

Prevalence of HBV and HCV Infections and Associated Risk Factors in Addict Prisoners

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Abstract

High prevalence of HBV and HCV infections in prisoners suggests them as one of the main infection source in community. Preventive measures can possibly decrease their rate of infection and infectivity. We evaluated prevalence of HBV and HCV infections and their relation to dangerous behavior in addict prisoners. This was a cross-sectional study included prisoners of central provinces of Iran who were evaluated for HBV and HCV in 2003. All of 1431 prisoners filled out questionnaires that were evaluated for HBsAg and HCV antibody. There were 51 prisoners (3.5%) who were HBsAg positive and 513 prisoners (35.8%) had HCV antibody. Odd's ratio for HBV and HCV were 10.3 and 9.6 for IVDA, respectively. This study showed that the HBV and specially HCV infection had high prevalence among prisoners. In comparison to rate of HBsAg and HCV infection in general population of Iran, this study showed that the HBsAg was 2 times and HCV infection was 70 times more frequent in prisoner than in general population of Iran. The education for dangerous behavior is strongly recommended to control this persistent infection source for hepatitis B and C in the community.

Keywords: *HBV, HCV, Risk factors, Prisoners, Iran*

Introduction

Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are one of the major health problems in the world (1). In previous studies, it had been estimated that HBsAg carrier rate was about 3% in Iran (2). According to the recent Iranian national health survey, the prevalence of HBV infection is 1.7% in the country (3).

In addition, world prevalence of HCV infection is 1% (2). Earlier studies in Iran put HCV prevalence rate at about 0.3% (2). However, it seems that its prevalence is increasing in the country; and in a recent study, 0.46% of Iranian blood donors were HCV positive (4).

Viral hepatitis B and C infections have been common diseases during recent decades. These diseases take place via similar routes of transmission, and population affected are such as intravenous drug users (IVDU), hemophilia, dialysis patients, and health care workers (5). In addition, these infections are more prevalence in some other high-risk

groups like gypsies than normal population. One study showed that they were 10 times more frequent in gypsies than in general population (6). Beside to mention groups another high-risk group is prisoners. It is estimated by Centers for Disease Control, about 8 millions prisoners return to community annually that may be dangerous for community health. In addition, Up to 35% of prisoners have history of addition. (7-11). In returning to community, they may have a major role to transmit these infections to others. There are many studies which indicate a high prevalence of HBV, HCV infection among prisoners. 13%-47% of prisoners in the USA had HBV infection (12). 57.7% of Australian prisoners had HCV infection (13) that was 2-6 times more than its prevalence in the community (12). Likewise, 68% and 65% of addict prisoners are infected with HBV and HCV infection, respectively (14). The communities of prisoners are characterized by pervasive social health problems, illegal be-

havior, and limited educational opportunities. Because of different life style, they might be exposed to multiple sexual partners, addiction and various kinds of infections. There have been limited studies dealing with their health status in Iran. Epidemiologic studies of HBV and HCV infection among prisoners population are very important, as they can become a potential source of these communicable diseases.

Consequently, the prevalence rate of HBV and HCV infections and their relation to dangerous behavior in addict prisoners were the main purposes of this study.

Materials and Methods

In this study, we evaluated Jails of the 3 central provinces of Iran including Isfahan, Lorestan and Chaharmahal VA Bakhtiari in 2003. Our target population included all male prisoners who were arrested because of their addiction. In these three Jails, 1898 prisoners were selected randomly and classified by duration of being in prison. All of 1431 questionnaires were filled out by prisoners. These questionnaires had been confirmed for validity and contents by a psychiatrist, social medicine specialist, and infectious disease specialist. The reliability of questionnaires were calculated in 30 prisoners (results included in this results) that showed cronbach's alpha of 88%. Then the blood samples were taken and sera were sent to reference blood bank laboratory where the tests were done. Used kit (Made by Italian Diasorin Company) had specificity and sensitivity more than 90%. All of the positive tests were repeated and done by the same laboratory, instrument, and specialist.

The results were considered negative, suspected, and positive, if they were less than 1, between 1 to 1.2 and more than 1.2, respectively.

The collected data were analyzed by logistic tests and with SPSS program. This paper was conducted in Infectious and Tropical Diseases Research Center affiliated to Isfahan University of Medical Sciences and Department of Infectious Diseases of Shahr-e-kord University of Medical Sciences, Iran.

Results

Our results showed that 51 prisoners (3.5%) had HBsAg positive and 513 (35.8%) had HCV antibody. According to the age, mostly HBsAg carrier and HCV infection has been occurred in prisoners younger than 30 yr old (Table 1). Suspected titers of HBsAg were seen in 14 prisoners (0.97%) and HCV antibody in 137 prisoners (9.5%). 58.8% and 62.2% of the prisoners with HBsAg and HCV infections had one or more high-risk behaviors. The most common dangerous behaviors were as follows: Previous addiction (80.5%), tattooing (50.7%), needle sharing (36%), current addiction (28.3%), and I.V drug abusers (IVDA) (28%). Totally, 903 of the prisoners had been imprisoned for less than 1 yr, 621 (43.4%) for their first time but 323(22.6%) for at least 4 times. Odd's ratio for HBV and HCV infections were 10.3 and 9.6 in IVDA, ($P < 0.001$ and $P < 0.05$) respectively. Odd's ratio for HBV and HCV infections were 2.4 and 4, in being in prison between 1-5 yr ($P < 0.001$ and $P < 0.005$), respectively. In addition odd's ratio for HBV and HCV infections were 2.9 and 6.3, in being in prison more than 5 yr ($P < 0.001$ and $P < 0.01$), respectively.

Table 1: Distributions of HBsAg and HCV-Ab by age and province

Age (yr)	Isfahan				Lorestan				Chaharmahal va Bakhtiari			
	HBsAg		HCV-Ab		HBsAg		HCV-Ab		HBsAg		HCV-Ab	
	n	%	n	%	n	%	n	%	n	%	n	%
< 30	8	53.3	79	38.5	14	53.8	117	50	3	30	40	53.3
31-40	6	40	67	32.7	8	30.8	80	34.5	3	30	19	25.3
> 41	1	6.7	59	28.8	4	15.4	36	15.5	4	40	16	21.4
Total	15	100	205	100	26	100	233	100	10	100	75	100

Discussion

In comparison to rate of HBsAg and HCV infection, in general population of Iran, this study showed that the HBsAg was 2 times and HCV infection was 70 times more frequent. Similar to our study, one third of the prisoners had been reported to have HBV and HCV infections (9). The prevalence of HBV and HCV infections were shown to be 6% and 22% in Irish prisoners (10), 61.1% and 82.2% in IVDA of Mexicans jails (15) 20.2% and 23.1% among males in Rhode Island prisons (11) and 25.2% and 29.7%, (12) 64% and 87% among IVDA Danish prisoners (16). In addition, this rate would reach up to 30% for HCV infection in British prisoner (1), 57.5% in Australian correctional facilities (13) and 37% of prisoners (17). Even some of them had chronic HBV infection (12). All these studies show the importance of this issue.

The greatest threat in our study was for the IVDA, as their odd's ratio for HBV and HCV infection were 10.3 and 9.6, respectively. The odd's ratio for males in Rhode Island prisons, for hepatitis B and C were 7.9 and 32.4, respectively (18).

The high prevalence of HBV and HCV infections of these studies summarized their permanent infectivity, especially among IVDA prisoners (19) who can be as a source for community after freedom. Inadequate information of the prisoners about dangerous behaviors for HBV and HCV infections that is less than 20% (16), along with incomplete attention to preventive measures has caused that less than 2% of prisoners had been vaccinated against HBV (20).

Considering the results of this study, education for dangerous behavior along with screening, vaccination, and appropriate treatment against hepatitis that are demonstrated to be cost benefit (21- 23) is strongly recommended to control this persistent infection source for HBV and HCV in the community.

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References

1. Skipper C, Guy JM, Parket J, Roderick P, Rosenberg WM (2003). Evaluation of a prison outreach clinic for the diagnosis and prevention of hepatitis C: Implication for the national strategy. *Gut*, 52(10): 1500-504.
2. Malekzadeh R, Khatibian M, Rezvan H (1997). Viral hepatitis in the world and Iran. *J Irrn Med Council*, 15: 183-200.
3. Massarrat MS, Tahaghoghi-Mehrizi S (2002). Iranian national health survey: A brief report. *Arch Irrn Med*, 5: 73-9.
4. Pourshams A, Malekzadeh R, Monavvari A, Akbari MR, Mohamadkhani A, Yarahmadi S et al. (2005). Prevalence and etiology of persistently elevated alanine aminotransferase levels in healthy Iranian blood donors. *J Gastroentrol Hepatol*, 20(2): 229-33.
5. Robinsin WS (2000). Hepatitis B virus and Hepatitis D virus. In: Principles and Practice of Infectious Diseases. Eds, Mandell GL, Benette JE, Dolin R. 5th ed, Churchill livingstone Inc. Philadelphia, pp: 1652-68.
6. Hosseini Asl SK, Avijgan M, Mohamadnejad M (2004). High Prevalence of HBV, HCV, and HIV Infections: In Gypsy Population Residing In Shar-e-kord. *Arch Iranian Med*, 7(1): 22-24.
7. Arracle A, Zak Dft Zbar O, Vasseur V (2002). Prevalence of HBV and HCV infection in lasant. *Arr Med Interne*, 152 (suppl 7): 6-8.
8. Champian JK, Taylor A, Hutchinson S, Cameron S, Mcmenamin J, Mitchell A et al.(2004). Incidence of hepatitis C virus infection and associated risk factors among Scottish prison inmates: a cohort study. *Am J Epidemiol*, 159(5): 514-9.

9. Butler TCA, Dolan KA, Ferson MJ, MC Guinness LM, Brown PR, Robertson PW (1997). Hepatitis B and C in New South Wales prison: Prevalence and risk factors. *Med J Aust*, 166(3): 127-30.
10. Long J, Allwright S, Barry J, Reynolds SR, Thornton L et al. (2001). Prevalence of antibodies to hepatitis B, hepatitis C and HIV and risk factors entrants to Irish prisons: a national cross sectional survey: *BMJ*, 323(7323): 1209-13.
11. Anonymous (2004). Centers for disease control and prevention. Hepatitis B vaccination of inmates in correctional facilities. 2000-2002. *MMWR*, 53(30): 681-3.
12. Anonymous (2004). Centers for disease control and prevention. Transmission of hepatitis B virus in correctional facilities. Georgia 1999-2002. *MMWR*, 53(30): 678-81.
13. Hellard Me, Hocking JS, Croffs N (2004). The prevalence and the risk behaviors associates with transmission of hepatitis C virus in Australian correctional facilities. *Epidemiol Infect*, 132(3): 404-15.
14. Van Ameijden EJ, Van den Hoek JA, Mientjes GH, Coutinbo RA (1993). A longitudinal study on the incidence and transmission patterns of HIV, HBV and HCV infection among drug users in Amsterdam. *Eur J Epidemiol*, 9(3): 255-62.
15. Samul MC, Doherty PM, Bulterys M, Jenison SA (2001). Association between heroin use needle sharing and tattoos received in prison with hepatitis B and C positivity among street- recruited injecting drug users in new Mexico USA. *Epidemiol Infect*, 127(3): 475-84.
16. Chistensen PB, Kraup HB, Niesters HG, Norder H, Georgson J (2000). Prevalence and incidence of blood borne viral infections among Danish prisoners. *Eur J Epidemiol*, 16(71): 1043-9.
17. Butler TCA, Dolan KA, Ferson MJ, MC Guinness LM, Brown PR, Robertson PW (1997). Hepatitis B and C in New South Wales prisons: Prevalence and risk factors. *Med J Aust*, 166(3): 127-30.
18. Macalino GE, Vlahov D, Sanford- Colby S, Patel S, Sabin K, Salas C et al. (2004). Prevalence and incidence of HIV, hepatitis B virus and hepatitis C virus infections among males in Rhode Island prisons. *Am J Public Health*, 94(7): 1218-23.
19. Weild AR, Gill ON, Bennett D, living stone SJ, Parry JV, Curran L (2000). Prevalence of HIV, hepatitis B, and hepatitis C antibodies in prisoners in England and Wales: a national survey. *Commun Dis Public Health*, 3(2): 121-6.
20. Solomon L, Flynn C, Muck K, Vertcfeuille J (2004). Prevalence of HIV, Syphilis, Hepatitis B and hepatitis C among entrants to Maryland correctional facilities. *J Urban Health*, 81(1): 25-37.
21. Weinbaum C, Lyerla R, Margolis HS (2003). Prevention and control of Infection with hepatitis viruses in correctional setting. *MMWR Recomm Rep*, 52(10): 205-14.
22. Awofeso N (2002). Hepatitis B vaccinations in prisons. *Boll World Health Organ*. 80(7): 569-74.
23. Jacobs RJ, Rosenthal P, Meyerhoff AS (2004). Cost effectiveness of hepatitis A/B vlrus hepatitis B vaccination for US prison inmates. *Vaccine*, 22(9-10): 1241-80.