

Demographic Distribution of Viral Hepatitis in the Patients of District Quetta, Pakistan

Haleema Sadia^{1,*}, Nelofar Bugti¹, Sana Ashiq², Saeeda Kalsoom³, Hameed Baloch⁴, Ahmed Nawaz⁴, Ali Akbar⁵

¹Department of Biotechnology, BUIITEMS, Quetta, Pakistan.

²Centre for Applied Molecular Biology, University of the Punjab, Lahore-Pakistan.

³Department of Biotechnology, Virtual University of Pakistan.

⁴Department of Veterinary Sciences, LUWAM, Sciences, Baluchistan, Pakistan.

⁵Department of Microbiology, University of Baluchistan, Pakistan.

ABSTRACT

Background: Hepatitis is an inflammation of the liver, caused by viruses in most of the cases. In the Asian region, the prevalence of viral hepatitis is very high. Worldwide, about 71 million people are affected by this fatal disease, and its prevalence varies in different regions of the world.

Objectives: The present study aims to investigate the distribution of viral hepatitis in the patients of district Quetta, Pakistan.

Methodology: A structured questionnaire was prepared to take the information of patients. The data of a total of 1580 ELISA positive patients affected with viral hepatitis and who visited the Bolan Medical College (BMC) hospital and a clinic present at Pat feeder, Quetta, during January 2017-July 2018 was collected. The data was then analyzed and structured using Microsoft Excel.

Results: It was observed that HBV is the most prevalent among both genders. Males have more chances of HCV/HBV, HDV, and mixed viral hepatitis as compared to females ($p < 0.05$). Married males and females were largely infected with HCV and HBV, and they belonged to rural areas ($p < 0.05$). Patients under the treatment were less as compared to new patient entries, and the patients who attended the BMC for 1st vaccination were more prevalent than those who attended for the 2nd or 3rd time during 2017. Viral hepatitis was more prevalent in male patients in 46-60 years age group, while females had non-significant differences in different age groups.

Conclusion: It is necessary to spread awareness among the general public on how to prevent this deadly disease. Also, proper vaccination and treatment programs should be introduced to decrease the mortality rate.

Keywords

HBV, HCV, HDV, BMC, Pat feeder, Pakistan, Quetta.

*Address of Correspondence

sadiahaleema377@gmail.com

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INTRODUCTION

Viral hepatitis is increasing rapidly, and it is due to viral infection of the liver¹. The most common viral hepatitis

occurs due to A, B, C, D, E, and F viruses. Viral hepatitis can also occur by herpes virus² therefore, there should be

proper diagnosis and treatment of viral hepatitis. The Hepatitis C Virus (HCV) and Hepatitis B Virus (HBV) are more frequent, while Hepatitis Delta Virus (HDV) is mostly present in mixed form with HBV. Moreover, HBV, HCV, HDV, and other viral hepatitis mutate their genome and these varying forms of viral hepatitis have different prevalence rates in diverse areas. HBV is known to have a close contact with the environment and the host³. According to an estimate, about 80% of HBV patients are in Asian countries and 20% in the remaining world^{4,5}. HBV has no proofreading ability, and this is why it has high variability of the genome⁶.

Pakistan has the world's maximum infection rates of HBV, where 25% of the affected patients lead to cirrhosis and death⁷. Similarly, HCV infections are also chronic and linked with cirrhosis and liver cancer⁸. Globally, 71 million people are affected by HCV⁹ while in Pakistan, the prevalence of HCV is 4.8% according to a survey of 2007-2008¹⁰. World Health Organization (WHO) has set the target to eliminate HCV from the world by 2030¹¹. HDV RNA requires HBV DNA for its assembly¹², and both HBV and HDV transfer by the same risk factors. Mostly, HDV transfers when HBV is already present or both viruses transfer at the same time to an infected person¹³. According to an estimate, out of 350 million HBV infected patients, 18 million had co-infection with HDV¹⁴. Due to HDV, hepatitis is converted into fulminant hepatitis¹⁵.

HCV has a different prevalence in different parts of the world. For example, Saudi Arabia, Oman, China (Shandong, Henan province), Middle-East and Pakistan showed 8.6%, 7.7%, (7.2%,3.5%), 3.3% and 16.6%-58.6% prevalence, respectively¹⁶. In the year 2020, Fawad *et al.* observed a significant difference in demographic variables among the selected studies. Moreover, in comparison to females, males showed a higher mean score¹⁷. Another study conducted in the year 2021 showed a higher prevalence of the infection in male patients as compared to females in the age group of 31-50 years¹⁸. Liu *et al.* 2019 recommended HCV screening for patients older than 40 years. Similarly, they reported a higher percentage of male patients particularly for the 60-64 years age group¹⁹. The present study was conducted in the district of Quetta to find

out the demographic features of viral hepatitis patients, and it was compared with previous reports in Pakistan.

MATERIALS & METHODS

It was a cross-sectional study. For sample collection, a structured questionnaire was designed by studying recent literature available and data was collected from Bolan Medical College, hospital, and a clinic at Pat feeder Quetta, from January 2017 to July 2018. Ethical approval for the study was obtained from Institutional Review Board of the Balochistan University of Information Technology, Engineering and Management Sciences, Quetta. The questionnaire was divided into 2 sections. The first part was designed for the collection of demographic details while the second part was designed to gather information regarding laboratory parameters. The data was collected after taking consent from the study participants. Data analysis was done by using Microsoft excel and meaningful results were interpreted based on the results obtained. The results were reported in frequencies and percentages.

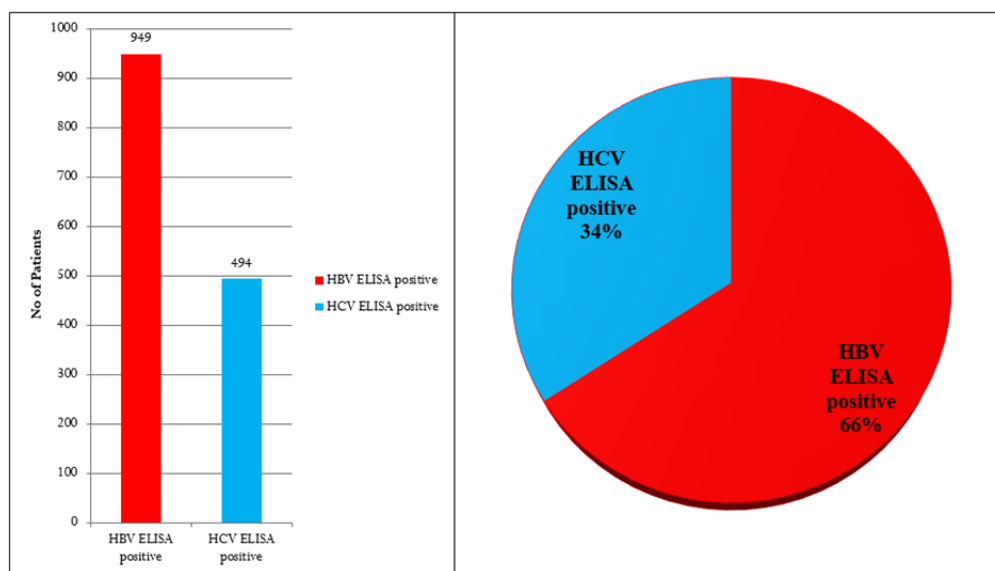
RESULTS

This examination demonstrated that viral hepatitis infection is predominant among the people who attended the Bolan medical college/hospital of Quetta. Findings from a comparative report were taken into consideration from the people who attended Bolan medical college. All the information was collected and observed closely. It was seen that the rate of viral hepatitis in BMC was extremely high. The most common types of hepatitis were hepatitis B, C, and D. Hepatitis D is very rare and it mostly occurs in mixed form with hepatitis B. During the year 2017, the total tests performed by ELISA in BMC hospital are given in the Table 1.

According to the results, a total of 5486 patients attended the BMC Hospital throughout the year 2017, out of which 494 were HCV ELISA positive patients, 949 were HBV ELISA positive patients, and 4043 patients were non-ELISA positive. Moreover, 66% patients were HBV ELISA positive and 34% patients were HCV ELISA positive. Data collected from BMC also showed that HBV was more prevalent in the patients who visited the BMC, and males were more affected as compared to females (Fig. 1).

Table 1. Total Tests Performed by ELISA Method by BMC, Hospital during Jan-2017-December 2017.

Month	Total Test Performed by ELISA Method	HBV ELISA Reactive	HCV ELISA Reactive	Total Non-Reactive	Male	Female	Total Reactive Percentage
January	376	51	18	307	230	146	18.35%
February	335	67	23	245	200	135	43%
March	410	89	28	293	256	154	28.53%
April	519	90	45	384	292	227	26.01%
May	532	104	40	388	301	231	27.07%
June	472	73	68	331	286	186	83.47%
July	338	60	38	240	205	133	28.99%
August	676	99	94	483	387	289	28.55%
September	379	59	37	283	209	170	25.32%
October	523	87	33	403	297	226	22.94%
November	490	77	37	376	311	179	15.79%
December	436	93	33	310	205	131	54.33%
G. Total	5486	949	494	4043	3179	2207	26.30%

**Figure 1.** HBV and HCV ELISA positive patients of BMC during 2017.

A large number of patients visit the diagnostic labs for HCV and HBV diagnosis with a lot of money being invested on their diagnosis. Only 26% patients were ELISA positive, out of which some chances of false-positive also remains valid (Fig. 2).

Vaccination Record of HBV during 2017 (January-December 2017) at BMC Hospital

A general trend is that people go to different hospitals for first-time vaccination and consider that only one time

vaccination is enough, but it is not. The following Table 2 shows that the people who attended the BMC Hospital during 2017 for vaccination of HBV for the first time (996) were greater in number than those who attended the second time (851), and second time attendees were greater in number than those who visited the third time (757). Cumulatively, the total number of people who attended BMC-Hospital were 2604 (Table 2).

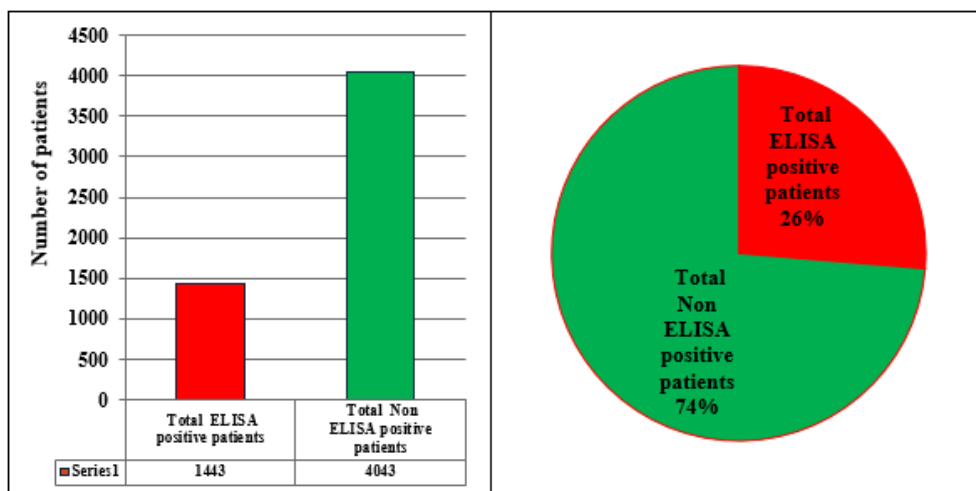


Figure 2. ELISA positive and non-positive patients.

Table 2. Vaccination Record of HBV during 2017 (January-December 2017) at BMC Hospital.

Month	Doses			Total
	1 st	2 nd	3 rd	
January	10	0	0	10
February	55	55	50	160
March	0	0	0	0
April	90	85	60	235
May	315	300	250	865
June	300	289	280	869
July	55	50	50	155
August	45	43	40	128
September	20	15	15	50
October	10	8	8	26
November	6	6	4	16
December	90	0	0	90
Total	996	851	757	2604

Similarly, the percentage of patients who attended the BMC hospital was also calculated i.e. the first time attendees ratio was 38.25%, those who attended the second time were 32.68% and those who attended the third time were 29.07%, as shown in Fig 3.

Data Collected from Pat feeder about the Type of Hepatitis Virus, Age, Gender, Lifestyle and Treatment Plans of the Patients

The information including the type of hepatitis virus, age, gender, lifestyle and treatment was obtained from Pat feeder hospital from January 2018 to July 2018. The data

collected during this period were given in the supplementary file.

The ELISA positive samples of Pat feeder clinic were also counted and data was analyzed. The HCV patients were 49, while HBV positive samples were 87; indicating that HBV has a prevalence of 63%, while HCV positive samples were 37%. In the same way, the males had a total of 97 HCV and HBV samples, while females had 39 HCV and HBV samples. Fig 4 explains the prevalence and gender-wise distribution of both HCV and HBV.

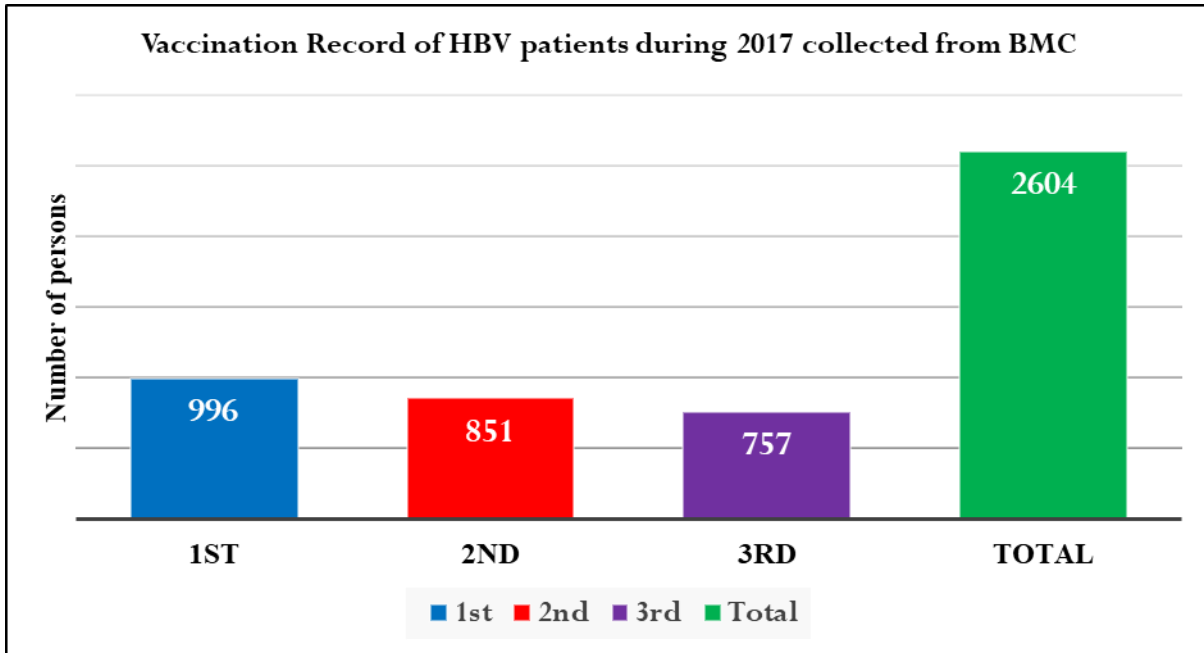


Figure 3. Vaccination Record of HBV during 2017 (January-December 2018) at BMC.

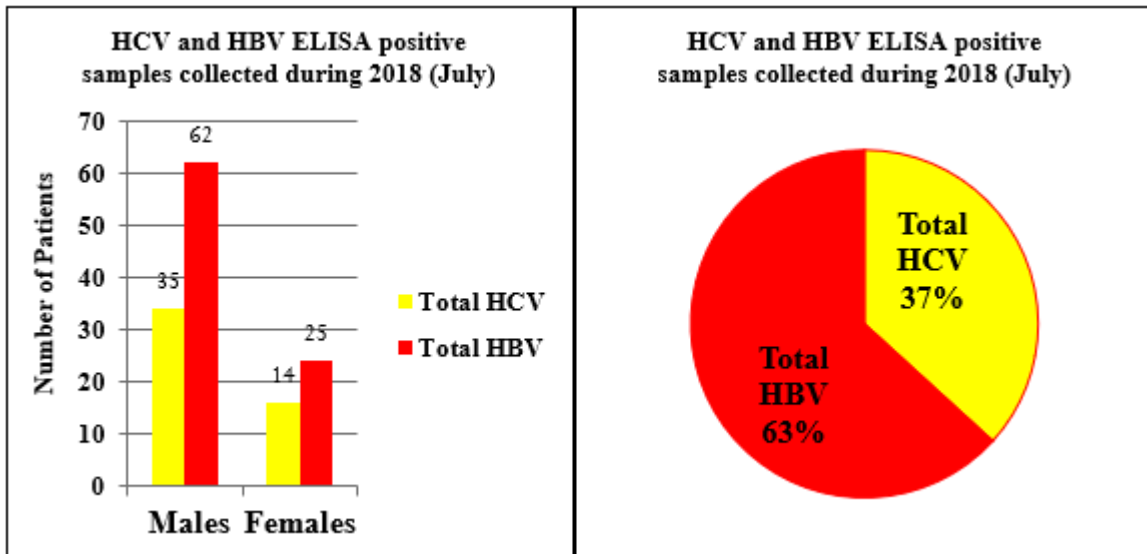


Figure 4. HCV and HBV ELISA positive samples and gender-wise distribution.

HCV and HBV in Different Age Groups

Patients were divided into 5 different groups on the basis of patients with 15 years age gap. Males in 46-60 age group had more chances of HCV and HBV while in females, non-significant results were on the basis of age groups. So, we cannot say with surety which age group has more prevalence, however, HBV patients were greater in number as compared to HCV in both genders as shown in Fig 5.

Marital Status

Married males and females had more HCV (60%, 34%) and HBV (62%, 27%) infection as compared to unmarried males (having less number of HCV and HBV cases (6%, 11%). However, unmarried females did not show any viral infection. The distribution of both HBV and HCV according to marital status is shown in Fig. 6.

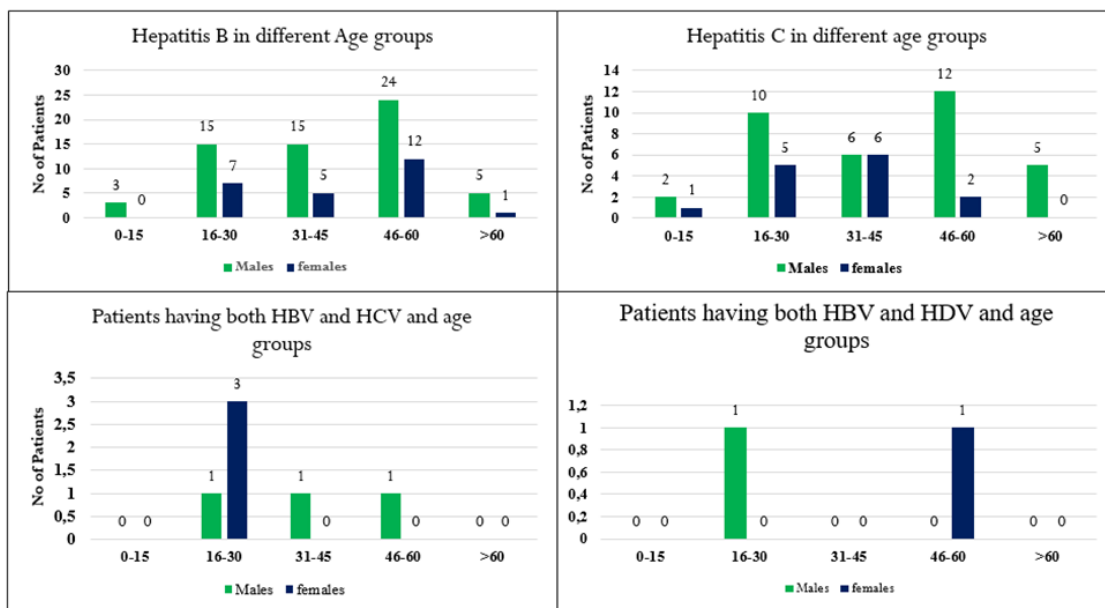


Figure 5. HCV and HBV in different age groups.

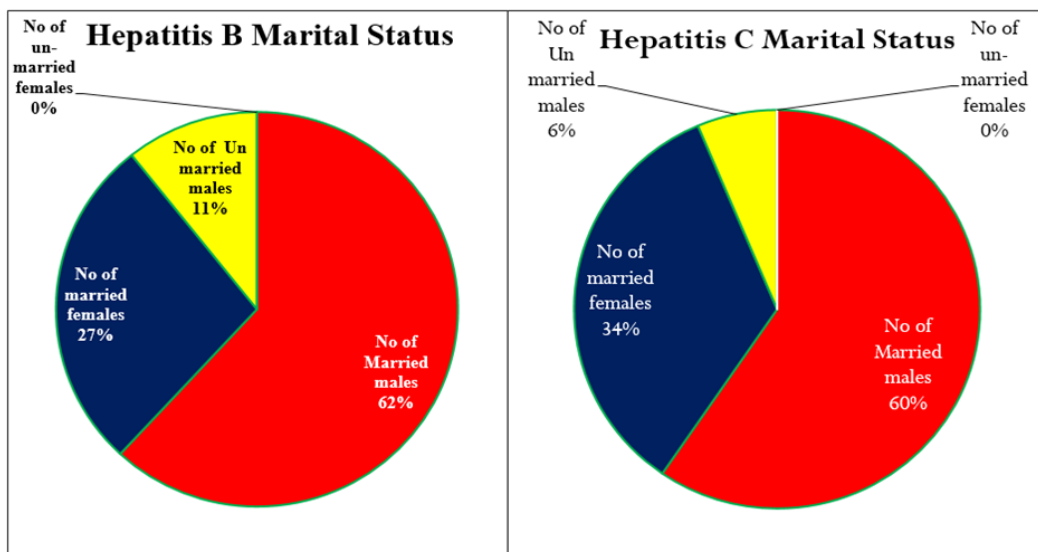


Figure 6. Marital status-wise distribution of HCV and HBV.

Status of Hepatitis B and C Patients' Treatment

The number of males and females under treatment was less as compared to without treatment; it means the viral hepatitis was increasing day by day. Total 33 patients were under treatment while 44 were new entries for HBV. For HCV, 20 patients were under treatment while 29 were new entries. The treatment status for both HBV and HCV is given in Fig. 7.

Hepatitis B and C Affected Areas

The number of males and females infected with HCV and HBV was greater in rural areas while the urban areas had less numbers. The number of females from rural areas was 14% for HCV and 17% for HBV, whereas for urban areas, it was 17% for HCV and 17% for HBV. Moreover, the number of males from rural areas was 43% for HCV and 50% for HBV and from urban areas, it was 26% for HCV and 25% for HBV. Figure 8 explains the area-wise distribution of viral hepatitis.

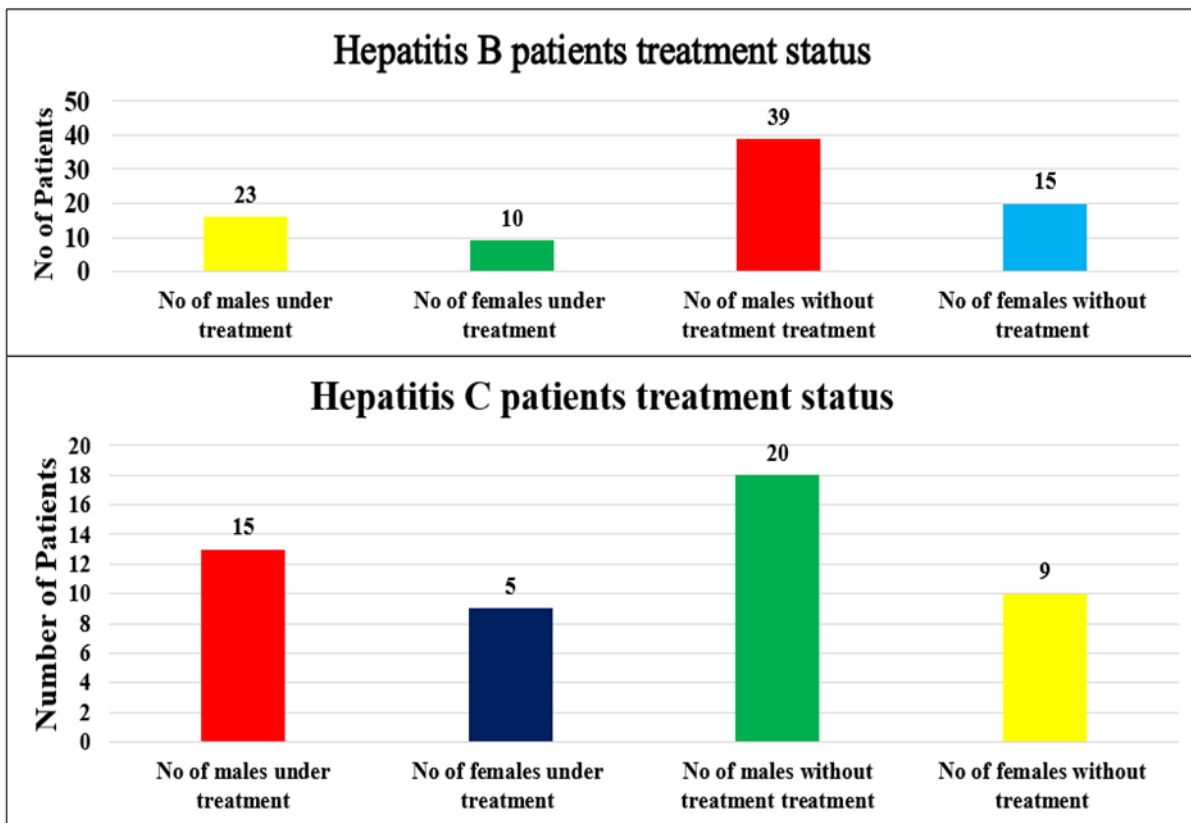


Figure 7. HCV and HBV patients' treatment status.

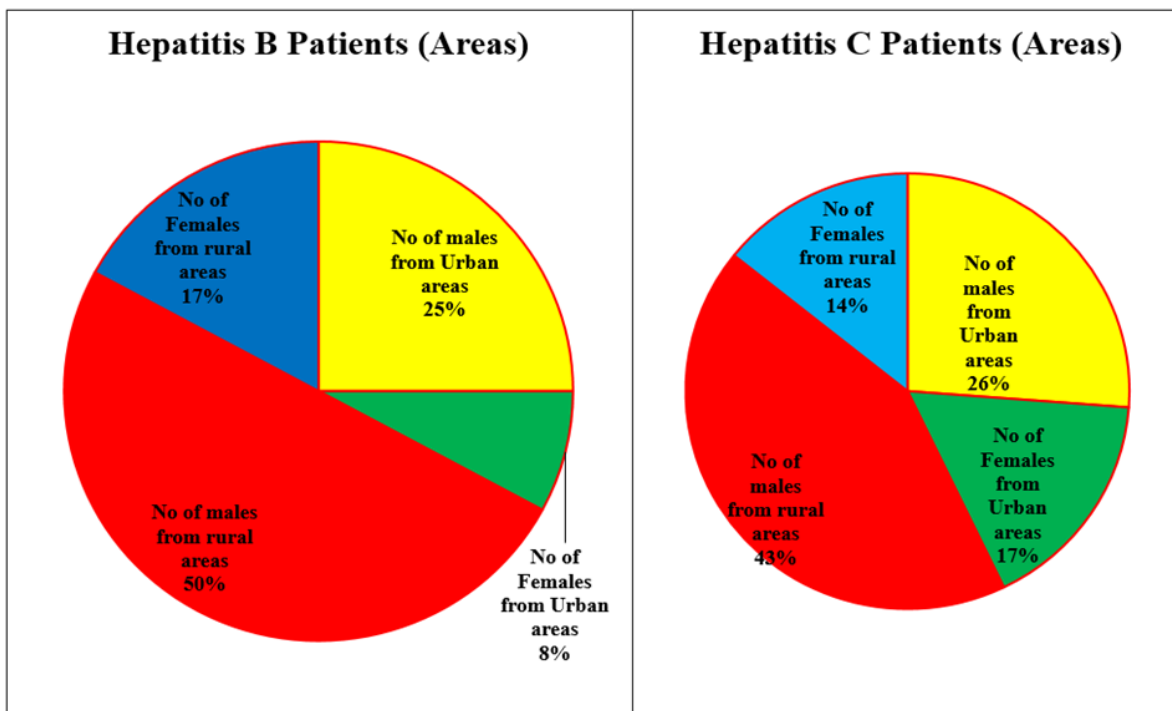


Figure 8. HCV and HBV affected areas.

DISCUSSION

Viral hepatitis is the viral infection of the liver that can cause severe damage to the liver, leading to Hepatocellular carcinoma (HCC) in most cases. Hepatitis B and C are the most common viral hepatitis in developed and underdeveloped countries including Pakistan²⁰. Throughout the world, about 257 million people are infected with Hepatitis B and 157 million are infected with Hepatitis C, while 71 million hepatitis C patients are under the chronic stage. According to the World Health Organization, 399000 deaths occur every year because of HCV²¹. About 80% and 20% of viral HCC are due to HBV and HCV infection, respectively (especially in East Asia and Africa for HBV and North America and Western Europe for HCV)²².

The present study was designed to find out the prevalence of viral hepatitis in District Quetta. Although in Quetta, most of the diagnosis is based on the ELISA test which may have false-positive results as well²³. The data of patients infected with viral hepatitis was collected from BMC College/Hospital, Quetta (January 2017-December 2018) and a clinic present at Pat feeder (January 2018-July 2018). Almost 26% of patients were positive, while 74% were non-reactive. HBV patients (949) were more than HCV (494) patients.

Similar results were obtained from the clinic of Pat feeder; HBV ELISA patients were 63% and 37% HCV positive patients. Comparable reports were obtained from already published surveys from Balochistan^{24, 25} and NWFP²⁶ which showed a higher prevalence of HBV. Also, other reports showed that males are more affected with viral hepatitis as compared to females. In reports, male to female ratio was 4:1 or 3:1 in Sub Sharan Africa and Asia Pacific region as well as in medium-risk countries and even in those regions where there were fewer chances of HCC, the ratio was 2:1^{25, 27}. While, the same results were observed in our study with a 2.5:1 ratio of males to females both in HBV and HCV cases. Males with an increase in age were observed to have more chances of HBV and HCV in our study, while females had non-significant results in different age groups. Also, married persons had more HBV (males 62%, females 27%) and HCV (males 60%, females 34%) as compared to unmarried HBV persons (males 11%, females 0%), and HCV (males 6%, females 0%). Our findings are in

accordance with another study that increasing age and being married were the most common risk factors in HBV and HCV patients¹⁰.

We found that HBV and HCV patients were mostly from low income group belonging to rural areas of Quetta. The same results were also reported by different other studies from Pakistan¹⁴. This may be due to greater social freedom males have in our society, especially in rural areas²⁸. Also, a greater number of patients from rural areas might be due to 60% of Pakistani population living in rural areas²⁹. In our study, we also found that patients less than 15 years old, 3 years and 4 years males, and 6 years females were there. This might be due to the vertical transfer of viral hepatitis³⁰.

From 2007 to 2008, Pakistan Medical Research Council checked the prevalence of HCV and HBV and they found around 13 million population in Pakistan to be affected with HBV and HCV³¹. Our results showed that people under treatment were low as compared to new entries. Similarly, when we collected the data on HBV vaccination from BMC, Hospital, it was found that the number of people for first time vaccination was more than the second time and lesser the third time (38%, 32%, 29% respectively). This data was from the general population, however, in another study from Pakistan, Muhammad Medical College Mirpurkhas, a survey was performed among the medical students from the 1st till 5th year and it was found that 57% of students were vaccinated and 43% were not, although they were attending hospitals and patients of wards regularly. This might be due to a lack of motivation and awareness about vaccination³².

CONCLUSION

From the above study, we concluded that HBV is more prevalent than HCV and males have more chances of both viral hepatitis and even married males are largely affected than unmarried. There were non-significant differences in HCV and HBV prevalence based on different age groups in males and females. HCV and HBV are more in rural areas both in males and females. We found that the persons who attended the BMC more for the first vaccination as compared to second and third times.

FUTURE IMPLICATIONS

HCV and HBV are spreading day by day, therefore, it is necessary to take preventive measures for its prevention.

Prevention recommends that straws, needles, syringes, water, cooker, pipes, toothbrushes/razors, or any personal hygiene articles that have blood on them (even tiny amounts) should never be shared. Screening of blood before transfusion is necessary. Government should spread awareness among the people on how to prevent this deadly disease. Also, proper vaccination and treatment programs should be introduced to eradicate the disease. Government should pay more attention to poor people and allocate a good amount of budget for their treatment.

ETHICAL APPROVAL

Ethical approval for the study was obtained from Institutional Review Board of the Balochistan University of Information Technology, Engineering and Management Sciences, Quetta, Pakistan.

CONFLICT OF INTEREST

None

FUNDING SOURCE

Department of Biotechnology, BUIITEMS, Quetta, Pakistan.

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LIST OF ABBREVIATIONS

BMC	Bolan Medical College
ELISA	Enzyme-Linked Immunosorbent Assay
HCV	Hepatitis C Virus
HBV	Hepatitis B Virus
HDV	Hepatitis D Virus
RNA	Ribonucleic Acid
WHO	World Health Organization

REFERENCES

1. Wang Z, Wu Q, Feng S, Zhao Y, Tao C. Identification of four prognostic lncRNAs for survival prediction of patients with hepatocellular carcinoma. *Peer J*. 2017; 5:3575-9.
2. Kaufman B, Gandhi SA, Louie E, Rizzi R, Illei P. Herpes simplex virus hepatitis: Case report and review. *Clin Infect Dis*. 1997; 24(3):334-8.
3. Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Estimations of worldwide prevalence of chronic

hepatitis B virus infection: A systematic review of data published between 1965 and 2013. *Lancet*. 2015; 386(10003):1546-55.

4. Matin A, Islam MR, Mridha MA, Mowla MG, Khan R, Islam MR. Hepatitis B & C viral markers status in icteric children at a tertiary care hospital. *J Shaheed Suhrawardy Med Coll*. 2011; 3(2):35-7.
5. Alam S, Azam G, Mustafa G, Alam M, Ahmad N. Past, present, and future of hepatitis B and fatty liver in Bangladesh. *Gastroenterol Hepatol Open Access*. 2017; 6(3):197-205.
6. Ganem D. Hepadnaviridae: The viruses and their replication. *Fields' Virol*. 2001; 2:2923-69.
7. Poynard T, Bedossa P, Opolon P. Natural history of liver fibrosis progression in patients with chronic hepatitis C. *Lancet*. 1997; 349(9055):825-32.
8. Schulze zur Wiesch J, Ciuffreda D, Lewis-Ximenez L, Kasproicz V, Nolan BE, Streeck H, *et al*. Broadly directed virus-specific CD4+ T cell responses are primed during acute hepatitis C infection, but rapidly disappear from human blood with viral persistence. *J Exp Med*. 2012; 209(1):61-75.
9. Wedemeyer H, Dore GJ, Ward JW. Estimates on HCV disease burden worldwide-filling the gaps. *J Viral Hepat*. 2015; 22:1-5.
10. Qureshi H, Bile KM, Jooma R, Alam SE, Afrid HU. Prevalence of hepatitis B and C viral infections in Pakistan: findings of a national survey appealing for effective prevention and control measures. *EMHJ-Eastern Mediterr Health J*. 2010; 16:15-23.
11. World Health Organization. Combating hepatitis B and C to reach elimination by 2030: Advocacy brief. World Health Organization; 2016.
12. Lin CC, Lee CC, Lin SH, Huang PJ, Li HP, Chang YS, *et al*. RNA recombination in Hepatitis delta virus: Identification of a novel naturally occurring recombinant. *J Microbiol Immunol Infect*. 2017; 50(6):771-80.
13. François-Souquière S, Makuwa M, Bisvigou U, Kazanji M. Epidemiological and molecular features of hepatitis B and hepatitis delta virus transmission in a remote rural community in central Africa. *Infect Genet Evol*. 2016; 39:12-21.
14. Abbas M, Hussain MF, Raza S, Shazi L. Frequency and awareness of hepatitis B and C in visitors of Hepatitis Awareness Mela. *J Pak Med Assoc*. 2010; 60(12):1069-71.
15. Bahcecioglu IH, Aygun C, Gozel N, Poyrazoglu OK, Bulut Y, Yalniz M. Prevalence of hepatitis delta virus (HDV) infection in chronic hepatitis B patients in eastern Turkey: Still a serious problem to consider. *J Viral Hepat*. 2011; 18(7):518-24.
16. Sayad B, Naderi Y, Alavian SM, Najafi F, Janbakhsh A, Mansouri F, *et al*. Hepatitis D Virus Infection in Western Iran: Seroprevalence and Viremic Infections. *Gastroenterol Hepatol Bed Bench*. 2018; 11(2):145-52.

17. Janjua FI, Siddique J, Khan S, Siddiqui A, Altaf M. Cross sectional study of viral hepatitis awareness among patients from public sector hospitals of Lahore city of Pakistan. *PalArch's J. Archaeol. Egypt/ Egyptol.* 2020; 17(8):589-603.
18. Ullah N, Kakakhel MA, Bai Y, Xi L, Khan I, Kalra BS, *et al.* Prevalence of active HCV infection and genotypic distribution among the general population of district Mardan, Pakistan. *Braz J Biol.* 2021; 83-7.
19. Liu L, Xu H, Hu Y, Shang J, Jiang J, Yu L, *et al.* Hepatitis C screening in hospitals: Find the missing patients. *Virology.* 2019; 16(1):1-9.
20. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. *Int J Cancer.* 2010; 127(12):2893-917.
21. WHO M. World Health Organization Mortality Database. WHO. URL: http://www.who.int/healthinfo/mortality_data/en/ (accessed: 20.09.2015). 2015.
22. Ozakyol A. Global epidemiology of hepatocellular carcinoma (HCC epidemiology). *J Gastrointest Cancer.* 2017; 48(3):238-40.
23. Bahadar N, Ali F, Israr M, Ahmad S. The correlation between RT-PCR and ELISA assay on hepatitis C positive serum samples. *Pure Appl Biol.* 2016; 5(4):689-94.
24. Quddus A, Luby SP, Jamal Z, Jafar T. Prevalence of hepatitis B among Afghan refugees living in Balochistan, Pakistan. *Int J Infect Dis.* 2006; 10(3):242-7.
25. Alam M, Naeem MA. Frequency of hepatitis B surface antigen and anti-hepatitis C antibodies in apparently healthy blood donors in northern areas. *Paki J Pathol.* 2007; 18(1):11-4.
26. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: Cancer J Clin.* 2018; 68(6):394-424.
27. Kew MC. Hepatocellular carcinoma: epidemiology and risk factors. *J Hepatocell Carcinoma.* 2014; 1:115-9.
28. Naeem SS, Siddiqui EU, Kazi AN, Khan S, Abdullah FE, Adhi I. Prevalence of Hepatitis 'B' and Hepatitis 'C' among preoperative cataract patients in Karachi. *BMC Res Notes.* 2012; 5(1):492-7.
29. Idrees M, Riazuddin S. Frequency distribution of hepatitis C virus genotypes in different geographical regions of Pakistan and their possible routes of transmission. *BMC Infect Dis.* 2008; 8(1):69-75.
30. Asia B, Bano KA, Misbah-ul-Islam K, Riaz H. Antenatal screening of women for hepatitis B and C in an out-patient department. *J Dow Univ Health Sci.* 2008; 2(1):32-5.
31. Farhat M, Yasmeen A, Ahmad A. An overview of hepatitis B and C in Pakistan. *Int J Microbiol Allied Sci.* 2014; 1(2):98-102.
32. Asif M, Raza W, Gorar ZA. Hepatitis B vaccination coverage in medical students at a medical college of Mirpurkhas. *J Pak Med Assoc.* 2011; 61(7):680-6.