Annals of R.S.C.B., ISSN:1583-6258, Vol. 26, Issue 1, 2022, Pages. 263- 273
Received 08 November 2021; Accepted 15 December 2021.

Sero-epidemiological occurrence of “the killer” hepatic (B & C) infection among the population of District Jhang, Pakistan.

Muhammad Masood Ahmad[1], Irfan Pervaiz[2], Uqba Mehmood [3], Muhammad Farrukh Tahir[4], Amir Jalal[5], Ali Zar Pasha[1,6] and *Muhammad Khurram Shahzad[1,6]

[1]Department of Biochemistry, Government College University Faisalabad, Faisalabad, Pakistan.

[2]Department of Pharmacy, University of Lahore (Gujrat Campus), Pakistan.

[3]Department of Biological Sciences, Superior University Lahore, Pakistan.

[4]Department of Biochemistry, University of Jhang, Jhang, Pakistan

[5]Department of Biochemistry, Sahara Medical College, Narowal, Pakistan.

[6]PICME labs, Lahore, Pakistan.

*Corresponding Author: Dr. Muhammad Khurram Shahzad, Department of Biochemistry, Government College University Faisalabad, Pakistan.

*Khurrum_2005@yahoo.com

Abstract

The HBV and HCV viruses cause hepatocellular carcinoma and cirrhosis. Cirrhosis, liver damage, and hepatocellular carcinoma occur in 15 - 40% of persons with chronic hepatitis caused by HBV or HCV. In Pakistan, 4-7 % have HCV and 10 % have HBV. Larger number of Pakistani communities have greater hepatitis rates. Jhang, (the most backward area of Punjab, Pakistan) was investigated for hepatitis B and C seroprevalence. 1322 serum samples were taken for this study from local population. Anonymized data for the study included seroprevalence and demographic of the local inhabitants. During investigation, project revealed that age, sex, social and health background of blood donors, income level and professions increase the sero-incidence of hepatic infection due to B & C pathogens. Males have more hepatic C virus infection than females, whereas females have higher hepatic B virus infection than males. Hepatitis B and C viruses are more common in the 30-40 years age group. Contrary to the wealthy, the impoverished are highly

afflicted with Hepatitis B and C. People who had dental surgery or donated blood were more prone to HCV and HBV hepatitis. This study implies that HCV is more prevalent than HBV in the male population of Jhang. Education of people regarding the use of disposable syringes, needles, blades, donation and transfusion of non-tested blood is highly recommended to overcome the seroprevalence of Hepatitis B and C.

Introduction

Globalization is radically changing the transmissable viral diseases, their shape and epidemiology. Hepatitis B and C represent a global health problem with a wide spectrum of clinical manifestations. Hepadnaviridae and Flaviviridae are the families of viruses causing hepatitis B & C respectively (Seeger *et al.*, 2007). The HBV and HCV viruses may be propagated by blood transfusions, the placenta, wounds, repeated use of outdated syringes needles, administering different medications, scratching and razing on the body for design and fashion reasons, and injecting pharmaceuticals through injections (Cheesbrough, 2000). It is considered that there are approximately 400 million hepatitis B carriers (Aggarwal & Ranjan, 2004). Hepatitis C in combination of Hepatitis B are generally more prevailed viral infections globally distributed in male community of Pakistan (Ali *et al*., 2010). In advanced regions of world like USA, UK, Russia etc, prevalence of HCV infections is less than 2 percent (Averhoff *et al.*, 2012). Hepatitis C prevalence in Pakistan ranges from 4.5 percent to 8 percent, making it one of the most affected countries in the world (Khattak *et al*., 2002). The lack of information about hepatitis C (HCV) and hepatitis B is the major cause of it (Abbas & Tanwani, 1997).

Common method for testing and quantification of HBV infection is the use of hepatitis B virus surface antigen (HBsAg) an essential analytical parameter in the collection and treatment (Jaroszewicz *et al*., 2010). High accurate, sensitive and specific determination of HBV and HCV infections is mostly carried out by the serology techniques as enzyme-linked immunosorbent assay (ELISA) and enzyme immunoassays (EIA) (Chaudhary and Maclean, 1993). Special analytical test “Polymerase Chain Reaction (PCR)” is usually employed to check the DNA of hepatitis B & C (Weiner *et al*., 1990). Many European organizations as European Association for the Study of the Liver (EASL), American Association for the Study of Liver Diseases (AASLD) and The Asian Pacific Association for the Study of the Liver (APASL) has proposed diagnostic and screening techniques for hepatitis B infection consisting of: DNA quantity of plasma HBV, serum glutamate

phosphotransferase (SGPT) quantity or level of pathologically implanted severity (CHB) (Lin and Kao, 2013).

Apart from, the spread rate of hepatitis B (2.4%) and hepatitis C (6.7%) in Punjabi people, very less information about prevalence and sero-epidemology of hepatitis B & C (HBV & HCV) infection in male urban population of Jhang city is found. The present study was designed with the aim to find, to probe and to overcome risk parameters for the HBV & HCV in the male of various age groups among the urban population of Jhang city, the most backward area of the Punjab, the province of Pakistan.

Materials & Methods

The research was carried out for sero-epidemological study of HBV & HCV in 1322 persons selected from general male urban community of Jhang City and were categorized into eight groups based on their age. Two groups for gender study and four groups for socioeconomical studies of positive cases were also generated. History of patients was taken by questionnaires during blood sampling for age wise distribution and to estimate the economic position. The serum from blood was collected through centrifuging the samples at 25000 rpm for 5 minutes. The serum samples were store at -20 ℃ in eppendorf to check HBV and HCV infection rate (Hamoudi *et al*., 2013). Single step antigen with 99 % Sensitivity (Weiner et al., 1990) and antibodies with 96.8 % Sensitivity (Zhang et al., 1993) test along with Elisa method (Usuda *et al*., 1999) for HBV & HCV was performed in Shifa Clinical Biochemistry Lab, Shifa Medical Center Jhang.

Results and Discussion:

During the study on 1322 volunteers, it was found that 468 persons (35.4 %) were found active hepatitis virus (either B or C) while the remaining 854 persons (64.6%) were having hepatitis negative (both B &C). The details of study have been given in table 1.

Table 1. Age Crosstabulation of HBV and HCV

Test		Age								Total
		< 10	11-20	21-30	31-40	41-50	51-60	61-70	>70	
1	HBV-	25	56	62	86	62	52	70	28	441
2	HCV-	22	56	62	78	53	46	64	28	409

Annals of R.S.C.B., ISSN:1583-6258, Vol. 26, Issue 1, 2022, Pages. 263- 273
Received 08 November 2021; Accepted 15 December 2021.

3	**HBV- & HCV-**	0	0	2	2	0	0	0	0	4
4	**HBV+**	1	2	8	2	2	6	4	2	27
5	**HCV+**	4	2	7	10	10	12	10	2	57
6	**HBV+ & HCV+**	22	54	60	74	51	38	60	25	384
Total		74	170	201	252	178	154	208	85	**1322**

Impact of aging as risk parameter was analyzed at Sero-spreading. The volunteers were divided into 8 age groups within ten to eighty years. The selected persons in age group 31 to 40 years were found to have more prone towards the disease (18.37 %) which was also statistically significant ($P < 0.05$). Occurrence of Hepatic C viral infection found minimum (6.19 %) in peoples of older age (Details has been given in Table 1). The volunteers in the age group 30-40 years were more prone towards the disease in our data could be due to that the persons in this age may be more conscious about their health as they were going towards aging biologically (Hamoudi *et al.*, 2013).

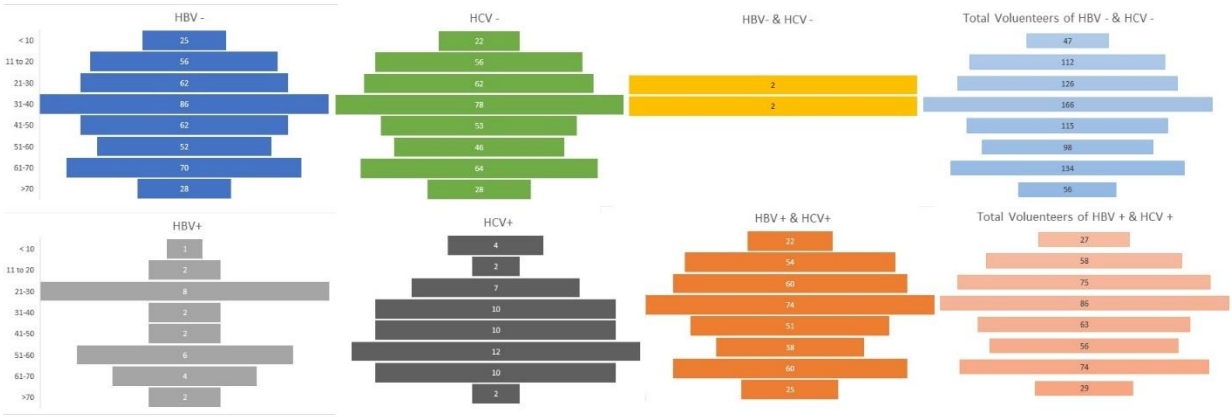

Figure 1: Graphical representation of Frequency distribution of Hepatitis B & C Viruses in different age groups

The maximum prevalence of the disease HBV (29.63 %) was observed in the volunteers of age group 21 to 30 years with non-significant statistics inferences ($P > 0.05$). This seemed that sero-spreading with HBV resulted the most within 21-30 years older individuals. The maximum prevalence of the disease HCV (21.1 %) was observed in the volunteers of age group 51 to 60 years with non-significant statistics inferences ($P > 0.05$). This was analyzed that sero-spreading

Annals of R.S.C.B., ISSN:1583-6258, Vol. 26, Issue 1, 2022, Pages. 263- 273
Received 08 November 2021; Accepted 15 December 2021.

of Hepatic C virus found the most within 51-60 years olders. Hepatitis B & C (collectively) present more in the age of 31-40 years.

Bello *et al.* (2011) reported the same kind of results using single step rapid device for Hepatitis B antigene (HBsAg) in 472 selected persons serum. Most high ratio of Hepatitis B antigen was found within 30 years older (70.6%). The difference of the results may be due to the reason that our data was small which contains only 472 volunteers. Regional distribution also affects the seroprevalance rate of the disease (Ali *et al.*, 2009).

Income level was analyzed associated with sero-spreading of Hepatic B infection within population of male population of Jhang city. Volunteers were divided into four groups: poor, very poor, rich and very rich (Table 2).

Table 2: All data representing age groups and their respective economic status

Age	Very poor		Poor		Rich		Very rich		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<10	16	3.41	7	1.49	3	0.64	1	0.21	27	5.76
11-20	36	7.69	12	2.56	6	1.28	4	0.85	58	12.39
21-30	45	9.61	12	2.56	13	2.77	5	1.06	75	16.02
31-40	40	8.54	20	4.27	15	3.20	11	2.35	86	18.37
41-50	26	5.55	12	2.56	13	2.77	12	2.56	63	13.46
51-60	20	4.27	14	2.99	12	2.56	10	2.13	56	11.96
61-70	27	5.76	31	6.62	9	1.92	7	1.49	74	15.81
>70	9	1.92	9	1.92	6	1.28	5	1.06	29	6.19
All	219	46.79	117	25	77	16.45	55	11.75	468	100

Of these 468 volunteers, randomly selected, 219 were belonged to very poor families whilst 117, 25 and 55 were reported to have a poor, rich and very rich back ground respectively. Degree of Hepatitis B antigen (Australian antigen) found analyzed applying (ICT) device within samples these chosen peoples. This made inference that Hepatitis B antigen (Australia antigen) was the most within specimens of individuals of very poor class (46.79 %) and was least in rich group persons (11.75 %). Age groups; 21-30 (16.02 %), 31-40

(18.37 %) and 41-50 (13.46 %) showed maximum percentage of HBV, HCV+ between age groups while considering the socioeconomic status of participants. Impact of income level of chosen peoples on sero-spreading of Hepatic B Viral infection revealed that 15.8 % hepatitis B antigen (HBsAg) was higher in poor persons as compared to the economically stable Hepatitis B antigen (HBsAg) positive 9.8% persons (Mohamed *et al.* 2013). There was least positive person for Hepatitis B antigen (HBsAg) in very rich group because the poor persons have no medical facilities and they cannot afford interferons for the treatment of the disease. They have more chances for the occurrence of the disease as they use combine eating utensils, razors, combs etc. which can transfer the disease from one person to the other. They go to the non-medical persons for their treatment who uses same syringe for many patients which make the poor community more prone towards the disease (Achakzai *et al.*, 2007; Waheed *et al.*, 2009). The economic effects on hepatitis B virus in 785 healthy persons was studied by Ugwuja *et al.* (2010). The level of Hepatitis B antigen (HBsAg) in three groups, rich, middle and poor was checked. Data showed that Hepatitis B antigen (HBsAg) was more positive in poor families as compared to middle and rich families. The effect of the danger parameter of income level was also analyzed for serospreading of Hepatic C virus within male population of Jhang city. Total cases of HBV & HCV+ were 384. There was significant correlation (P = 0.008) between age group and economical status for HBV & HCV+. Age groups 31-40 (19.27 %) showed maximum percentage of HBV & HCV+ between age groups whereas people having very poor economic status showed highest percentage (45.31 %). The patients go to the non-medical persons for surgery because of their socioeconomic status who used unsterilized instruments and syringes (Tessema *et al.*, 2010). Janjua, 2006 studied the sero spreading of of hepatits C and resulted that the barber reuses razor (if any cut formed during shaving, then the virus can transmit and cause the disease). It was seen during his study that from 92 clients 22 (11.4 %) gave disinfected razors and 88 (46%) served repeatedly using razors. Most of the barbers especially in the rural areas have no or less knowledge about the transfer of the HCV so they do not care for the use of sterilized razors. Usage of same towel, same brush and comb might be the factors for transmitting the disease. Similar kind of sero-spreading of Hepatitis C virus infection was studied by Ghias *et al.*, 2010 where they got information via planned questions and specimens were analyzed for immunoglobulins of

hepatitis C and got the result that that hepatitis C viral infection affected persons contained higher association of process of shave and hair cut in saloon sites.

According to Akhtar *et al.*, 2013 blood transfusion show the maximum rate of the disease as blood might be not screened properly or blood was screened with false results which results in the disease spread. Borhany *et al.*, 2011 also concluded the result that blood donations also have the seroincidence on HCV during one of their studies on blood specimens of 173 haemophilia individuals were taken and 51.4 persons out of 173 were anti HCV (+).

Risk parameters of hepatitis C virus (HCV) in the population of Bangladesh was studied by Mahtab *et al.*, 2011 where 1018 individual were collected at random from a semi-urban area, their blood was collected for Anti-HCV and the data was analyzed to see the result of blood donation on the seroincidence of HCV which showed 88 subjects out of 100 were anti-HCV (+) and the major risk parameter was the blood donation.

The risk parameter of jaundice for the seroincidence of Hepatic B virus was resulted by Mehmet *et al.* (2005) in Turkey. Serum specimens of twenty-eight hundred and eighty-eight marked individuals were applied for Hepatitis B antigen (HBsAg) and the hepatic activity markers. This was seen that the quantity of billirubin and other chemical hepatic enzymatic factors were more in the Hepatic B virus (+) individuals with biostatistically significant figures ($P = 0.05$).

The worldwide level of hepatic infection due to B pathogen through separate factors like jaundice was analyzed by Hanafiah *et al.* (2013). This was inferenced that Hepatic B viral infection seropositive spread was markedly highly influenced due to jaundice.

Conclusion

Hepatocellular carcinoma and cirrhosis are caused by the HBV and HCV viruses, respectively. The development of cirrhosis, liver damage, and hepatocellular cancer occurs in 15 to 40% of people who have chronic hepatitis B or C caused by HBV or HCV. HCV and HBV are prevalent in Pakistan, with 4-7 percent having HCV and 10 percent having HBV. Hepatitis A and B rates are higher in Pakistani groups with a larger number of members. A study was conducted in Jhang, Pakistan (the most backward region of Punjab), to determine the prevalence of hepatitis B and C in the population. A total of 1322 serum samples were collected from the local community for this investigation. The research used anonymized data to determine the

prevalence of seroprevalence and the demographics of the local population. During the course of the inquiry, it was discovered that factors such as age, gender, social and health background of blood donors, income level, and occupation all contribute to the sero-incidence of hepatic infection caused by B and C viruses. Males are more likely than females to have hepatitis C virus infection, but females are more likely than males to have hepatitis B virus infection. Hepatitis B and C viruses are more prevalent in people between the ages of 30 and 40. The poor, in contrast to the rich, are disproportionately affected by Hepatitis B and C infections. People who underwent dental surgery or gave blood were more likely to get HCV and HBV hepatitis than the general population. According to the findings of this research, HCV is more widespread in the male population of Jhang than HBV. Education of the public on the proper use of disposable syringes, needles, and blades, as well as the donation and transfusion of untested blood, is strongly encouraged in order to reduce the incidence of Hepatitis B and C in the population.

References

Abbas, K. A., & Tanwani, A. K. (1997). Prevalence of hepatitis B surface antigenaemia in healthy children. *JOURNAL-PAKISTAN MEDICAL ASSOCIATION*, *47*, 93-93.

Achakzai. M., M. Kassi and M. P. Kasi. 2007. Seroprevalences and co-infections of HIV, hepatitis C virus and hepatitis B virus in injecting drug users in Quetta, Pakistan. Trop. Doct. 37: 43-45.

Abbas, K. A., & Tanwani, A. K. (1997). Prevalence of hepatitis B surface antigenaemia in healthy children. *JOURNAL-PAKISTAN MEDICAL ASSOCIATION*, *47*, 93-93

Aggarwal, R., & Ranjan, P. (2004). Preventing and treating hepatitis B infection. *Bmj*, *329*(7474), 1080-1086.

Akhtar, A. M., M. A. Khan, T. Ijaz, Z. Iqbal, M. Y. Rana, A. Maqbool and A, Rehman. 2013. Seroprevalence and Determinants of Hepatitis -C Virus Infection in Blood Donors of Lahore, Pakistan. Pak. J. Zool. 45: 1-7.

Ali, A., Ahmed, H., & Idrees, M. (2010). Molecular epidemiology of Hepatitis C virus genotypes in Khyber Pakhtoonkhaw of Pakistan. *Virology Journal*, *7*(1), 1-7.

Ali, S. A., R. M. J. Donahue, H. Qureshi and S. H. Vermund. 2009. Hepatitis B and hepatitis C in Pakistan: prevalence and risk factors. Int. J. Infec. Dis. 13: 9-19.

Amin, J.. M, G. Law, M. Bartlett, J. M. Kaldor and G. J. Dore. 2006. Causes of death after diagnosis of hepatitis B or hepatitis C infection: a large community-based linkage study. Lancet. 368: 938-945.

Averhoff, F. M., Glass, N., & Holtzman, D. (2012). Global burden of hepatitis C: considerations for healthcare providers in the United States. *Clinical infectious diseases*, *55*(suppl_1), S10-S15.

Bello, R. H., E. Obot and K. O. H. Olabode. 2011. Sero-prevalence and risk factors associated with hepatitis B surface antigen (Hepatitis B antigene (HBsAg)) amongst patients in BIU, Borno State, Nigeria. J.Pub Health Epidemiol. 3: 448-453.

Borhany, M., T. Snamsi, S. Boota, H. Ali, N. Tahir, A. Naz, I. Naseer, T. Farzana, S. Ansari, M. Nadeem, M. Z. U. Rahman and Z. Sangji. 2011. Transfusion transmitted infections in patients with hemophilia of Karachi, Pakistan. Clin. Appl. Thromb Hemost. 17: 651-655.

Chaudhary, R. K., & Maclean, C. (1993). Detection of antibody to hepatitis C virus by second-generation enzyme immunoassay. *American journal of clinical pathology*, *99*(6), 702-704.

Cheesbrough, M. (2005). *District laboratory practice in tropical countries, part 2*. Cambridge university press.

Ghias, M., M. K. Pervaiz and A. Aslam. 2010. Risk Factors for Hepatitis C Virus among Urban,/Rural Settings of Patients Visiting Tertiary Care Hospitals at Lahore, Pakistan, J. East. Mediterr. Health. 16: 10-17.

Hamoudi, W. S, A. S. Ali, M. Abdallat, C. R. Estes and H. A. Razavi. 2013. HCV infection prevalence in a population recruited at health centers in Jordan. J. Epidemiol. Global Health. 3: 67-71.

Hamoudi, W., Ali, S. A. S., Abdallat, M., Estes, C. R., & Razavi, H. A. (2013). HCV infection prevalence in a population recruited at health centers in Jordan. *Journal of epidemiology and global health*, *3*(2), 67-71.

Hanafiah, K. M., J. Groeger, A. D. Flaxman and S. T. Wiersma. 2013. Global Epidemiology of Hepatitis C Virus Infection: New Estimates of Age-Specific Antibody to HCV Seroprevalence. J. Hepatol 57: 1333-1342.

Janjua, N, Z. 2006. Knowledge and Practices of Barbers about Hepatitis B and Transmission in Rawalpindi and Islamabad. J. Pak. Med. Assoc. 54: 116-119.

Jaroszewicz, J., Serrano, B. C., Wursthorn, K., Deterding, K., Schlue, J., Raupach, R. & Cornberg, M. (2010). Hepatitis B surface antigen (HBsAg) levels in the natural history of hepatitis B virus (HBV)-infection: a European perspective. *Journal of hepatology*, *52*(4), 514-522.

Khattak, M. F., Salamat, N., Bhatti, F. A., & Qureshi, T. Z. (2002). Seroprevalence of hepatitis B, C and HIV in blood donors in northern Pakistan. *J Pak Med Assoc*, *52*(9), 398-402.

Lin, C. L., & Kao, J. H. (2013). Hepatitis B viral factors and treatment responses in chronic hepatitis B. *Journal of the Formosan Medical Association*, *112*(6), 302-311.

Mahtab, M. A., F. Karim, G. Foster, S. M. F. Akbar and S. Rahman. 2011. Prevalence and Risk Factors of Asymptomatic Hepatitis C Virus Infection in Bangladesh. J. Clin. Exp. Hepatol 1: 13-16.

Mehmet, D., E. Meliksah, Y. Serif, S. Gunay, O. Tuncer and S. Zeynep. 2005. Prevalance Of Hepatitis B Infectionin The Southeastern Regions Of Turkey: Comparison Of Risk Factors For HBV infection In Rural And Urban Areas.. 58: 15-19.

Mohamed, H. I., Z. M. Saad, E. M. A. Elreheem, W. M. A. Elghany, M. S. Mohamed, E. A. A. Elnaeem and A. E. Seedhom. 2013. Hepatitis C, hepatitis B and HIV infection among Egyptian prisoners: Seroprevalence, risk factors and related chronic liver diseases. J. Infect and Public Health. 6: 186-195.

Seeger, C., F. Zoulim, W. Mason, Hepadnaviridae, D. Knipe and P. Howley. 2007. Fields Virology, Wolters Kluwer Health, Lippincott Williams & Wilkins, Philadelphia. J. Hepatol. 1: 2977-3030.

Tessema, B., G. Yismaw, A. Kassu, A. Amsalu, A. Mulu, F. Emmrich and U. Sack. 2010. Seroprevalence of HIV, HBV, HCV and syphilis infections among blood donors at Gondar University Teaching Hospital, Northwest Ethiopia: declining trends over a period of five years. *BMC Infect. Dis.* 10:111-112.

Ugwuja, E. 1 and N. C. Ugwu. 2010. Seroprevalence of Hepatitis B Surface Antigen and Liver Function Tests among Adolescents in Abakaliki, South Eastern Nigeria. Int. J. Trop. Med. 6: 4-9.

Usuda, S., Okamoto, H., Iwanari, H., Baba, K., Tsuda, F., Miyakawa, Y., & Mayumi, M. (1999). Serological detection of hepatitis B virus genotypes by ELISA with monoclonal antibodies to type-specific epitopes in the preS2-region product. *Journal of virological methods*, *80*(1), 97-112.

Waheed, Y., T. Shaf, S. Z. Saf and I. Qadri. 2009. Hepatitis C virus in Pakistan: A systematic review of prevalence, genotypes and risk factors. World J. Gastroenterol 15: 5647-5653.

Weiner, A. J., Kuo, G., Lee, C., Rosenblatt, J., Choo, Q. L., Houghton, M., & Saracco, G. (1990). Detection of hepatitis C viral sequences in non-A, non-B hepatitis. *The Lancet*, *335*(8680), 1-3.

Weiner, A. J., Kuo, G., Lee, C., Rosenblatt, J., Choo, Q. L., Houghton, M. & Saracco, G. (1990). Detection of hepatitis C viral sequences in non-A, non-B hepatitis. *The Lancet*, *335*(8680), 1-3.

Zhang, H., Q. Li, J. Sun, C. Wilber, J. C. 1993. Development and use of laboratory tests for hepatitis C infection: a review. J. Clin. Immunoassay, 16: 204-205.