis of age group, significant differences were observed in the prevalence of HCV in both genders. The frequency of HCV also assorted with respect to age but the utmost prevalence 27% was detected in age groups 41-50 years. In age groups above 50 years (51 to 80 years), a decreasing trend of active HCV prevalence was observed. The decrease in percentage to 13% in the age group of 51-60 years, 7% in 61-70 and 10% in > 70 years. It is suggested that decreasing the prevalence of HCV in the age group 70 or above in present study may cause due to collection of small size of patients of HCV or death ratio higher in the age of 70 or above by different diseases or naturally in the Pakistani population unlike the developed countries. It was not surprising that our findings were different as compared to findings of others because several researchers have reported different percentage of prevalence of HCV in different age groups such as (Ahsan et al., 2019) have reported that in different cities of Punjab, a considerably extraordinary frequency was detected in 41-60 years old as over 33%. (M. Khan, Khan, et al., 2018) from Batkhela, Malakand District reported that infection of HCV was maximum, 31.71% in 41-60 years age group. (Gilani et al., 2021) reported utmost prevalence of hepatitis C was observed in 61-70 years age group, (Jan et al.,

2020) found that in District Bannu, Khyber Pakhtunkhwa, infection of HCV infection was maximum, 33.33% in 16-30 years age group. (N. Ullah et al., 2021) found that in district Mardan, Khyber Pakhtunkhwa, the age group 21-40 years was found most active towards hepatitis C infection (47.09%). (Ahsan et al., 2019) found that in patients of Khyber College of Dentistry Peshawar, the age group 21-40 years was revealed most seropositive towards HCV infection (44.55%). Our findings preclude that patients with age group 41-50 were highly infected with HCV. Our results are in agreement with (Niu, Zhang, & Tong, 2016) who described that as age increased above 40 years, the rate of HCV infection also increased.

Alternations in hematological and biochemical variables have been examined and described in the Hepatitis C infection. For diagnosis early the complication related to severe Hepatitis C infection, biochemical and hematological examination have vital role. This helps to extensively care for the patients and prevent death that may results from such complications. The result of this study shows that the Hepatitis C infection resulted in the alternations of few parameters.

In present study as depicted in Fig-6, 21-30 and up to 70 years age groups showed normal Hb concentration where as in 10-20- and 71-80-years age group showed slightly reduce than normal Hb. It was noted that the age group 41-50 which in our study showed highest prevalence of HCV in present report exhibit normal Hb. These results were harmony by (Bukhari & Zafar, 2013) and (Asghar, Anjum Zia, Jafri, Ahmed, & Amjad, 2017) who revealed normal range of hemoglobin in HCV patients. However current findings were different from the studies, described by (Chen et al., 2008) that the hemoglobin is higher in HCV patients. Moreover, another study carried out by (Abdullah, 2018) in Saudi Arab showed lower level of hemoglobin. Hemoglobin is decreased in chronic cases when there is lower liver efficiency that increase the breakdown of red blood cells. The Hct values showed significantly below normal in all age groups of Hepatitis C. The Hct and Hb are closely linked to each other hence low values may be indicated the presence of anemia in under study patients. Hepatitis C have an impact on the red cells, the main components of the CBC. In under studied Hepatitis C patients RBC were found normal in all age group, only 10-20- and 70-80-years age group show slightly reduce RBC than other age group but in normal range. In Hepatitis C patients according to present data, MCV were found normal in all age groups except age group 31-40 which showed below normal range. Over all there were no significant abnormalities were observed in MCV values. On the other hand, values of MCH were noted slightly reduced than normal in patients of HCV in current study except

age group 10-20. Furthermore, MCHC values estimated and was found normal in all age groups. In present report, age group 21-80 years represented normal count of WBC except 10-20 years age group which showed high WBC count. (Asghar et al., 2017) mentioned normal value of the Hb, however, (Tsai et al., 2015) have revealed that the HCV-infected patients also displayed considerably higher Hb, WBC and RBC count and level of Hct. Platelet count was found normal in under study Hepatitis C patients in 21 to 80 years age group while only 10 to 20 years old group contained greater than normal platelet count. Our results were different from (Bukhari & Zafar, 2013) and many published studies which found lower than normal range of platelets and reported that, thrombocytopenia is an initial diagnostic indicator for HCV infection (de Almeida et al., 2004; Wang, Yao, Wang, Chang, & Chou, 2004). On the other hand Wang et al., (Wang et al., 2004) have mentioned that an HCV-infected group, which also had chronic hepatitis and cirrhosis, had a mean platelet count greater than normal range.

Our studies also include liver function test (LFT) of patients which is important biochemical marker, used to detect the liver diseases. The liver function test includes serum analysis of serum ALP, Albumin and Bilirubin. The level of bilirubin was estimated in patients of HCV and found significantly high in age groups 10-30 and 41-60 years as compared to other age groups. Our results are consisted with the results of (Abdullah, 2018) and (Ashraf et al., 2016) which shows high level of bilirubin. Several literatures documented that the increase level of bilirubin reflects bile duct damage or liver cell damage. High levels of bilirubin can cause jaundice (Tasneem, 2016). (Giannini, Testa, & Savarino, 2005) have reported that Jaundice occurs in about 20%–33% of cases of acute hepatitis C infection.

Higher values of ALT in HCV positive patients were found in this present study. The highest elevated values of ALT were observed in age group of 10-20 years. Similarly, high level of ALT was also found in HCV patients as reported by (Abdullah, 2018), (Hassanpour & Karami, 2017) and (Asghar et al., 2017). It has been reported by (Woreta & Alqahtani, 2014) that variable ALT levels (ranging from normal to high) related to chronic HCV infection. Continual, normal levels of ALT have been related with a lower advancement and incidence of cirrhosis in hepatitis patients.

In HCV infected patients the value of ALP was found high in all age groups. Alike results were also documented by (Abdullah, 2018), (Asghar et al., 2017) and (Ashraf et al., 2016). In liver diseases, increased ALP amount release into plasma, instead of impaired biliary secretion. It has been reported (Hsu et al., 1996) that level of ALP increased with increasing age, body

mass index, C-reactive protein, monocyte count, serum uric acid, lead, diabetes, and smoking, lesion of liver and cardiovascular disease.

Albumin level in the patients of HCV infected in all age groups were found normal except age group 10-20 which showed slightly lower to normal albumin level. These findings are different from Abdullah (Abdullah, 2018) who reported significant reduction in albumin level and Hassanpour and Karami mentioned slightly low albumin level.

## CONCLUSION

On the basis of reported data in the present study, the HCV prevalence was documented in different age and gender groups exhibit its occurrence has been higher with the increase in age. The percentage of HCV infection in male individuals was almost higher as compared to Females. WBC and PLT are high in the 10-20 age groups. Hematocrit and MCH were decreased as compared to normal. Bilirubin, SGPT, and Alkaline phosphate were high in some age groups but also normal in other age groups. The higher hepatitis C prevalence shows that the overall population in Hyderabad is constant exposure to the risk of HCV infection. There is an immediate requirement to introduce active population-based health awareness programs among the people about paths of dispersal and hindrance from Hepatitis virus.

**Research funding:** No funding sources.

**Statement of ethics:** The ethical approval was taken from the ethical committee at the Institute of Biotechnology and Genetic Engineering, University of Sindh, Jamshoro and Medical Superintendent of ISRA University Hospital, Hyderabad.

**Disclosure statement:** The authors have no conflicts of interest to declare.

## REFERENCES

- Abbasi, I. N., Fatmi, Z., Kadir, M. M., Sathiakumar, N. J. I. j. o. o. m., & health, e. (2014). Prevalence of hepatitis B virus infection among barbers and their knowledge, attitude and practices in the district of Sukkur, Sindh. *27(5)*, 757-765.
- Abdullah, S. M. J. P. j. o. m. s. (2018). Prevalence of Hepatitis B and C virus infection and their correlation with hematological and hepatic parameters in subjects undergoing Premarital Screening in the Jazan Region, Kingdom of Saudi Arabia. *34(2)*, 316.
- Ahsan, A., Khan, A. Z., Javed, H., Mirza, S., Chaudhary, S. U., & Shahzad-ul-Hussan, S. J. P. o. (2019). Estimation of hepatitis C prevalence in the Punjab province of Pakistan:



- a retrospective study on general population. *14*(4), e0214435.
- Al Kanaani, Z., Mahmud, S., Kouyoumjian, S. P., & Abu-Raddad, L. J. (2018). The epidemiology of hepatitis C virus in Pakistan: systematic review and meta-analyses. *Royal Society open science*, *5*(4), 180257.
- Alric, L., Fort, M., Izopet, J., Vinel, J. P., Bureau, C., Sandre, K., . . . Duffaut, M. J. T. A. B. c. (2000). Study of host-and virus-related factors associated with spontaneous hepatitis C virus clearance. *56*(2), 154-158.
- Alter, M. J. (2007). Epidemiology of hepatitis C virus infection. *World journal of gastroenterology: WJG*, *13*(17), 2436.
- Ambreen, K., Younas, A., Rasool, S., & Ali, U. J. I. J. o. A. R. i. B. S. (2016). Frequency of HCV, Hbs Ag & HIV in general population Lahore Pakistan. *3*(8), 118-123.
- Asad, M., Ahmed, F., Zafar, H., & Farman, S. (2015). Frequency and determinants of Hepatitis B and C virus in general population of Farash Town, Islamabad. *Pakistan journal of medical sciences*, *31*(6), 1394.
- Asad, M., Ahmed, F., Zafar, H., & Farman, S. J. P. j. o. m. s. (2015). Frequency and determinants of Hepatitis B and C virus in general population of Farash Town, Islamabad. *31*(6), 1394.
- Asghar, S., Anjum Zia, M., Jafri, S., Ahmed, I., & Amjad, M. (2017). *A Correlative Study Between Biochemical and Hematological Parameters and Hepatitis C Prevalence in the Premises of Faisalabad*.
- Ashraf, A., Chakravarti, A., Roy, P., Siddiqui, O., Goel, S., Kapoor, N., & Kar, P. (2016). Revisiting the Utility of Biochemical Profile in the Diagnosis and Management of Hepatitis C Virus Infection: a Study from India. *Journal of Pharmaceutical and Biomedical Sciences*, *6*(9).
- Asif, A. F. J. J. o. I. M., & College, D. (2019). Appraisal of national response to chronic hepatitis in Pakistan. *8*(1), 3-7.
- Bukhari, K. T., & Zafar, H. J. A. J. A. B. (2013). Blood complete picture examination; A surrogate test for screening hepatitis C viral infection. *1*(2), 76-78.
- Chen, C. B., Chou, C. Y., Tseng, Y. H., Huang, C. C., Chen, W., Shih, C. M. J. D., & Transplantation. (2008). Chronic hepatitis C infection is associated with higher hemoglobin levels in hemodialysis patients, but hepatitis B infection is not. *37*(1), 12-17.
- de Almeida, A. J., Campos-de-Magalhães, M., de Melo Marçal, O. P., Brandão-Mello, C. E., Okawa, M. Y., de Oliveira, R. V., . . . Lampe, E. J. A. o. h. (2004). Hepatitis C virus-associated thrombocytopenia: a controlled prospective, virological study. *83*(7), 434-440.
- Desikan, P., & Khan, Z. J. I. j. o. m. m. (2017). Prevalence of hepatitis B and hepatitis C virus co-infection in India: A systematic review and meta-analysis. *35*(3), 332-339.
- Giannini, E. G., Testa, R., & Savarino, V. (2005). Liver enzyme alteration: a guide for clinicians. *CMAJ : Canadian Medical Association Journal*, *172*(3), 367-379. doi:10.1503/cmaj.1040752
- Gilani, I., Kayani, Z. A., Awan, S. L., Sabir, F., Akhter, N., & Naqvi, S. Z. J. P. J. o. P. (2021). Frequency of hepatitis b and c virus in surgical patients in a tertiary care hospital of muzaffarabad. *17*(3), 11-13.
- Hassanpour, S. H., & Karami, S. Z. (2017). *International Journal of Current Medical and Pharmaceutical Research*.
- Hsu, S.-H., Chan, C.-Y., Tam, T.-N., Lin, S.-H., Tang, K.-C., & Lee, S.-D. (1996). The liver biochemical tests and serological markers of hepatitis B virus in the very old-aged population in Taiwan. *Zhonghua yi xue za zhi= Chinese medical journal; Free China ed*, *57*(1), 16-21.
- Jan, N., Awan, Z. U. R., Awan, M. U. R. J. P., & Biology, A. (2020). 2. Hepatitis C Virus (HCV) infection in general population of District Bannu Khyber Pakhtunkhwa, Pakistan. *9*(3), 1679-1689.
- Junejo, S. A., Khan, N. A., & Lodhi, A. A. (2009). Prevalence of hepatitis B and C infection in patients admitted at tertiary eye care centre: A hospital based study. *Pak J Med Sci*, *25*(4), 597-600.
- Junejo, S. A., Khan, N. A., & Lodhi, A. A. J. P. J. M. S. (2009). Prevalence of hepatitis B and C infection in patients admitted at tertiary eye care centre: A hospital based study. *25*(4), 597-600.
- Khalid, A., Zahid, M., Aslam, Z., Bilal, M., Haider, A. J. I. J. o. V., & Biology, M. (2015). Sero-Epidemiology of Hepatitis B and C Virus in Rural Population of Tehsil Samundri, District Faisalabad, Pakistan. *4*, 19-22.
- Khan, M., Jalil, F., Din, M., Ali, S., & Ahmad, A. J. I. J. B. (2018). Seroprevalence and risk factors of hepatitis C virus (HCV) in tehsil Takht Bhai district Mardan, KPK, Pakistan. *12*(5), 249-254.
- Khan, M., Khan, S., Haider, S., Jalil, F., Jamal, M., & Ahmad, A. J. I. J. C. R. R. (2018). Prevalence and Risk Factors of Hepatitis C Virus (HCV)

- in Tehsil Batkhela District Malakand, KPK, Pakistan. 9(06), 20251-20256.
- Khan, Z., Zaman, N., Iqbal, S., Khan, A., Ualiyeva, D., Mahmood, R. T., . . . Mian, I. A. (2021). 6. Incidence of Hepatitis C virus infection in Swat District, Pakistan: a preliminary study. *Pure and Applied Biology (PAB)*, 11(1), 51-57.
- Lim, A. G., Qureshi, H., Mahmood, H., Hamid, S., Davies, C. F., Trickey, A., . . . Walker, J. G. J. I. j. o. e. (2018). Curbing the hepatitis C virus epidemic in Pakistan: the impact of scaling up treatment and prevention for achieving elimination. 47(2), 550-560.
- Mahmood, H., & Raja, R. J. G. H. O. A. (2017). Risk factors of hepatitis C in Pakistan. 7(6), 00259.
- Mehmood, S., Raza, H., Abid, F., Saeed, N., Rehman, H. M., Javed, S., & Khan, M. S. (2020). National prevalence rate of hepatitis B and C in Pakistan and its risk factors. *Journal of Public Health*, 28(6), 751-764.
- Moin, A., Fatima, H., & Qadir, T. F. J. T. L. (2018). Tackling hepatitis C—Pakistan's road to success. 391(10123), 834-835.
- Mostafa, A., Shimakawa, Y., Medhat, A., Mikhail, N. N., Chesnais, C. B., Arafa, N., . . . Esmat, G. (2016). Excess mortality rate associated with hepatitis C virus infection: a community-based cohort study in rural Egypt. *Journal of Hepatology*, 64(6), 1240-1246.
- Muhammad Naveed, A., Muhammad, N., & Umar Farooq, Q. (2016). Hepatitis B and C; prevalence in south Punjab population.
- Muzaffar, F., Hussain, I., & Haroon, T. S. J. J. o. P. A. o. D. (2008). Hepatitis C: the dermatologic profile. 18(3), 171-181.
- Niu, Z., Zhang, P., & Tong, Y. J. S. (2016). Age and gender distribution of Hepatitis C virus prevalence and genotypes of individuals of physical examination in WuHan, Central China. 5(1), 1-9.
- Organization, W. H. (2017). *Global hepatitis report 2017*: World Health Organization.
- Pakistan, G. o. (2017). Pakistan Bureau of statistics. In: Population Census of Pakistan Islamabad.
- Qamar, Z., Anwar, F., Ahmad, R., Haq, I., Khan, A. M. K., Hussain, R., . . . Khan, J. (2021). Prevalence of Hepatitis C virus and determination of its genotypes in subjects of Tehsil Daggarr District Buner, KP, Pakistan. *Clinical Epidemiology and Global Health*, 12, 100809.
- Qamar, Z., Anwar, F., Ahmad, R., Haq, I., Khan, A. M. K., Hussain, R., . . . Health, G. (2021). Prevalence of Hepatitis C virus and determination of its genotypes in subjects of Tehsil Daggarr District Buner, KP, Pakistan. 12, 100809.
- Raja, N. S., Janjua, K. A. J. J. o. M., Immunology, & Infection. (2008). Epidemiology of hepatitis C virus infection in Pakistan. 41(1), 4-8.
- Rytsareva, I., Campo, D. S., Zheng, Y., Sims, S., Thankachan, S. V., Tetik, C., . . . Aluru, S. (2017). Efficient detection of viral transmissions with next-generation sequencing data. *BMC genomics*, 18(4), 1-7.
- Samo, A. A., Laghari, Z. A., Baig, N. M., Khoso, G. M. J. T. A. J. o. T. M., & Hygiene. (2021). Prevalence and risk factors associated with hepatitis B and C in Nawabshah, Sindh, Pakistan. 104(3), 1101.
- Tasneem. (2016). Evaluates the Efficiency of Interferon-Alpha Therapy for Different Time Intervals on the Levels of Iron in Serum Samples of Chronic Hepatitis C Patients. *Pharm Anal Acta* 7:510. doi:doi: 10.4172/2153-2435.1000510
- Tsai, M.-H., Lin, K.-H., Lin, K.-T., Hung, C.-M., Cheng, H.-S., Tyan, Y.-C., . . . Yuan, S.-S. (2015). Predictors for early identification of hepatitis C virus infection. *BioMed research international*, 2015.
- Ullah, I., Khan, N., Khan, Z., Khan, F. U., Khan, A., & Rehman, S. U. J. G. J. o. M. S. (2021). Distribution of active hepatitis c infected population by sex and age groups in district di khan, pakistan. 19(3), 85-90.
- Ullah, N., Kakakhel, M., Bai, Y., Xi, L., Khan, I., Kalra, B., . . . Guanlan, L. J. B. J. o. B. (2021). Prevalence of active HCV infection and genotypic distribution among the general population of district Mardan, Pakistan. 83.
- Umer M, I. M. (2016). Hepatitis C virus prevalence and genotype distribution in Pakistan: Comprehensive review of recent data. *World J Gastroenterol*, 22(4), 1684-1700. doi: <http://dx.doi.org/10.3748/wjg.v22.i4.1684>
- Waheed, Y., & Siddiq, M. J. H. R. (2018). Elimination of hepatitis from Pakistan by 2030: is it possible?, 4, 45.
- Wang, C.-S., Yao, W.-J., Wang, S.-T., Chang, T.-T., & Chou, P. (2004). Strong association of hepatitis C virus (HCV) infection and thrombocytopenia: implications from a survey of a community with hyperendemic HCV infection. *Clinical infectious diseases*, 39(6), 790-796.
- Woreta, T. A., & Alqahtani, S. A. J. M. C. (2014). Evaluation of abnormal liver tests. 98(1), 1-16.