

The Profiles of Hepatitis B and C Virus Infections in Prison-Assisted Citizens

Patricia Gita Naully*

Department of Medical Laboratory Technology (D-4), Stikes Jenderal Achmad Yani Cimahi.
Jl. Terusan Jenderal Sudirman Kota Cimahi, West Java 40633, Indonesia

ARTICLE INFO

Article History:

Received: November, 2019

Revise: June, 2020

Accepted: July, 2020

Keywords: hepatitis B,
hepatitis C, prison-assisted
citizens

ABSTRACT

Prison-assisted citizens or prisoners are one of the groups of people who are at high risk of Hepatitis B and C virus infections. The data on the prevalence of both viruses in prisoners in Indonesia are still limited. This study aims to determine the profiles of Hepatitis B and C virus infections in prison-assisted citizens in the Class IIA Narcotics Correctional Institution in Bandung Regency. A total of 30 prisoners were used as the samples in this study. All procedures performed in this study were following the applicable codes of ethics. The presence of surface antigens of Hepatitis B virus (HBsAg) in serums was detected using a qualitative sandwich Enzyme-Linked Immunosorbent Assay method. The existence of antibodies of the Hepatitis C virus (Anti-VHC) was detected using the immunochromatography method. The laboratory test results have shown five people (16.7%) were positive on the HBsAg test and one person (3.3%) was positive on the anti-VHC test. One case of Hepatitis B and C co-infection was also found in the prison-assisted citizens who were in the Class IIA Narcotics Correctional Institution in Bandung Regency. All the prisoners infected by the Hepatitis B and C viruses used injection drugs, had tattoos on their bodies and never received vaccinations.

*Corresponding author:

Patricia Gita Naully

Department of Medical Laboratory Technology (D-4), Stikes Jenderal Achmad Yani Cimahi

Email: patriciagitanaully@gmail.com



"Jurnal Biomedika" is an open access article under the CC BY-SA license

Homepage: www.biomedika.setiabudi.ac.id

INTRODUCTION

Hepatitis virus infection is one of the causes of premature death in the world. Five million people died from the virus each year (Ramin et al., 2015). Two of five types of hepatitis viruses are most dangerous, including the Hepatitis B Virus (VHB) and the Hepatitis C Virus (VHC) (WHO, 2017). According to Gahrton et al. (2019), in about 60-80% of people suffering from acute HBV or HCV infection, the infection will develop into a chronic condition. Both viruses can cause cirrhosis of the liver and hepatocellular carcinoma (Smith et al., 2017). HBV is transmitted through blood, sperm and vaginal fluids (Kudesia and Wreghitt, 2009). HCV can also be spread through blood, but cases of HCV transmission through sexual contact are still rarely reported.

One of the community groups who are at high risk of VHB and VHC infections is a group of prison-assisted citizens (*Warga Binaan Pemasyarakatan/WBP*). Prison-assisted citizen is a term for a convict who has to serve the sentence at the Correctional Institution (*Lembaga Pemasyarakatan/Lapas*). Prisoners often commit risky actions, such as drug injection, tattoos, and unsafe sexual contact (Behzadifar et al., 2018). Besides, they must live in the same environment for a particular period with limited spaces and lack of nutrition and health services (Ramin et al., 2015).

In their research, Smith et al. (2017) concluded that the prevalence of hepatitis B in prison-assisted citizens in the world ranged from 0.9%-11.4% for active infection (positive on the surface antigen test for hepatitis B virus (HBsAg)) and could be contagious, while for those who had been exposed to the virus (positive on anti-HBs or HBsAb examination) was 6.5% -42.6%. In the following year, a study by Moradi et al. (2018) reported that the prevalence of Hepatitis B in prison-assisted citizens in the world was 5.17%, with the highest prevalence in Afrika (13.14%). This disease was found to affect more male prison-assisted citizens than female ones. Exceeding Hepatitis B, the prevalence of Hepatitis C in prison-assisted citizens in the world was 13.22%.

The highest prevalence of hepatitis C was among prison-assisted citizens in Australia (26.4%).

In Indonesia, the data on Hepatitis B and C prevalence are limited. Only three correctional institutions in Indonesia have reported the data, Class IIA Correctional Institution in Banceuy, Bandung City (Nelwan et al., 2010), Correctional Institution in Central Java (Prasetyo et al., 2013), and Lubuk Pakam Correctional Institution located in Deli Serdang Regency, North Sumatra (Rey et al., 2018). To complete the data, research dealing with HBV and HCV in prison-assisted citizens in other areas is required.

One of the correctional institutions that have attracted the researchers' attention is the Class IIA Narcotics Correctional Institution, Bandung Regency. Many prisoners with the history of drug injection serve the sentences in the correctional institution. Moreover, this place is overcrowded, inhabited by 1,223 prisoners, although its capacity is only 793 people (Andriansyah, 2018). One detention room in the correctional institution is supposed to be occupied by 10 people, but in reality, it is occupied by 25-30 people.

The overcrowded detention rooms and the inadequate number of prison officers can lead to undesirable incidences, such as fights, torture, beatings, even smuggling and drug trading activities in the location. The facts have indicated that the prison-assisted citizens in the correctional institution have been infected with HBV and HCV and can transmit the viruses through their activities there. There have not been any studies reporting the data of HBV and HCV infections in the prison-assisted citizens in Class IIA Narcotics Correctional Institution, Bandung Regency. Therefore, this study aims to determine the profiles of HBV and HCV infections in the prison-assisted citizens in this correctional institution.

MATERIALS AND METHODS

This research belongs to a cross-sectional study that considers disease and exposure status

simultaneously to examine the relationship between them. The observation was carried out to individuals in the population. All procedures in this study were under the applicable codes of ethics and approved by the Health Research Ethics Committee of Stikes Jenderal Achmad Yani Number 79/KEPK/V/2019.

Materials

The equipment used in this research included ELISA reader (Bio-Rad), a syringe (Becton Dickinson), micropipette (Bio-Rad), centrifuge (Thermoscientific), a vacuum tube (Becton Dickinson), a tourniquet (Onemed), and water bath (Julabo). Answer Imunokromatografi Anti-HCV kit, Wantai HBsAg ELISA kit, hypochlorite, plaster, and alcohol swabs were also used in this study.

Research Population and Samples

The population in this study were all prison-assisted citizens in the Class IIA of Narcotics Correctional Institution in Bandung Regency. The samples were 30 prison-assisted citizens that, at least, met one criterion of inclusion, having tattoos or piercings on their bodies, having used injected drugs, and having had more than one sexual partner. The criterion of exclusion was the unwillingness to take part in this study.

Research Procedure

Informed Consent and Questionnaire Filling

This research began with the explanation of the research background, objectives and procedures to the entire samples of the study. Furthermore, the research subjects were asked to fill out an identity sheet, questionnaires on lifestyle and medical history, and sign a letter stating their willingness to be involved in this research (informed consent).

Collection of Specimens

The specimens used in this study were serums. Therefore, the venous blood drawn was put into a vacuum tube and centrifuged at 1500 rpm for 15 minutes.

Hepatitis B Examination

The method used to check for hepatitis B was a qualitative sandwich Enzyme-Linked Immunosorbent Assay (ELISA). HBsAg from well-bound specimens was identified by anti-HBs conjugated by the Horseradish Peroxidase enzyme. The ELISA used in this study had a sensitivity value of 99.65% and a specificity of 99.75%.

Hepatitis C Examination

Hepatitis C examination was performed using the immunochromatography method. The presence of anti-HCV in the serum was detected by the HCV antigen conjugated with colloidal gold. The results were interpreted after 15 minutes of incubation at room temperature. The immunochromatography applied in this study had a sensitivity of 98.1% and a specificity of 99.6%.

Data Analysis

The data obtained from questionnaires and laboratory examinations were processed and analyzed using a descriptive analysis technique. This study did not use statistical analysis in data processing.

RESULT AND DISCUSSION

In this study, 30 prison-assisted citizens aged 18-62 years were gathered. All samples were male and the majority of them were primary school graduated. The results of laboratory tests have shown that five samples were HBsAg-positive (Figure 1) and one sample was anti-VHC-positive (Figure 2). One sample that was positive for hepatitis C was also positive for hepatitis B (co-infected).

The results obtained in this study were in accordance with the preliminary hypotheses. Viewing the condition of the correctional institution previously described, it is likely that the prison-assisted citizens occupying the Class IIA Narcotics Correctional Institution in Bandung

Regency could be infected with VHB and VHC. This study is also in line with the previous studies in Indonesia. (Nelwan et al., 2010; Prasetyo et al., 2013; Rey et

al., 2018) and in other countries, such as Iran (Behzadifar et al., 2018; Ghafari et al., 2019), Sweden (Gahrton et al., 2019), and Turkey (Keten et al., 2016).

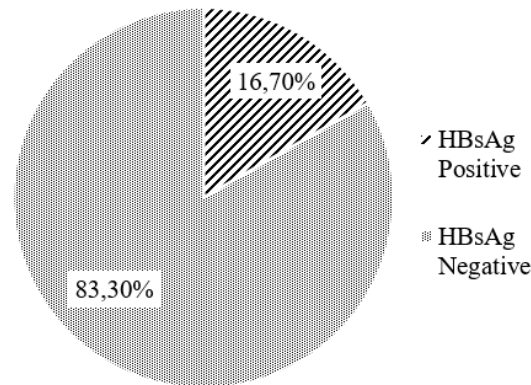


Figure 1. The Results of Hepatitis B Examination on Prison-Assisted Citizens in Class IIA Narcotics Correctional Institution, Bandung Regency.

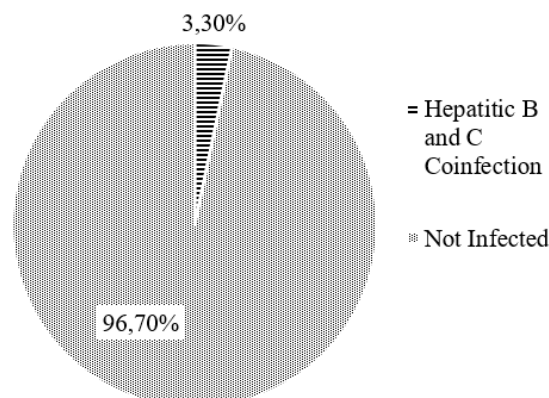


Figure 2. The Results of Hepatitis C Examination on Prison-Assisted Citizens in Class IIA Narcotics Correctional Institution, Bandung Regency.

Based on the data attained from questionnaires, the prison-assisted citizens who were co-infected were once injection drug users (Table 1). Injection drugs use is a risk factor for hepatitis virus infection, especially VHC. In their research, Behzadifar et al. (2018) reported that the case of as many as 53% of prison-assisted citizens infected with VHC was attributed to injection drug use. Even Kivimets et al. (2018) stated that injection drug users have a 24 times higher risk of HCV infection. In contrast to HCV, HBV infection is less affected by injection drug use. The results of the research by Ghafari et al. (2019) proved insignificant differences in HBV infection

between prison-assisted citizens who used injection drugs and those who did not.

Most of the prison-assisted citizens infected with HBV in this study had tattoos and piercings on their bodies (Table 1). The precise time the prison-assisted citizens got tattoos or piercings was not identified, but they are predicted to do so in the correctional institution. This is based on the results of interviews with the correctional institution officers who mentioned that they found sharp objects, such as small knives, nails, wire, and sharpened toothbrush handles, in the detention rooms. These tools could be used to make tattoos or piercings. Making tattoos or piercings in a

correctional institution is more vulnerable to HBV transmission because it is done with non-sterile equipment and by non-professionals (Kivimets et al., 2018). This was also proven in the study by

Viswanathan et al. (2011), which reported HBV transmission among prison-assisted citizens in the correctional institution through tattooing.

Table 1. The Characteristics of Research Samples

Variable	Total Respondent		Infected with Hepatitis B Virus		Infected with Hepatitis C Virus	
	n	%	n	%	n	%
Age (Year)						
16 – 25	7	23.3	2	28.6	0	0
26 – 35	13	43.3	2	15.4	0	0
36 – 45	5	16.7	1	20	1	20
46 – 55	3	10	0	0	0	0
56 – 65	2	6.7	0	0	0	0
Education						
Elementary school	13	43.3	0	0	0	0
Junior school	8	26.7	2	25	1	12.5
Senior school	9	30	3	33.3	0	0
Multiple sexual partners						
Yes	3	10	1	33.3	0	0
No	27	90	4	14.8	1	3.7
Use of condoms						
Yes	4	13.3	0	0	0	0
No	26	86.7	5	19.2	1	3.8
Oral						
Yes	2	6.7	1	50	0	0
No	28	93.3	4	14.3	1	3.5
Anal						
Yes	1	3.3	0	0	0	0
No	29	96.7	5	17.2	1	3.4
Blood transfusion						
Yes	2	6.7	0	0	0	0
No	28	93.3	5	17.8	1	3.5
Injection drugs						
Yes	17	56.7	3	17.64	1	5.8
No	13	43.3	2	15.38	0	0
Tattoo						
Yes	19	63.3	5	26.32	1	5.2
Np	11	36.7	0	0	0	0
Piercing						
Yes	19	63.3	2	10.5	1	5.2
No	11	36.7	3	27.3	0	0
Jaundice						
Yes	1	3.3	1	100	0	0
No	29	96.7	4	13.8	1	3.4
Hepatitis B Vaccination						
Yes	6	20	0	0	0	0
No	14	80	5	35.7	1	7.14

Apart from tattoos and piercings, one of the factors causing infection of the virus in prison-assisted citizens in this study was that they had not been vaccinated before. This result is in line with the results of previous studies (Viswanathan et al., 2011; Keten et al., 2016; Smith et al., 2017). Vaccination is an easy and effective way to prevent HBV infection (Gahrton et al., 2019). Hepatitis B vaccination can induce the body to produce anti-HBs, and thus, preventing HBV from entering the liver cells. The protective power of the vaccine can last up to five years (Naully and Romlah, 2019).

In their research, Keten et al. (2016) recounted that the number of HBV infections in prison-assisted citizens in Turkey was much lower than in those in other countries because 35% of them had received vaccinations. Therefore, Smith et al. (2017) suggest that all prison-assisted citizens who do not have good immunity should be vaccinated. In the UK, every prison-assisted citizen who has just entered prison for one month is obliged to be vaccinated, even the officials are recommended to get vaccinated (Viswanathan et al., 2011). There are several limitations in this study, one of which is the limited number of samples. It is suggested that further studies examine hepatitis B and C to use a larger number of samples. Moreover, this study only describes the number of prison-assisted citizens infected with HBV and HCV without tracing the actual generated time of infection and how they got infected. They might have been infected with HBV and HCV before entering the correctional institution. Therefore, the authorities should carry out hepatitis B and C checks for the prison-assisted citizens before they serve their sentence. The authorities of the correctional institution are also expected to improve health services for the prison-assisted citizens by providing vaccinations and conducting regular medical checks. Supervision of prison-assisted citizens' activities needs to be improved by increasing the number of correctional institution officers. Such supervision is necessary so that prison-assisted citizens do not take risky actions that can transmit the disease to other prison-assisted citizens.

CONCLUSION

Based on the laboratory tests conducted on 30 prison-assisted citizens, five (16.7%) were infected with HBV and one (3.3%) was infected with VHC. Besides, one case of VHB and VHC co-infection was found in the Class IIA Narcotics Correctional Institution in Bandung Regency.

REFERENCES

- Andriansyah, I. (2018). Dampak Penempatan Kamar Hunian Melebihi Daya Tampung yang Menyebabkan Perkelahian antar Narapidana di Lembaga Pemasyarakatan Kelas II A Narkotika Bandung (*Skripsi*). Universitas Pasundan, Bandung.
- Behzadifar, M., Gorji, H.A., Rezapour, A. & Bragazzi, N.L. (2018). Prevalence of hepatitis C virus infection among prisoners in Iran: a systematic review and meta-analysis. *Harm Reduct J* 15, 24. <https://doi.org/10.1186/s12954-018-0231-0>
- Gahrton, C., Westman, G., Lindahl, K., Öhrn, F., Dalgard, O., Lidman, C., Nilsson, L.-H., Said, K., Duberg, A.-S., & Aleman, S. (2019). Prevalence of Viremic hepatitis C, hepatitis B, and HIV infection, and vaccination status among prisoners in Stockholm County. *BMC Infect Dis* 19, 955. <https://doi.org/10.1186/s12879-019-4581-3>
- Ghafari, S., Sharifzadeh, G., Jamali, S., Taji, B., Javadmoosavi, S.Y., & Ziaee, M., (2019). Prevalence of Hepatitis B and C among Drug-Abusing Male Prisoners in Birjand, South Khorasan, Iran. *Arch Iran Med* 22, 4.
- Gupta, E., Bajpai, M., Choudhary, A. (2014.) Hepatitis C virus: Screening, diagnosis, and interpretation of laboratory assays. *Asian journal of transfusion science* 8, 19–25.
- Keten, D., Emin Ova, M., Sirri Keten, H., Keten, A., Gulderen, E., Tumer, S., Caliskan, A., & Kulotu, S. (2016). The Prevalence of Hepatitis B and C Among Prisoners in Kahramanmaraş, Turkey. *Jundishapur J Microbiol* 9. <https://doi.org/10.5812/jjm.31598>
- Kivimets, K., Uusküla, A., Lazarus, J.V. & Ott, K. (2018). Hepatitis C seropositivity among newly incarcerated prisoners in Estonia: data analysis of electronic health records from 2014 to 2015. *BMC Infect Dis* 18, 339. <https://doi.org/10.1186/s12879-018-3242-2>

- Kudesia, G. & Wreghitt, T. (2009). *Clinical and Diagnostic Virology*. Cambridge University Press, Cambridge.
- Moradi, G., Goodarzi, E., & Khazaei, Z. (2018). Prevalence of Hepatitis B and C in prisons worldwide: A meta-analysis during the years 2005-2015. *Biomed. Res. Ther.* 5, 2235–2251. <https://doi.org/10.15419/bmrat.v5i4.436>
- Naully, P.G. & Romlah, S., (2019). Deteksi Gen sHBsAg sebagai Penanda Koinfeksi Hepatitis B pada Pengidap HIV. *Jurnal Kesehatan* 10, 236–244. <https://doi.org/10.26630/jk.v10i2.1381>
- Nelwan, E.J., Van Crevel, R., Alisjahbana, B., Indrati, A.K., Dwiyana, R.F., Nuralam, N., Pohan, H.T., Jaya, I., Meheus, A., & van Der Ven, A. (2010). Human immunodeficiency virus, hepatitis B and hepatitis C in an Indonesian prison: prevalence, risk factors and implications of HIV screening: Blood-borne infections in an Indonesian prison. *Tropical Medicine & International Health* 15, 1491–1498. <https://doi.org/10.1111/j.1365-3156.2010.02655.x>
- Prasetyo, A.A., Dirgahayu, P., Sari, Y., Hudiyono, H., & Kageyama, S. (2013). Molecular epidemiology of HIV, HBV, HCV, and HTLV-1/2 in drug abuser inmates in central Javan prisons, Indonesia. *J Infect Dev Ctries* 7, 453–467. <https://doi.org/10.3855/jidc.2965>
- Ramin, A., Fatemeh, A., Seyed-Mostafa, H.-Z., Farideh, A.D., Mohammad Parsa, M., & Mahmoud, N. (2015.) Prevalence of Hepatitis B and C in Male Prisoners in Iranian Prisons in 2012. *ijtmgh* 3, 199–202. <https://doi.org/10.20286/ijtmgh-0304112>
- Rey, I., Saragih, R.H., Effendi-YS, R., Sembiring, J., Siregar, G.A. & Zain, L.H. (2018). Profile of hepatitis B and C virus infection in prisoners in Lubuk Pakam correctional facilities. *IOP Conf. Ser.: Earth Environ. Sci.* 125, 012033. <https://doi.org/10.1088/1755-1315/125/1/012033>
- Smith, J.M., Uvin, A.Z., Macmadu, A. & Rich, J.D. (2017). Epidemiology and Treatment of Hepatitis B in Prisoners. *Curr Hepatology Rep* 16, 178–183. <https://doi.org/10.1007/s11901-017-0364-8>
- Viswanathan, U., Beaumont, A., O'Moore, E., Ramsay, M., Tedder, R., Ijaz, S., Balogun, K., & Kirwan, P. (2011). Hepatitis B transmission event in an English prison and the importance of immunization. *Journal of Public Health* 33, 193–196. <https://doi.org/10.1093/pubmed/fdq083>
- WHO, 2017. *Global Hepatitis Report*. WHO, Geneva.