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# THE PREVALANCE OF HEPATITIS B IN PEOPLE LIVING WITH HIV: A PROSPECTIVE STUDY IN GGH, ONGOLE

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**ABSTRACT**

The prevalance of Hepatitis B virus(HBV) in among people living with HIV(PLHIV)remains a critical concern globally. By analyzing a diverse sample, this study aims to investigate the co-occurrence of HBV in individuals already infected with HIV. The results will shed light on the extent of HBV within the PLHIV population, providing valuable insights for healthcare interventions. This study contributes novel data to the existing literature, offering a fresh perspective on the dual burden of HIV and HBV. The implications of our research extend to public health strategies and policies, emphasizing the importance of tailored approaches for individuals co-infected with HIV and HBV.

**MATERIALS AND METHODS**

In this prospective observational study, the prevalence of HBV was assessed in 4,000 HIV-positive individuals, out of which 90 tested positive for HbsAg. These individuals belonged to various age groups. They are well diagnosed by the physician based on the laboratory parameters, diagnostic tests and are treated with respective medications are enrolled in the study. The data was collected by using well designed proforma according to the criteria and data was analysed.

**RESULTS**

The overall incidence rate of Hepatitis B in people living with HIV is 2.25%. The highest number of positive patients belonged to the age group of 41-60 (58.9%). 70% of the patients were male, while 30% were female. A higher prevalence of Hepatitis B among males, which warrants further investigation.

**CONCLUSION**

There is a considerable incidence of hepatitis B among people with HIV. The overall incidence rate of hepatitis B in people living with HIV is 2.25%. the majority of HIV patients with HBV coinfection were males. The age groupof 40- 60 are at having higher rate of HBV infection.

**Key words:** Hepatitis B virus, co-occurrence, healthcare interventions, dual burden, public health strategies, co-infected.

## I. INTRODUCTION

The coexistence of two potent viral adversaries, Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV), within the same individual presents a significant challenge in infectious diseases [1]. This coinfection, known as HBV and HIV coinfection, is a critical intersection where two distinct viral pathogens converge, each with deleterious impacts on the body[2]. This dual infection extends beyond their individual effects, heightening morbidity and mortality rates as they target the liver and immune system[3].
HBV, a DNA virus, primarily affects the liver, leading to acute and chronic liver diseases, including cirrhosis and liver cancer [4]. HIV, a retrovirus, attacks the immune system, progressing to Acquired Immunodeficiency Syndrome (AIDS), making the body susceptible to various infections[5].
Coinfection accelerates liver disease progression, increasing liver-related morbidity and mortality rates. It disrupts the immune response to both viruses, complicating management. HBV replication surges in the presence of HIV, increasing transmission risk. Effective management strategies are crucial in addressing these intertwined challenges[6].
Globally, around 2.7 million people have HIV/HBV co-infection, with the highest prevalence in sub-Saharan Africa and Asia[7]. In developed countries, HBV prevalence in HIV patients has decreased due to vaccination and antiretroviral therapy (ART), but specific populations remain at risk. Co-infection accelerates liver disease progression, increasing the risk of liver failure and cancer[4].
Etiology of HBV and HIV co-infection involves the factors causing simultaneous infection. Both HBV and HIV transmit through similar routes like unprotected sex and drug injection. Those engaging in high-risk behaviors, e.g., multiple partners or drug use, face elevated co-infection risk. Preexisting HBV infection weakens immunity, increasing HIV susceptibility, and vice versa due to shared high-risk behaviors[8].
HIV (Human Immunodeficiency Virus) and HBV (Hepatitis B Virus) are distinct viruses with different modes of transmission, but both viruses can affect the immune system and result in persistent infections[9].
HIV primarily targets CD4+ T cells, which play a crucial role in coordinating the immune response. The virus enters these cells, replicates, and eventually destroys them[10]. As a result, the immune system weakens over time, making the individual more susceptible to opportunistic infections and certain cancers. The progression of HIV infection is measured by the decline in CD4+ T cell count and the increase in viral load[11].
On the other hand, HBV primarily affects the liver. The virus enters liver cells, leading to inflammation and potentially causing acute hepatitis. In some cases, the immune system successfully clears the virus during the acute phase. However, if the infection becomes chronic, it can lead to long-term liver damage, including cirrhosis and an increased risk of liver cancer. The immune response in chronic HBV infection is complex, involving both innate and adaptive components[12].
Both HIV and HBV can be transmitted through blood and sexual fluids, but HBV can also be transmitted from mother to child during childbirth. While antiretroviral therapy (ART) can effectively manage HIV and slow disease progression, there is no cure [13].
HBV and HIV co-infection can lead to more severe liver disease and an elevated risk of liver cancer compared to mono-infection with either virus. Symptoms can vary and may include fatigue, loss of appetite, nausea, abdominal pain, dark urine, and jaundice[14]. Co-infected individuals may experience more frequent and severe episodes of liver inflammation, hastening disease progression.Liver-related complications like cirrhosis and hepatocellular carcinoma (HCC) in co-infected individuals, but the precise mechanisms remain unclear and warrant further investigation[15].
Diagnosing HIV/HBV co-infection involves multiple tests:
**HIV antibody test:** Detects HIV antibodies in the blood, confirming HIV infection[16].
**HIV viral load test:** Measures HIV RNA levels to assess viral load and ART effectiveness.
**HBV surface antigen (HBsAg) test:** Detects active HBV infection[17].
**HBV DNA test:** Measures HBV DNA levels to monitor viral load and antiviral therapy efficacy[18].
**Liver function tests:** Gauge liver enzyme levels for signs of liver damage or disease[19].
**Liver biopsy (if necessary):** Assesses liver damage and fibrosis presence.
The diagnosis of co-infection is confirmed when both HIV and HBV are detected in the blood. It is important for individuals with HIV to be tested for HBV and vice versa.Early diagnosis and treatment of co-infection can improve outcomes and prevent complications[20].
Risk factors for HIV/HBV co-infection include, **Shared Transmission Routes:** Both viruses can transmit through unprotected sex, needle sharing, or mother-to-child transmission, making high-risk behavior a key factor[21]. **Geographic Location:** Prevalence of HIV and HBV varies by region, with higher risk in areas like sub-Saharan Africa and certain parts of Asia [22]. **Age:** Younger age groups engage in higher-risk

behaviors, increasing their susceptibility. **Gender:** Men, who often engage in risky behaviors like injection drug use and unprotected sex, are more susceptible[23]. **Immunodeficiency:** Weakened immune systems, as seen in advanced HIV or other immune-compromising conditions, heighten HBV co-infection risk and disease severity. **HBV Vaccination Status:** Lack of HBV vaccination elevates infection risk, especially when exposed to HIV[24].

Individuals at increased risk should take precautions, including safe sex practices, avoiding needle sharing, and considering HBV vaccination if not already immune[25].

HIV/HBV co-infection brings various complications:

**Liver Disease Acceleration:** Co-infection speeds up liver disease progression, including chronic hepatitis B, cirrhosis, liver failure, and cancer (4). **Opportunistic Infections:** Weakened immunity due to both viruses increases vulnerability to opportunistic infections like tuberculosis and pneumonia[26]. **Drug Toxicity Risk:** Co-infected individuals on antiretroviral therapy (ART) may face heightened risk of liver toxicity from certain HIV medications, worsening liver damage [27]. **Antiviral Therapy Response:** Co-infected individuals may respond less effectively to HBV antiviral therapy due to compromised immunity. **Transmission Risk:** Co-infection raises the risk of transmitting both HIV and HBV to others, potentially through sexual contact or injection drug use[28].

**Hepatitis B Reactivation:** HBV can reactivate during HIV treatment in some co-infected individuals, causing liver damage and complications. Managing both infections closely with a healthcare provider is crucial to prevent complications and enhance outcomes for the individual and reduce transmission risk to others[29].

Treatment for HIV/HBV co-infection requires a multidisciplinary approach and aims to suppress both viruses, halt liver disease progression, and enhance immune function. Key components include:

**Antiretroviral Therapy (ART):** Combats both viruses, suppressing HIV viral load and improving immune function. Some drugs used for chronic hepatitis B are also effective in co-infected individuals: Tenofovir disoproxil fumarate (TDF), Lamivudine (3TC), Emtricitabine (FTC), Entecavir (ETV), Pegylated interferon (PEG-IFN), with more side effects[30].

**Liver Transplant:** Considered for advanced liver disease, though co-infection increases transplant-related complications due to immunosuppressive drugs[31].

**Regular Monitoring:** Crucial for tracking liver function, HIV viral load, and CD4 cell counts to detect disease progression and adjust treatment accordingly[32].

**HBV Vaccination:** Offers protection against new HBV infections and complications in HIV-infected individuals, contributing to better overall health and reduced liver-related risks[33].

Treatment choices depend on individual factors like immune status, liver damage, potential drug interactions, and drug resistance. Regular monitoring guides the most suitable treatment approach, promoting effective management of both infections and improved health outcomes[34].

## II. MATERIALS AND METHODS

This prospective observational study was carried out on patients of department of ART at government general hospital, ongole, from november 2022 to april 2023. A total of 4000 subjects(both male and females) of all age groups were for in this study.

**Study design:** This was Retrospective observational study carried out in ART Centre.

**Study site**: This study was conducted at the Antiretroviral therapy (ART) Centre in a Teritiary care Teaching Hospital, Ongole, Prakasam dist., Andhra Pradesh, India.

**Study period:** This study took place over a six-month period, from November to April.

**Study population:** A total of 90 people were surveyed for this study.

**Procedure methodology**

A retrospective observational study was conducted among the subjects who are admitted in the ART department of a tertiary care teaching hospital. They are well diagnosed by the physician based on the laboratory parameters, diagnostic tests and are treated with respective medications are enrolled in the study. The data was collected by using well designed proforma according to the criteria and data was analysed.

**Statistical analysis**

The prevalence, complications and risk factors towards disease progression was statistically analyzed by ***Descriptive statistics, Chi-square test and one way ANOVA.***

## III. RESULTS

**Incidence of Hepatitis B:**

At our time of study in November 4000 people living with HIV were screened for the presence of HBsAg. The results of the study reveals that 90 HIV patients were tested positive for HBsAg. The overall incidence rate of hepatitis B in people living with HIV is 2.25% as shown in below figure.

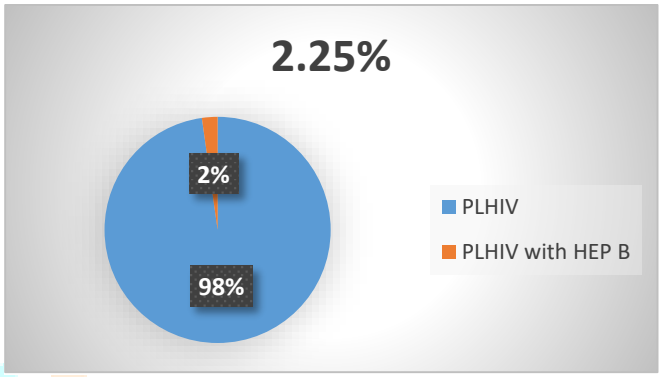


**Fig 14:** Incidence of Hepatitis B in people living with HIV

| AGE | HEPATITIS B POSITIVE |
|---|---|
| Below 20 | 3(3.3%) |
| 21-40 | 20(22.2%) |
| 41-60 | 53(58.9%) |
| 61-80 | 14(15.6%) |
| **TOTAL** | **90** |

**Table 4:** Age distribution of HIV patients with Hepatitis B

The table shows that the age range of male and female HIV patients with Hepatitis B. There are only 3.3% of patients below 20years, the patients of age 21-40 are 22.2%(20) , the patients of age 41-60 are 58.9%(53) , the patients of age 61-80 are 15.6%(14)

| RESIDENCE | HEPATITIS B POSITIVE |
|---|---|
| Urban | 18 (20%) |
| Rural | 72 (80%) |
| **TOTAL** | **90** |

**Table 5:** Residence wise frequency distribution of HIV patients with HBV

Among them 18 participants were Urban (20%) and 72 participants were Rural (80%).

| OCCUPATION | HEPATITIS B |
|---|---|
| Employed | 15(16.66%) |
| Unemployed | 75(83.33%) |
| **Total** | **90** |

**Table 6:** Occupation wise frequency distribution of HIV patients with HEPATITIS B

A total of 75 participants are unemployed (16.66%) and 15 participants are employed (83.33%).

| LEVEL OF EDUCATION | HEPATITIS B POSITIVE |
|---|---|
| Illiterate | 31(34.44%) |
| Primary school | 23(25.55%) |
| Secondary school | 29(32.22%) |
| College and above | 7 (7.77%) |
| **TOTAL** | **90** |

**Table 7:** Education wise frequency distribution of HIV patients with HBV

Education levels of patients with HBV- HIV coinfection varies with 34.44% being illiterate, 25.5% having primary school education, 32.22% having secondary school education, and 7.77% having college-level education

| GENDER | HEPATITIS POSITIVE |
|---|---|
| Male | 63 (70%) |
| Female | 27 (30%) |
| **TOTAL** | **90** |

**Table 8:** Gender distribution of HIV patients with Hepatitis B

The results of the table shows that, the total number of male HIV patients with Hepatitis B are 63(70%) and female HIV patients with Hepatitis.

**Treatment regimen used by the patients for HIV with HBV:**

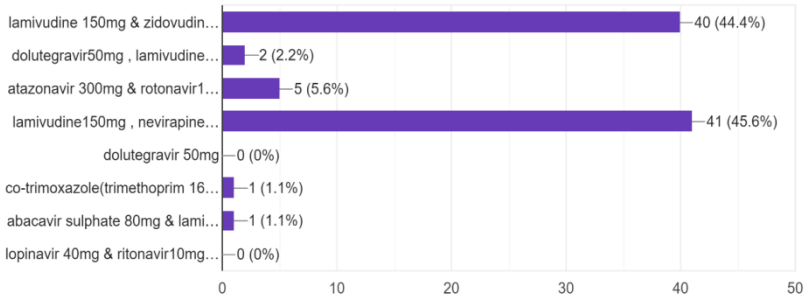


**Fig 20:** Treatment regimen used by the patients for HIV with HBV

**Histogram representation of treatment regimen**

The above data shows Lamivudine 150mg & Zidovudine 300mg is used by 44.4% (40) patients dolutegravir50mg , lamivudine 300mg & tenofovir 300mg used by 2.2% (2) patients atazonavir 300mg & rotonavir100mg is used by 5.6% (5) patients co-trimoxazole (trimethoprim 160mg & sulphamethoxazole 200mg) is used by 1.1% (1) patients abacavir sulphate 80mg & lamivudine 60/30mg is used by 1.1% (1).

| ETIOLOGICAL DISTRIBUTION | MALE | FEMALE | TOTAL |
|---|---|---|---|
| Sexual transmission | 30 | 17 | **47(52.2%)** |
| Blood transfusion | 20 | 10 | **30(32.2%)** |
| Congenital | 4 | 2 | **6(6.6%)** |
| Vertical | 7 | 0 | **7(7.7%)** |
| **TOTAL** | **61(67.77%)** | **29 (32.22%)** | **90** |

**Table 9:** Etiological distribution of HIV patients with Hepatitis B

The above data shows that the etiological distribution of HIV patients with HBV infection. There were 52.2% (47) of patients infected with HBV through sexual transmission, of these males were 30 and females were 17. People infected through blood transfusion were 32.2% (30) of these 20 were males and 10 were females. People infected through congenital were 6.6% (6) of these 4 were males , 2 were females. People infected vertically were 7.7% (7) of these 7 were males.

## IV. DISCUSSION

In our study, we assessed the knowledge of 90 respondents living with HIV using a self-designed questionnaire. Concurrently, in November, 4000 HIV-positive individuals were screened for HBsAg. The study identified 90 HIV patients who tested positive for HBsAg, resulting in an overall Hepatitis B incidence rate of 2.25%.

The age distribution revealed that the highest proportion of positive patients fell within the 41-60 age group (58.9%), potentially due to prolonged HIV infection and increased exposure to Hepatitis B.

In terms of residence, rural areas exhibited a higher infection rate (80%) compared to urban areas (20%).

Regarding occupation, the majority of infections were found among the unemployed (83.33%), as opposed to the employed (16.66%).

Education levels among participants varied, with 34.44% being illiterate, 25.5% having primary school education, 32.22% having secondary school education, and 7.77% having college-level education. This educational diversity may influence disease understanding, although most respondents displayed good knowledge of ART and Hepatitis B, potentially due to counseling by healthcare staff.

Gender-wise, 70% of HIV patients with Hepatitis B were male, suggesting a higher prevalence among males, warranting further investigation.

The primary treatment regimen used was lamivudine 150mg & nevirapine 200mg & zidovudine 300mg (45.6%), followed by lamivudine 150mg & zidovudine 300mg (44.4%), offering valuable insights for healthcare professionals.

For HbsAg-negative patients, Hepatitis B vaccination is administered to prevent infection.

Etiologically, sexual transmission accounted for the highest proportion (52.2%) of HBV cases, with 30 males and 17 females affected. Blood transfusion constituted the second-largest category (32.2%), with 20 males and 10 females. A smaller percentage contracted HBV congenitally (6.6%), including 4 males and 2 females, while vertical transmission accounted for 7.7% and affected only males.

These findings provide a comprehensive overview of Hepatitis B incidence among HIV patients, highlighting demographic trends, transmission methods, and treatment patterns that can inform healthcare strategies and future research endeavors.

## V.CONCLUSION

There is a considerable incidence of hepatitis B among people with HIV. The overall incidence rate of hepatitis B in people living with HIV is 2.25%. the majority of HIV patients with HBV coinfection were males. As hygiene and knowledge matters, most of patients were from rural areas and were illiterates & unemployed. Regular checkups and treatment could be helpful for patients with acute co infection and some surgical procedures may suggested in severe stage of infection. Appropriate health education and knowledge could be provided to patients about risk factors, transmission, and prevention of HBV infection in people living with HIV.

## REFERENCES


1. Phung BC, Sogni P, Launay O. Hepatitis B and human immunodeficiency virus co-infection. World Journal of Gastroenterology. 2014 Dec 14;20(46):17360-7.
2. Corcorran MA, Kim N. Chronic hepatitis B and HIV coinfection. Top Antivir Med. 2023 Mar 31;31(1):14-22.
3. Singh KP, Crane M, Audsley J, Avihingsanon A, Sasadeusz J, Lewin SR. HIV-hepatitis B virus coinfection: epidemiology, pathogenesis, and treatment. AIDS. 2017 Sep 24;31(15):2035-2052.
4. Parvez MK. HBV and HIV co-infection: Impact on liver pathobiology and therapeutic approaches. World J Hepatol. 2015 Jan 27;7(1):121-6.
5. Terrault, N. A., Lok, A. S., & McMahon, B. J. (2018). Chronic hepatitis B virus infection: update on treatment. Journal of clinical gastroenterology, 52(9), 781-795.
6. Konopnicki D, Mocroft A, de Wit S, et al. Hepatitis B and HIV: prevalence, AIDS progression, response to highly active antiretroviral therapy and increased mortality in the EuroSIDA cohort. AIDS. 2005;19(6):593-601.
7. Lavanchy, D. (2004). Hepatitis B virus epidemiology, disease burden, treatment, and Current and emerging prevention and control measures. Journal of viral hepatitis, 11(2), 97-107.
8. Ghanem A, Little SJ, Drumright L, Liu L, Morris S, Garfein RS. High-risk behaviors associated with injection drug use among recently HIV-infected men who have sex with men in San Diego, CA. AIDS Behav. 2011 Oct;15(7):1561-9.
9. Leoni, M.C., Ustianowski, A., Farooq, H. et al. HIV, HCV and HBV: A Review of Parallels and Differences. Infect Dis Ther 7, 407–419 (2018).
10. Lifson JD, Engleman EG. Role of CD4 in normal immunity and HIV infection. Immunol Rev. 1989 Jun;109:93-117.
11. Vidya Vijayan KK, Karthigeyan KP, Tripathi SP, Hanna LE. Pathophysiology of CD4+ T-Cell Depletion in HIV-1 and HIV-2 Infections. Front Immunol. 2017 May 23;8:580.
12. Chisari FV, Isogawa M, Wieland SF. Pathogenesis of hepatitis B virus infection. Pathol Biol (Paris). 2010 Aug;58(4):258-66. doi: 10.1016/j.patbio.2009.11.001. Epub 2010 Feb 8.
13. Navabakhsh B, Mehrabi N, Estakhri A, Mohamadnejad M, Poustchi H. Hepatitis B Virus Infection during Pregnancy: Transmission and Prevention. Middle East J Dig Dis. 2011 Sep;3(2):92-102.
14. McGovern BH. The epidemiology, natural history and prevention of hepatitis B: Implications of HIV co-infection. Antivir Ther 2007; 12: H3–H13.
15. Morimoto HK, A. C-A. Seroprevalence de infector poor hepatitis B, hepatitis C e HTLV Em populace infected pelo HIV/AIDS de Londrina e region. Goiania: Anais do XIII Congress Brasileiro de Infectologia; 2003

16. Fromentin R, Tardif MR, Tremblay MJ. Human hepatoma cells transmit surface bound HIV-1 to CD4+ T cells through an ICAM-1/LFA-1-dependent mechanism. Virology. 2010; 398:168–175.

17. Mallet VO, Varthaman A, Lasne D, Viard JP, Gouya H, Borgel D, Lacroix-Desmazes S, Pol S. Acquired protein S deficiency leads to obliterative portal venopathy and to compensatory nodular regenerative hyperplasia in HIV-infected patients. AIDS. 2009; 23:1511–1518.

18. Laukamm-Josten U, Müller O, Bienzle U, Feldmeier H, Uy A, Guggenmoos-Holzmann I. Decline of naturally acquired antibodies to hepatitis B surface antigen in HIV-1 Infected homosexual men. AIDS. 1988; 2:400–401.

19. Hoofnagle JH, D. B. Serologic diagnosis of acute and chronic viral hepatitis. Seminars in Liver Disease. 1991:73-83

20. Chasan R, Reese L, Fishbein D. HIV and Hepatitis B Virus Coinfection: Approach to Management: Case Study and Commentary. J Clin Outcomes Manag. 2010 Jun 1;17(6):273-286.

21. The long-term serological course of asymptomatic hepatitis B virus carriers and the Development of primary hepatocellular carcinoma. Journal of Infectious Diseases. 1985;151(4):604-609

22. Hofer M, H J-J. Frequent chronic hepatitis B virus infection in HIV-infected patients positive for antibody to hepatitis B core antigen only. Swiss HIV Cohort Study. European Journal of Clinical Microbiology & Infectious Diseases. 1998:6-13

23. Saag, M. S., Benson, C. A., Gandhi, R. T., Hoy, J. F., Landovitz, R. J., Mugavero, M. J.,... & Thompson, M. A. (2018). Antiretroviral drugs for treatment and prevention of HIV infection in adults: 2018 recommendations of the International Antiviral Society–USA Panel. Jama, 320(4), 379-396.

24. Iloeje UH, Yang HI, Su J, et al; Risk Evaluation of Viral Load Elevation and Associated Liver Disease/Cancer In HBV (the REVEAL-HBV) Study Group. Predicting cirrhosis risk based on the level of circulating hepatitis B viral load. Gastroenterology 2006;130:678-86.

25. Preventing Sexual Transmission of HIV.HIV.gov.January 10, 2023. https://www.hiv.gov/hiv-basics/hiv-prevention/reducing-sexual-risk/preventing-sexual-transmission-of-hiv/

26. Justiz Vaillant AA, Naik R. HIV-1–Associated Opportunistic Infections. [Updated 2023 Jan 27]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-.

27. Thio CL, Seaberg EC, Skolasky R Jr, et al; Multicenter AIDS Cohort Study. HIV-1, Hepatitis B virus, and risk of liver-related mortality in the Multicenter Cohort Study (MACS). Lancet 2002; 360:1921-6.

28. NIDA. 2020, July 30. Drug Use and Viral Infections (HIV, Hepatitis) DrugFacts. Retrieved from https://nida.nih.gov/publications/drugfacts/drug-use-viral-infections-hiv-hepatitis on 2023, November 21.

29. Wang B, Mufti G, Agarwal K. Reactivation of hepatitis B virus infection in patients with hematologic disorders. Haematologica. 2019 Mar;104(3):435-443.

30. Australasian Society for HIV Medicine. Australian Commentary on the US Department Of Health and Human Services (DHHS) Guidelines for the use of antiretroviral agents in HIV-1-infected adults and adolescents (1 May 2014).

31. Moini M, Schilsky ML, Tichy EM. Review on immunosuppression in liver transplantation. World J Hepatol. 2015 Jun 8;7(10):1355-68.

32. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV. Clinical info hiv.gov. September 21, 2022. https://clinicalinfo.hiv.gov/en/guidelines/hiv-clinical-guidelines-adult-and-adolescent-arv/plasma-hiv-1-rna-cd4

33. Landrum ML, Hullsiek KH, Ganesan A, Weintrob AC, Crum-Cianflone NF, Barthel RV, O'Connell RJ, Fieberg A, Chun HM, Marconi VC, Dolan MJ, Agan BK; Infectious Disease Clinical Research

Program HIV Working Group. Hepatitis B vaccination and risk of hepatitis B infection in HIV-infected individuals. AIDS. 2010 Feb 20;24(4):545-55.

34. McMahon MA, Jilek BL, Brennan TP, Shen L, Zhou Y, Wind-Rotolo M, Xing S, Bhat S, Hale B, Hegarty R, et al. The HBV drug entecavir – effects on HIV-1 replication and resistance. N England Journal Med. 2007; 356:2614–2621.