DOI: 10.14744/cm.2023.47966
Comprehensive Medicine 2023;15(2):107-111

RESEARCH ARTICLE

Evaluation of Hepatitis B and Hepatitis C Seroprevalence in People Living with HIV

Ayşe Serra Özel, Lütfiye Nilsun Altunal, Merve Çağlar Özer, Şevval Özen Aksakal

Department of Infectious Diseases and Clinical Microbiology, University of Health Sciences, Ümraniye Training and Research Hospital, İstanbul, Türkiye

ABSTRACT

Objective: Due to the common transmission routes, hepatitis B virus (HBV) and hepatitis C virus (HCV) coinfections are common in people living with human immunodeficiency virus (PLWH). We planned to investigate the frequency of HBV and HCV coinfection in PLWH.

Materials and Methods: In this single-center, retrospective, and observational study, 277 PLWH were evaluated between January 2016 and August 2022 in a Training and Research Hospital, in Türkiye.

Results: The median age of patients was 42±13 years, and 84.8% were male. Nine patients (3.2%) were found to be positive for HBsAg, 11 (3.9%) were positive for isolated anti-HbcIgG, 65 (23.5%) were both positive for anti-HBcIgG and anti-HBs, and 102 (36.8%) were immunized with the hepatitis B vaccine (positive for Anti-HBs). Four of the HBsAg-positive patients were diagnosed with acute hepatitis B clinic during the emergency admission. HBV DNA levels were undetectable in admission and follow-up among the patients with isolated anti-HBcIgG positivity. Three patients were anti-HCV-positive and HCV RNA levels were negative in two patients.

Conclusion: HIV infection accelerates the progression of hepatitis B/C-related liver disease due to immunosuppression. It is important to detect and follow-up on HBV/HCV serologic markers in these patients' groups.

Keywords: Hepatitis B, hepatitis C, HIV, seroprevalence

How to cite this article: Özel AS, Altunal LN, Çağlar Özer M, Özen Aksakal Ş. Evaluation of Hepatitis B and Hepatitis C Seroprevalence in People Living with HIV. CM 2023;15(2):107-111

INTRODUCTION

Human immunodeficiency virus (HIV) is an infection that increased all over the world, and according to the World Health Organization data, approximately 38.4 million people living with HIV (PLWH) were reported at the end of December 2021.[1] In our country, 3002 confirmed PLWH were detected in 2021, and an increase in the number of cases was observed in recent years.[2]

HIV transmits among people through blood or infected body secretions through unprotected sexual intercourse and intravenous drug injection. Hepatitis B virus (HBV) and hepatitis C virus (HCV) are also frequently seen in PLWH due to similar transmission routes. HIV infection accelerates the progression of HBV and HCV-related liver disease, and if not detected and treated, it causes an increase in deaths due to end-stage liver disease and cirrhosis in these patients.[3] It has been estimated that nearly 30% of PLHWs are coinfected with HCV or HBV worldwide.[4] Türkiye is among the middle endemic regions in terms of HBV infection, and there are differences between the eastern and western regions. HBV seroprevalence varies between 3% and 5% in our country, and it is higher in eastern provinces.[5–9] The rate of HBV/HIV coinfection is between 3% and 16%, and HCV/HIV coinfection varies between 0% and 19% in studies from Türkiye.[8–11]

In Türkiye, although HIV seroprevalence data are available, there is no Ministry of Health data on the frequency of HBV and HCV coinfection in PLHW. Therefore, the publication of the centers' data is essential in increasing the data of the country's seroprevalence. We aimed to investigate the frequency of HBV and HCV coinfections in PLWH.

Address for Correspondence: Ayşe Serra Özel, Department of Infectious Diseases and Clinical Microbiology, University of Health Sciences, Ümraniye Training and Research Hospital, İstanbul, Türkiye
E-mail: aserra.ozel@gmail.com **ORCID ID:** 000-0003-2111-1183

Received date: 03.02.2023
Revised date: 22.02.2023
Accepted date: 08.03.2023
Online date: 21.03.2023

MATERIALS and METHODS

This retrospective, single-center, and observational study was conducted in the period from January 2016 and August 2022 among 277 adult PLWH followed in the infectious diseases and clinical microbiology department of a Training and Research Hospital. Demographic data and examination results were extracted from hospital data and patients' tracking files, retrospectively. CD4 T-lymphocyte count, HIV ribonucleic acid (RNA) (IU\mL) level, HCV antibody (anti-HCV), HCV-RNA polymerase chain reaction (HCV-RNA PCR), hepatitis B surface antigen (HBsAg), hepatitis B surface antibody (anti-HBs), hepatitis B core antibody (anti-HBc IgG), and HBV-DNA (HBV-Deoxyribonucleic acid) (IU/mL) were evaluated at the time of the first admission and 1 year follow-up of PLWH.

Ethics committee approval was obtained from our Hospital Ethics Committee (approval number: B.10.1.TKH.4.34.H.GP.0.01/30).

Statistical Analysis

Number Cruncher Statistical System (NCSS) 2007 (Kaysville, Utah, USA) program was used for statistical analysis. Descriptive statistical methods (mean, standard deviation, median, frequency, percentage, minimum, and maximum) were used while evaluating the study data.

RESULTS

Of the 277 PLWH, 84.8% (n=235) were male. The mean age of both genders was 42±13 years (range from 21 to 83). Of the participants, 50.9% were living single, 34.8% (n=96) were unemployed, and 3.6% (n=10) were foreign nationals. Only 7.6% (n=21) of them have substance use. The frequency of the heterosexual transmission route was 53.1% (n=147), bisexual was 22.7% (n=63), and men who have sex with men (MSM) was 24.2% (n=67) among all the patients. Demographic and laboratory values of PLWH are given in Table 1.

The rate of anti-HCV-positivity was 1.1% (n=3). One of these patients could not be treated with direct-acting antiviral agents due to being a foreign national and drug cost. HCV RNA load was undetectable in the other two patients.

The serological findings show that, at the time of admission, 3.2% (n=9) of the PLHW were found to be positive for HBsAg. The rate of the cases exposed to HBV infection and did not develop immunity (isolated anti-HBc IgG-positive) was 3.9% and HBV DNA was undetectable in all these patients. In patients, immunized by exposure to the HBV (both positive for anti-HBc IgG and anti-HBs) was 23.4% (n=65), and the rate of cases who were immunized with the vaccine (isolated anti-HBs positivity) was 36.8% (n=102) (Table 1).

There was no family history in any of the HBsAg-positive cases. Delta antigen positivity was not detected in any of the cases. HIV/HBV coinfected people were younger than the non-HBV-coinfected group (38.4±6.8; 43.0±13.5). Demographic and laboratory values are given in Table 2.

Among the HBsAg-positive PLHW, four (44.4%) of them were diagnosed with acute hepatitis B clinic. HBeAg was positive in four of the HBV/HIV coinfected cases. HBV serology at the diagnosis and 1-year follow-up in HBV/HIV coinfected patients is given in Table 3.

In HBV/HIV coinfected PLWH, four of the patients received elvitegravir/cobicistat/emtricitabine/tenofovir disoproxil fumarate, three of them tenofovir disoproxil fumarate/dolutegravir, one of them elvitegravir/cobicistat/emtricitabine/tenofovir alafenamide, and one of them bictegravir/emtricitabine/tenofovir alafenamide at the time of their admission. In five (55.5%) patients, HBsAg became negative during follow-up and HBV-DNA became undetectable in all HBV/HIV coinfected cases (Table 3).

DISCUSSION

The presence of HIV infection in patients with chronic HBV or HCV infection accelerates the development of cirrhosis in these patients due to cellular immunodeficiency. Low CD4 T-lymphocyte count in PLWH or the lack of HBV and HCV viral suppression increases the risk of liver failure.[1] In PLWH, the risk of reactivation continues in the presence of occult hepatitis B, even if anti-HBs become positive during follow-up.[12]

HBV/HIV seroprevalence varies between countries and regions among different populations such as intravenous drug users and MSM.[13] In a study conducted in recent years, the rate of HBV/HIV coinfection was reported as 7.4%, and the rate varies between the countries and the cities.[14] The HBV coinfection rate reached 16% in African countries and was determined as 0.5% in Asian countries.[14] In the studies conducted in Türkiye, the HBV/HIV coinfection rate ranges from 4% to 16% and is higher than our study.[8,10,11,15,16] In our study, HBV seroprevalence in PLWHs (3.2%) was lower than in other studies, but it was similar to another study involving 3896 patients.[8,10,11,15,17] However, the overall prevalence of HBsAg positivity reported decreased from 4.0% to 2.0% in recent years.[5] National vaccination programs may have led to a decrease in HBV seroprevalence over the years in PLWH.

Patients should be determined by anti-HBc IgG to rule out occult hepatitis B infection. Occult hepatitis B is seen especially in people with immunosuppression, HIV, and HCV infection due to HBsAg clearance.[18] The incidence of occult hepatitis

Table 1. Demographic characteristics and laboratory results of PLWH

Patients features	n	%
Gender (male)	235	84.8
Age (years), mean±SD	42±13	
Marriage status (single)	141	50.9
Employment status (unemployed)	96	34.8
Nationality		
Republic of Türkiye	267	96.4
Foreign national	10	3.6
Sexual preference		
Heterosexual	147	53.1
Bisexual	63	22.7
MSM	67	24.2
Habits (substance use)	21	7.6
Clinical and laboratory findings		
CD4 T-lymphocyte count (cells/mm^3), median (min-max)	318 (2–1899)	
CD4 T-lymphocyte count <350	149	53.8
HIV RNA (copies/mL), mean±SD	2,590.401±116,681	
HIV RNA > 500,000 (copies/ml)	106	38.3
Hepatitis-B serology		
HBsAg (+)	9	3.2
Isolated anti-HBc IgG (+)	11	3.9
Anti-HBc IgG (+) and Anti-HBs (+)	65	23.4
Anti-HBc IgG (–) and Anti-HBs (–)	90	32.4
Anti-HBc IgG (–) and Anti-HBs (+)	102	36.8
Hepatitis-C serology		
Anti-HCV (+)	3	1.1

Categorical variables: n, %. MSM: Men who have sex with men; HIV RNA: Human immunodeficiency virus ribonucleic acid (RNA); SD: Standard deviation; HBsAg: Hepatitis B surface antigen; Anti-HBs: Hepatitis B surface antibody; Anti-HBc IgG: Hepatitis B core antibody; Anti-HCV: Hepatitis C virüs antibody

was between 11.2% and 13% in PLWH in studies from other countries, and 12% and 21% in the studies conducted in Türkiye.[11,15,19,20] In this study, 11 (3.9%) cases were positive for isolated anti-HBc IgG and 23.4% developed immunity after HBV infection. In all these cases, HBV DNA levels were undetectable at the time of diagnosis, and HBV DNA remained negative at follow-up with the tenofovir-based antiretroviral regimen.

HBV transmission in PLHW is higher in MSM and bisexual men than in the general population.[14] In our study, the majority (55.5%) of HBV/HIV coinfected people were heterosexual, similar to the study conducted by Karaosmanoglu et al.[11] However, in our cases, it was determined that all HBsAg-positive individuals were sexually transmitted, they had no family history and substance use, and it was found to be similar to the studies conducted in our country.[11,21]

HIV infection adversely affects all stages of the natural history of hepatitis B, leading to increased persistent infection rates, higher HBV DNA levels, lower rates of HBeAg loss, increased liver-related complications, and death rates at low CD4 T-lymphocyte counts.[22,23] Studies demonstrated a constant interaction between HBV and HIV. HIV infection causes an increase in levels of HBV DNA and accelerates liver disease progression.[20] It was shown that HBV/HIV coinfection exacerbates the risk of HIV-associated immunodeficiency and accelerates the decline of CD4 T-lymphocyte levels compared with PLWH without HBV coinfection.[22–24] However, some of the studies did not find a relationship between low CD4 T-lymphocyte counts and high levels of viremia in HBV/HIV coinfected patients.[25,26] CD4 T-lymphocyte count was ≥350 cells/mm^3, and

Table 2. Demographic and laboratory characteristics of HBV/HIV coinfected individuals

Characteristics of patients	HBsAg (+) (n=9)	
	n	%
Gender (male)	9	100
Age (years), mean±SD	38.4±6.8	
Marital status (single)	5	55.6
Family history with hepatitis B	0	0
Employment status (unemployed)	2	22.2
Nationality		
Republic of Türkiye	8	88.9
Foreign national	1	11.1
Sexual preference		
Heterosexual	5	55.6
Bisexual	3	33.3
MSM	1	11.1
Habit (substance use)	0	0
HIV RNA at diagnosis		
≥500,000 copies/mL	2	22.2
CD4 T lymphocyte count		
<350 cells/mm^3	2	22.2

HBsAg: Hepatitis B surface antigen; SD: Standard deviation; MSM: Men who have sex with men; HIV RNA: Human immunodeficiency virus ribonucleic acid (RNA)

viral load was <500,000 copies/mL in most of the HBV/HIV coinfected PLWH (77.8%) in this study. The number of patients with HBV/HIV coinfection was low and no comparison could be made between the HBV/HIV coinfected and non-HBV coinfected groups.

HCV transmission is seen at higher rates in individuals who use intravenous drugs, those over 40 years of age, and in multiple sexual partner coexistence.[27] In studies conducted in other countries, the association of HCV/HIV coinfection varies between 2% and 5%.[28,29] In studies conducted in our country, this rate varies between 0.9% and 6%.[8,10,16,21,30] It was seen that the rates of injecting drug use vary between regions, which causes differences in HCV seroprevalence.

Limitations

This study has some limitations. Initially, this study is a retrospective and single center. In addition, the insufficient number of HBV/HIV and HCV/HIV coinfected PLWH was a limitation in comparing the coinfected and non-coinfected patients. However, there is no information about the condom use status of the cases and the association of sexual intercourse with multiple partners.

CONCLUSION

The seroprevalence of HBV and HCV in PLWH is limited in our country. We have contributed to the epidemiological data on the prevalence and characteristics of HBV and HCV coinfected PLWH in our country. It is important to provide information about the importance of condom use and immunization for all sexually active people. Furthermore, annual serology follow-up is necessary in reducing the frequency of HBV or HCV infection in PLWH. However, knowing the country data is important in terms of reaching the HBV and HCV elimination target.

Table 3. HBV serology at the diagnosis and follow-up in HBV/HIV coinfected individuals (n=9)

	n	%
At the time of admission		
HBV DNA count (copies/mL), mean±SD	56.862.942±1.698.536	
Acute Hepatitis B	4	44.4
Anti-HBe		
Negative	3	33.3
Positive	4	66.7
After 1 year follow-up		
HBV DNA negativity	9	100
HBsAg		
Negative	5	55.6
Positive	4	44.4

HBV DNA: Hepatitis B virus deoxyribonucleic acid; SD: Standard deviation; HBsAg: Hepatitis B surface antigen

Disclosures

Ethics Committee Approval: The study was approved by the University of Health Sciences, Ümraniye Training and Research Hospital Clinical Research Ethics Committee (No: B.10.1.TKH.4.34.H.GP.0.01/30, Date: 10/02/2022).

Informed Consent: Written informed consent was obtained from all patients.

Peer-review: Externally peer reviewed.

Authorship Contributions: Concept: A.S.Ö., L.N.A.; Design: M.Ç.Ö., Ş.Ö.A.; Supervision: A.S.Ö., L.N.A.; Data Collection or Processing: Ş.Ö.A., M.Ç.Ö.; Analysis or Interpretation: M.Ç.Ö., L.N.A.; Literature Search: Ş.Ö.A.; Writing: A.S.Ö.; Critical review: A.S.Ö.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

REFERENCES

1. World Health Organization. HIV. Available at: https://www.who.int/news-room/fact-sheets/detail/hiv-aids. Accessed Dec 23, 2022.
2. TC Sağlık Bakanlığı. HIV-AIDS İstatistik. Available at: https://hsgm.saglik.gov.tr/tr/bulasici-hastaliklar/hiv-aids/hiv-aids-liste/hiv-aids-istatislik.html. Accessed Dec 23, 2022.
3. Sili U, Tekin A, Korten V. Chronic viral hepatitis in human immunodeficiency virus-infected patients. Viral Hepat J 2016;22:39–42. [CrossRef]
4. Barth RE, Huijgen Q, Taljaard J, Hoepelman AI. Hepatitis B/C and HIV in sub-Saharan Africa: an association between highly prevalent infectious diseases. A systematic review and meta-analysis. Int J Infect Dis 2010;14:e1024–31. [CrossRef]
5. Özkan H. Epidemiology of chronic hepatitis B in Turkey. Euroasian J Hepatogastroenterol 2018;8:73–4. [CrossRef]
6. Ergunay K, Balaban Y, Cosgun E, Alp A, Simsek H, Sener B, et al. Epidemiologic trends in HBV infections at a reference centre in Turkey: an 11-year retrospective analysis. Ann Hepatol 2012;11:672–8. [CrossRef]
7. Akçam FZ. Hepatit B virüsü enfeksiyonu. Süleyman Demirel Üniversitesi Tıp Derg 2003,12:211–14.
8. İnci A. Investigation of hepatitis B and hepatitis C seroprevalence in HIV-infected patients. Klimik J [Article in Turkish] 2018;31:34–6.
9. Tozun N, Ozdogan O, Cakaloglu Y, Idilman R, Karasu Z, Akarca U, et al. Seroprevalence of hepatitis B and C virus infections and risk factors in Turkey: a fieldwork TURHEP study. Clin Microbiol Infect 2015;21:1020–6.
10. Ural S, Kaptan F, Türker N, Örmen B, El S, Coşkun NA, et al. Seroprevalence of hepatitis B virus and hepatitis C virus infections in human immunodeficiency virus-infected patients. Klimik J [Article in Turkish] 2010;23:100–4. [CrossRef]
11. Karaosmanoglu HK, Aydin OA, Nazlican O. Isolated anti-HBc among HIV-infected patients in Istanbul, Turkey. HIV Clin Trials 2013;14:17–20.
12. Soriano V. Treatment of chronic hepatitis C in HIV-positive individuals: selection of candidates. J Hepatol 2006;44(Suppl 1):S44–8. [CrossRef]
13. Fondazione Icona. Report Icona Foundation Cohort–Update December 2021. Available at: www.fondazioneicona.org. Accessed Oct 31, 2021.
14. Platt L, French CE, McGowan CR, Sabin K, Gower E, Trickey A, et al. Prevalence and burden of HBV co-infection among people living with HIV: a global systematic review and meta-analysis. J Viral Hepat 2020;27:294–315. [CrossRef]
15. Kaptan F, Örmen B, Türker N, El S, Ural S, Vardar İ, et al. Retrospective evaluation of 128 cases infected with human immunodeficiency virus. Turkiye Klinikleri J Med Sci [Article in Turkish] 2011;31:525–33. [CrossRef]
16. Şahin M, Altuntaş Aydın Ö, Kumbasar Karaosmanoğlu H, Yıldırım M. Seroprevalence of HBsAg and Anti-HCV among HIV positive patients. Viral Hepat J 2021;27:24–30. [CrossRef]
17. Sayan M, Özgüler M, Sarıgül Yıldırım F, Yıldırmak T, Gündüz A, Dokuzoğuz B, et al. Molecular identification of HIV-1 in the presence of hepatitis B virus and hepatitis C virus co-infections. Balkan Med J 2020;37:125–30. [CrossRef]
18. Pérez-Latorre L, Berenguer J, Micán R, Montero M, Cifuentes C, Puig T, et al; GeSIDA 8514 Study Group. HIV/HBV coinfection: temporal trends and patient characteristics, Spain, 2002 to 2018. Euro Surveill 2021;26:2000236. [CrossRef]
19. Nog R, Singaravelu K, Mannheimer S. Prevalence of occult hepatitis B infection among HIV infected patients at an innercity clinic. J AIDS Clin Res 2013;4:1–3. [CrossRef]
20. Opaleye OO, Oluremi AS, Atiba AB, Adewumi MO, Mabayoje OV, Donbraye E, et al. Occult hepatitis B virus infection among HIV positive patients in Nigeria. J Trop Med 2014;2014:796121. [CrossRef]
21. Şahin A, Şahin ST, Namıduru M, Karaoğlan İ, Boşnak V. Seroprevalence of hepatitis B and hepatitis C virus in HIV/AIDS patients at Gaziantep University. Mediterr J Infect Microb Antimicrob [Article in Turkish] 2016;5:5. [CrossRef]
22. Thio CL, Smeaton L, Saulynas M, Hwang H, Saravanan S, Kulkarni S, et al. Characterization of HIV-HBV coinfection in a multinational HIV-infected cohort. AIDS 2013;27:191–201. Erratum in: AIDS 2013;27:1041. [CrossRef]
23. Pappoe F, Hagan CKO, Obiri-Yeboah D, Nsiah P. Sero-prevalence of hepatitis B and C viral infections in Ghanaian HIV positive cohort: a consideration for their health care. BMC Infect Dis 2019;19:380. [CrossRef]
24. Sun HY, Sheng WH, Tsai MS, Lee KY, Chang SY, Hung CC. Hepatitis B virus coinfection in human immunodeficiency virus-infected patients: a review. World J Gastroenterol 2014;20:14598–614. [CrossRef]
25. Shimelis T, Tassachew Y, Tadewos A, Hordofa MW, Amsalu A, Tadesse BT, et al. Coinfections with hepatitis B and C virus and syphilis among HIV-infected clients in Southern Ethiopia: a cross-sectional study. HIV AIDS (Auckl) 2017;9:203–10. [CrossRef]
26. Abera B, Zenebe Y, Mulu W, Kibret M, Kahsu G. Seroprevalence of hepatitis B and C viruses and risk factors in HIV infected children at the Felgehiwot referral hospital, Ethiopia. BMC Res Notes 2014;7:838.
27. Freitas SZ, Teles SA, Lorenzo PC, Puga MA, Tanaka TS, Thomaz DY, et al. HIV and HCV coinfection: prevalence, associated factors and genotype characterization in the Midwest Region of Brazil. Rev Inst Med Trop Sao Paulo 2014;56:517–24. [CrossRef]
28. Cotte L, Hocqueloux L, Lefebvre M, Pradat P, Bani-Sadr F, Huleux T, et al; Dat'AIDS Study Group. Microelimination or not? the changing epidemiology of human immunodeficiency virus-hepatitis C virus coinfection in France 2012-2018. Clin Infect Dis 2021;73:e3266–74. [CrossRef]
29. Hønge BL, Jespersen S, Medina C, da Silva Té D, da Silva ZJ, Lewin SR, et al; Bissau HIV Cohort Study Group. Hepatitis C prevalence among HIV-infected patients in Guinea-Bissau: a descriptive cross-sectional study. Int J Infect Dis 2014;28:35–40. [CrossRef]
30. Ergen P, Caşkurlu H. Hepatitis C coinfection among people living with HIV in a university hospital in İstanbul. Viral Hepat J 2021;27:57–62.