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Original Article

Trends of HBV and HCV co-infection in HIV patients: A fifteen years retrospective study

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Abstract

Aim: *Globally, about 30% of HIV infected patients are coinfected with HBV/HCV resulting in 1 million deaths every year. Co-infection with HBV and HCV is common in HIV-infected patients. These co-infections in HIV infected patients complicate the clinical course, management and also adversely affect the therapy for HIV infection. The present study was conducted to determine these infections in HIV infected individuals attending Anti Retroviral Therapy (ART) Centre in a tertiary care hospital in north India.*

Methods: *A total of three thousand six hundred and sixty-eight (3,668), serum samples received from the ART Centre to the Microbiology laboratory from 1st January 2003 to 31st December 2017 were tested for detection of HBsAg and anti-HCV antibodies by ELISA.*

Results: *67(1.82%) were co-infected with HBV or/and HCV. It was found that HIV-HBV/HCV coinfection was predominant in males 43/67 (64.2%). Heterosexual contact was the prevalent mode of acquiring these infections. A preponderance of sexually active age group between 30-50 years was found significantly associated with HIV/HBV/HCV infections.*

Interpretation & Conclusion: *A declining course of HIV positivity and almost homogenous pattern of HBV and HCV co-infection was observed in the study, demanding a well planned awareness and control programme in place for health education of the high risk groups. Hepatitis virus infection leads to rapid progression of liver cirrhosis in HIV-infected patients hence a routine check-up of HIV seropositive patients for hepatitis virus may be required to monitor clinical outcome.*

Keywords: *Co-infection, Hepatitis B, Hepatitis C, Human Immunodeficiency Virus.*

Introduction

Co-infection with Hepatitis B (HBV) and Hepatitis C viruses (HCV) in HIV infected patients has emerged as significant cause of morbidity and mortality owing to hepatic disease, in last two decades. Currently, about 40 million

people are infected with HIV globally, while HCV and HBV cause 170 million and 2 billion infections respectively[1]. India holds the second highest number of HIV infected cases in the world with approximately 2.1 million cases as reported by UNAIDS 2017.[2] The burden of these co-infections is greatest in the African and South East Asia Regions of WHO[3]. According to WHO, HCV and chronic HBV infection affects an estimated 2–15% and 5–20% of population living with HIV, respectively[4].

Human immunodeficiency virus (HIV) infected patients are vulnerable to infection with HBV and HCV due to their similar routes of transmission, namely through blood and blood products, sharing of needles to inject drugs and sexual activity[5]. The main mode of spread of HIV in India is heterosexual, with blood products and intravenous drug use accounting for less than 5% of the infections[6]. Every year nearly 3 million people are newly infected with HIV, which causes Acquired immune deficiency Syndrome (AIDS). The immune deficient state in HIV infection is responsible for persistence of these hepatotropic viruses[7]. Both HBV and HCV cause acute and chronic hepatitis. The course of viral multiplication and disease progression is affected by simultaneous infection with more than one virus. HIV accelerates the natural history of HBV and HCV infection as well as progression of liver disease to cirrhosis and hepatocellular carcinoma and finally liver failure. Hence, co-infection with these Hepatitis viruses, in HIV infected patients complicates the clinical course, management and may also adversely affect therapy for HIV infection. Also, there is increased risk of hepatotoxicity associated with highly active Anti Retroviral Therapy (HAART) leading to progressive liver disease and decreased survival.

Owing to these vital aspects of co-infection, this study was conducted to analyse the seroprevalence of coinfection in the HIV positive population attending ART centre at the Government Medical College and Hospital, Jammu, J&K, a tertiary care institution. As regional variability affects the prevalence of these infections and less documentation is available from this region, the present study would help the health planners in developing more effective management and therapeutic plans for these patients.

Materials and Methods

In this cross-sectional retrospective study, a total of three thousand six hundred and sixty-eight (3,668), serum samples were received from the Anti Retroviral Therapy (ART Centre in the Department of Microbiology, Government Medical College, Jammu, J&K from 1st January 2003 to 31st December 2017 for detection of HBV& HCV markers. The study was conducted after approval by the ethics committee of the Institution.

The socio-demographic information collected included age, sex and marital status, education, occupation, socioeconomic status and mode of transmission.

Viral Diagnosis

Detection of HIV infection: About 5 ml of whole blood was collected aseptically by venepuncture. The collected blood was allowed to clot; serum was separated by centrifugation at room temperature. Antibody to HIV infection was tested by three rapid diagnostic tests, each of different antigen or test principle. Testing algorithm adhered to National Guidelines on HIV testing specified by the National AIDS Control Organisation (NACO), Ministry of Health & Family Welfare, and Government of India. Three approved test kits, namely, (*i*) Combaids RS advantage (Arkray Healthcare Private Limited, Surat), (*ii*) SD Bioline (SD Bio Standard Diagnostics Pvt. Ltd.), (*iii*) AIDSCAN (Bio-Tech India Pvt. Ltd). Pre-test counselling was done and informed consent obtained from the patient before performing an HIV test.

Detection of HBV/HCV co-infection: The HIV seropositive serum samples were tested for HCV and HBV for hepatitis B surface antigen (HBsAg) by ELISA (Hepalisa, J. Mitra & Co. Ltd), and for

anti-HCV antibodies by ELISA (Micro Lisa, J. Mitra & Co. Ltd) respectively. The cut off values were calculated as per the manufacturer's instructions. Readings below the cut-off value were considered non-reactive and value above the cut-off values were considered reactive

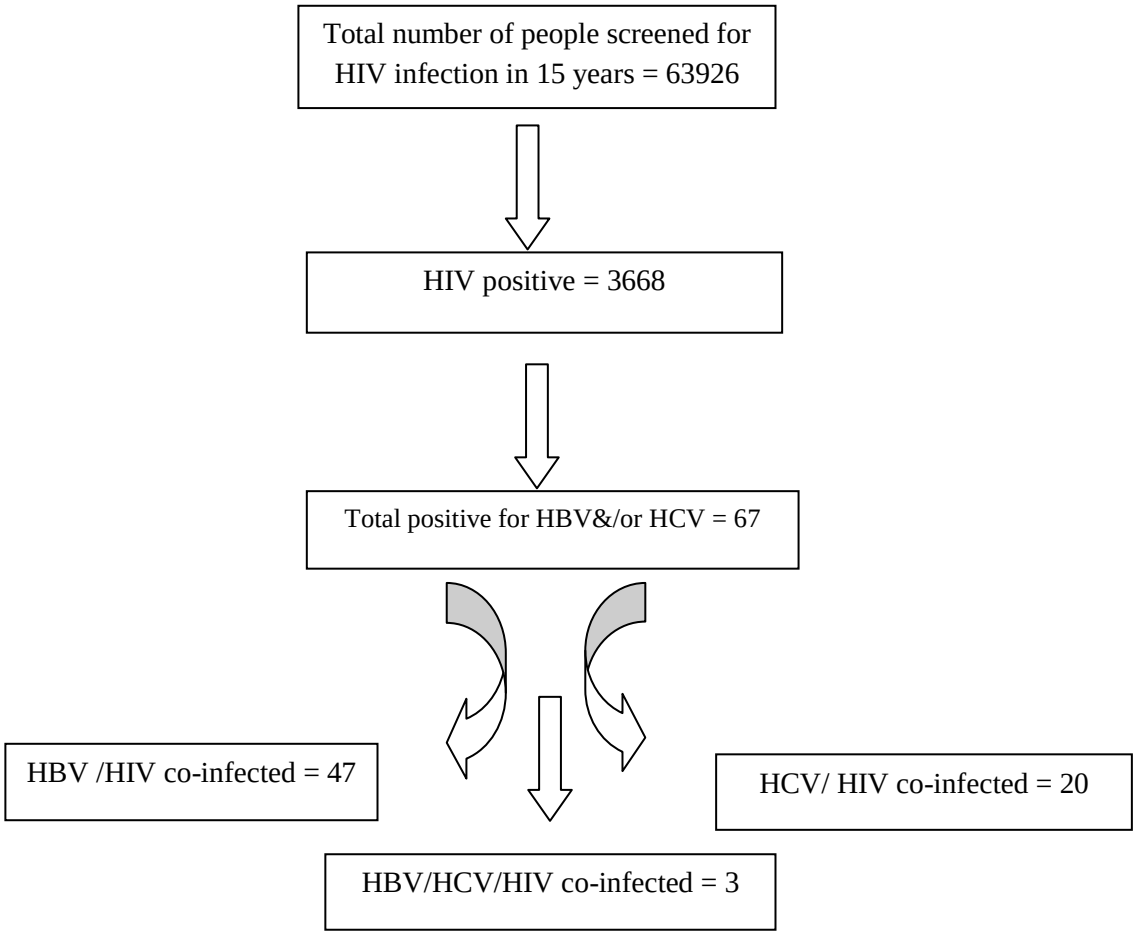
Baseline investigations that were performed included complete haemogram, blood biochemistry (including – Blood sugar, Renal function tests, Liver Function Tests, Serum Amylase, Serum Lipids) and CD4 counts. CD_4 count was done by Partech Flowcytometer.

Results

A total of 3,668 HIV positive serum samples from the ART Centre, Government Medical College and Hospital, Jammu (J&K) from January 2003 to December 2017 were analysed.

Out of 3668 HIV infected patients, 67(1.82%) were co-infected with HBV or/and HCV. Of the co-infected, 47(1.28%), and 20 (0.54%) were positive for HBV, anti-HCV respectively. Both HBV and anti-HCV co-infection was detected simultaneously in 3 (0.08%) HIV patients. Year wise distribution of HIV /HBV/ HCV coinfection is given in Table 1.

Flow chart showing confection of HIV positive samples



The socio-demographic characteristics of the study population are depicted in Table 2. It was found that HIV-HBV/HCV coinfection was predominantly found in males 43/67 (64.2%). The most commonly affected age group ranged between 30-50 years with 34/67 (50.7%) infected. Sixteen females attending the Ante-natal Clinic were also HIV positive but none of them were co-infected with HBV/HCV. The rates of HBV and HCV coinfection in HIV positive patients were higher among in unmarried people 38/67 (56.7%) than married people 29/67 (43.3%). 48.67 (71.6%) of HIV-HBV/HCV coinfection patients were from low SES and as per occupation 46.2% of the HIV-

HBV/HCV coinfection patients were drivers followed by labourers (22.4%), service class (13.4%), business class (12%) and lastly students (6 %). As far as mode of spread of disease was concerned heterosexual mode (71.6%) was found to be predominant.

Figure 1: Trend of HIV positivity from 2003-2017 (in percentage)

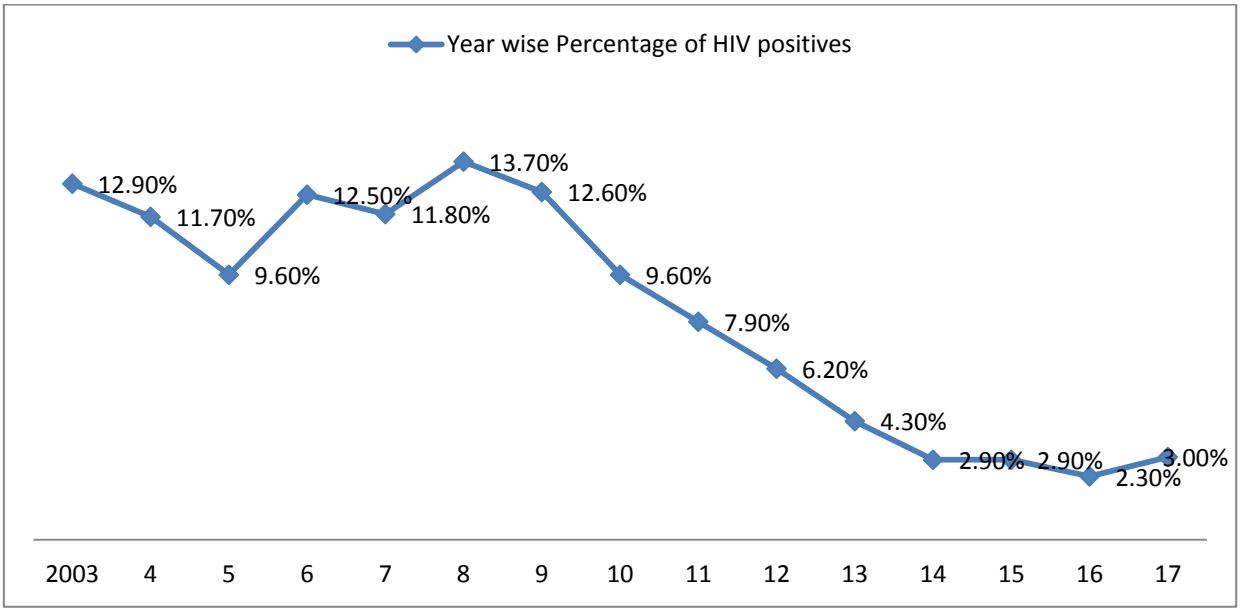


Table 1: Year wise distribution of HBV/HCV coinfection in HIV positives

S.No.	Year	Control (n) Total number of HIV tested	Total number of HIV patient	HBV	HCV	Co-infection HCV/HBV
1.	2003	1268	164 (12.9%)	0	0	0
2.	2004	1484	175 (11.7%)	1	0	1
3.	2005	1866	181 (9.6%)	1	0	1
4.	2006	1932	243 (12.5%)	3	0	3
5.	2007	2250	267 (11.8%)	5	4	9
6.	2008	1888	259 (13.7%)	6	0	6
7.	2009	2728	344 (12.6%)	9	6	15
8.	2010	2778	268 (9.6%)	0	0	0
9.	2011	3519	280 (7.9%)	2	1	3
10.	2012	4553	284 (6.2%)	0	0	0
11.	2013	6255	270 (4.3%)	4	1	5
12.	2014	6835	205 (2.9%)	5	1	6
13.	2015	8413	246 (2.9%)	8	3	11
14.	2016	9930	237 (2.3%)	1	2	3
15.	2017	8227	245 (3.0%)	2	2	4
	Total	63,926	3,668(5.73%)	47 (1.79 %)	20 (0.76 %)	67 (1.82%)

Table 2: Sex distribution of HIV positive patients

S.No.	Year	Total number of HIV patient	Males Positive	Females Positive
1.	2003	164	99	65
2.	2004	175	115	60
3.	2005	181	112	69
4.	2006	243	143	100
5.	2007	267	156	111
6.	2008	259	164	95
7.	2009	344	209	135
8.	2010	268	180	88
9.	2011	280	176	104
10.	2012	284	177	107
11.	2013	270	181	89
12.	2014	205	139	66
13.	2015	246	146	100
14.	2016	237	149	88
15.	2017	245	166	79
	Total	3,668	2312	1356

Discussion

The present study analyses the trends of HBV/HCV co-infection in HIV-infected patients over fifteen years (2003-2017) in ART centre of GMC, Jammu. The results revealed that the rate of the maximum percentage of HIV infected individuals was 13.7% in 2008 going down gradually to 3.0% in 2017 and since last five years the prevalence of HIV sero-positives has declined to <10%. The decrease in prevalence in HIV infection highlights the operational effectiveness of National AIDS Control Programme (NACP) and implementation of programme for prevention and control of HIV/AIDS since 1992. On the contrary the HIV/HBV/HCV co-infected patients have depicted a similar pattern of prevalence of below 5% throughout the study duration, underscoring the demand for health education and programmes for its prevention and control, more so in the vulnerable groups among the population at risk.

Very limited data is available on such patterns and one study from a super speciality hospital in New Delhi observing three years prevalence of less than 10%, is in agreement with our findings[9].

Several authors have variably documented the prevalence of HBV and HCV co-infection in HIV patients as the determinants of co-infection depends on multiple factors including age, the modes of transmission, the geographical difference and immune status at time of infection [10]. In our study, a lower prevalence of HBV/ HCV co-infection of 1.8% and 1.2% were documented, respectively. A prevalence of as high as 8.3% and as low as 1.6 % has been reported in India.[7,11] [13,7]. Tripathi et al reported a similar prevalence of HBV and HCV co-infection as 2.25% and 1.61% respectively[7]. The results of some other Indian authors are in line of agreement with the results of current study[6,8]. Whereas Tankhiwale and Nagy et al reported a high prevalence of HIV/HBV co-infection as 12.7% and 30.4% respectively [12, 13].

In the studies conducted abroad Egah et al in Nigeria[14] has reported 0.4% of HBV-HIV coinfection and 0% of HIV-HCV coinfection while Mohammadi et. al. from Iran[15] has reported 14.5% HIV-HBV coinfection and 72% HIV-HCV coinfection. Konopnicki et.al. has also reported a higher prevalence of 9% in HBV/HIV coinfection in the EuroSIDA cohort.[16]

The prevalence rate of HBV seropositivity in HIV patients in comparison with HCV seropositivity is high and the majority of the patients constitute the sexually active age group highlighting the fact that sexual route is predominant in HIV and HBV spread while HCV is transmitted mostly through intravenous route Although, HBV is a vaccine preventable disease and our study documents a higher prevalence rate of HBV/HIV co-infection

as compared to HCV/HIV coinfection. This galvanizes the demand of better vaccine coverage especially in all high-risk groups of our region.

The socio-demographic characteristics of the study population depicts that HIV-HBV/HCV coinfection was predominantly found in males as compared to females and the most commonly affected age group ranged between 30-50 years that is sexually active. These findings are in concordance to that reported previously[17,18,19]. The rates of HBV and HCV coinfection in HIV positive patients were higher among in unmarried people with dominance of hetrosexual mode of transmission mainly from low SES. These findings are in agreement with the studies conducted by Gupta et.al and Bhaumik et.al[20, 21].

In HIV patients, the liver damage may be directly associated with HIV infection or it may be due to prior hepatitis, intravenous drug abuse and alcoholism in already immunosuppressed patients[7]. Probably, other factors such as malnutrition, sepsis or administration of possible hepatotoxic antiretroviral medication may also be responsible for liver damage[22]. Highly active antiretroviral therapy recipients are more vulnerable to persistence of HBV and HCV infections. The presence of HIV infection makes the transmission of hepatitis viruses easier, through prenatal as well as sexual contact[23]. Moreover, pregnant women are prone to infection, perhaps owing to low immunity and hormonal changes[24].

Prevalence of HIV is high in India and one third of mortalities in these patients is attributed to cirrhosis and hepatic failure. Hence, prevention of hepatitis B and hepatitis C infections among HIV-infected patients is of prime importance and needed in the interest of public health. The focus should be on health education both in electronic and print media to make public aware of these diseases so that essential preventive steps could be taken to check their spread. Enhancement of Hepatitis B vaccine campaigns and improvement of its coverage among the high risk groups is the need of the hour.

Limitations

The patients attending ART centre were only studied while the patients availing diagnosis and treatment facility from private setup could not be included. Till date these infections bear a stigma in our society resulting in under-reporting, non-compliance and poor follow up. As this is a retrospective analysis of HIV patients, over the period of fifteen years i.e. from 2003 to 2017, follow up of the patients on treatment was not possible.

Conclusion

There is no proper surveillance system in place to monitor infection levels. Our results are consistent with other studies and are relevant for improving the care of HIV/AIDS patients. Findings of our analysis along with similar published reports must provide a platform to further modify, plan and execute the existing health programmes for prevention and control, thereby helping the beneficiaries.

References

1. Saravanan S, Velu V, Kumarasamy N, Nandakumar S, Murugavel KG, Balakrishnan P, et al. Coinfection of hepatitis B and hepatitis C virus in HIV-infected patients in south India. World J Gastroenterol. 2007;13:5015–20. [PMCID: PMC4434627] [PubMed: 17854146]
2. UNAIDS; Global AIDS Update 2016. Available from: https://www.avert.org/professionals/hiv-around-world/asia-pacific/india, accessed on Sept 4, 2018.
3. WHO; Global HIV/AIDS Data and Statistics 2017. Available from: http://www.who.int/hiv/data/en/, accessed on Nov 29, 2018.
4. Phung BC, Sogni P, Launay O. Hepatitis B and human immunodeficiency virus co-infection. World J Gastroenterol 2014; 20: 17360-7.

5. Chung RT. Hepatitis C and B viruses: The new opportunists in HIV infection. Top HIV Med. 2006; 14: 78-83.
6. Padmapriyadarsini C, Chandrabose J, Victor L, Hanna LE, Arunkumar N, Swaminathan S. Hepatitis B or hepatitis C co-infection in individuals infected with HIV and effects of Anti-tuberculosis drugs on liver enzymes. J Postgrad Med. April 2006; 52: 92-96.
7. Tripathi AK , KhannaM, GuptaN, Chandra M. Low Prevalence of Hepatitis B Virus and Hepatitis C Virus Co-infection in Patients with Human Immunodeficiency Virus in Northern India. JAPI .2007, 55:
8. Ahuja S, Malhotra S, Chauhan A, Hans C. Seroprevalence of Hepatitis B and C Co-Infection in HIV Positive Patients from a Tertiary Care Hospital. JIMSA. 2013 ; 26: 2.
9. Sharma A, Halim J, Jaggi T, Mishra B,Thakur A, Dogra V and Poonam SL. Time trends of sero-epidemiology of hepatitis C virus and hepatitis B virus coinfection in human immunodeficiency virus-infected patients in a Super Specialty Hospital in New Delhi, India: 2012–2014. Indian J Sex Transm Dis AIDS. 2016 Jan-Jun; 37(1): 33–37.
10. Sharma V, Ramachandran V. G, Mogha N S and Bharadwaj M. Hepatitis B & C virus infection in HIV seropositive individuals & their association with risk factors: A hospital-based study. Indian J Med Res. June 2018;147: 588-593.
11. Chandra N, Joshi N, Raju YS, Kumar A, Teja VD. Hepatitis B and/or C co-infection in HIV infected patients: A study in a tertiary care centre from South India. Indian J Med Res. 2013;138: 950–4.
12. Tankhiwale SS, Khadase RK, Jalgoankar SV. Seroprevalence of anti-HCV and hepatitis B surface antigen in HIV infected patients. Indian J Med Microbiol. 2003;21: 268–70.
13. Sonia Nagy G. Mortality in HlV/HBV co-infection in the Multicentre AIDS Cohort Study (MACS). AIDS Clinical Care 2003;301-5.
14. Egah DZ, Banwat EB, Audu ES, Iya D, Mandong BM, Anele AA, et al. Hepatitis B surface antigen, hepatitis C and HIV antibodies in a low-risk blood donor group, Nigeria. East Mediterr Health J. 2007;13:961–6.
15. Mohammadi M, Talei G, Sheikhian A, Ebrahimzade F, Pournia Y, Ghasemi E, et al. Survey of both hepatitis B virus (HBsAg) and hepatitis C virus (HCV-Ab) coinfection among HIV positive patients. Virol J. 2009;6:202.
16. Konopnicki D. Hepatitis B and HIV: Prevalence, AIDS progression, response to highly active antiretroviral therapy and increased mortality in the EuroSIDA cohort AIDS. 2005; 19: 593- 601.
17. Saha MK, Chakrabarti S, Panda S, Naik TN, Manna B, Chatterjee A, *et al.* Prevalence of HCV & HBV infection amongst HIV seropositive intravenous drug users & their non-injecting wives in Manipur, India. Indian J Med Res. 2000; 111 : 37-9.
18. Gautam H, Bhalla P, Saini S, Uppal B, Kaur R, Baveja CP, et al.Epidemiology of opportunistic infections and its correlation with CD4 T-lymphocyte counts and plasma viral load among HIV-positive patients at a tertiary care hospital in India. J Int Assoc Physicians AIDS Care (Chic). 2009; 8: 333-7.
19. Sharma A, Halim J, Jaggi T, Mishra B, Thakur A, Dogra V, et al. Time trends of seroepidemiology of hepatitis C virus and hepatitis B virus coinfection in human immunodeficiency virus-infected patients in a super specialty hospital in New Delhi,

India: 2012-2014. Indian J Sex Transm Dis. 2016; 37: 33-7.)

20. Gupta S, Singh S. Hepatitis B and C virus co-infections in human immunodeficiency virus positive North Indian patients. World J Gastroenterol . 2006; 12: 6879-83.
21. Bhaumik P, Bhattacharjee P, Sil SK. Hepatitis B and Hepatitis C Virus Co-infection among Human Immunodefi ciency Virus Infected Patients of Tripura. Int J Sci Stud. 2015; 3(6):77-80.
22. Poles MA, Dieterich DT, Schwarz ED, Weinshel EH, Lew EA, Lew R, et al. Liver biopsy findings in 501 patients infected with human immunodeficiency virus (HIV). J Acquir Immune Defic Syndr Hum Retrovirol. 1996; 11: 170-7.
23. Eyster ME, Alter HJ, Aledort LM, Quan S, Hatzakis A, Goedert JJ, et al. Heterosexual co-transmission of hepatitis C virus (HCV) and human immunodeficiency virus (HIV). Ann Intern Med. 1991; 115 : 764-8.
24. Nuriel-Ohayon M, Neuman H, Koren O. Microbial Changes during Pregnancy, Birth, and Infancy. Front Microbiol. 2016; 7: 1031.