

## Short Communication

# Prevalence of HCV infection in a prison population of the greater Florianópolis area

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### Abstract

**Introduction:** The present study aimed to estimate the prevalence of Hepatitis C virus (HCV) infection in a prison population. **Methods:** A total of 147 individuals were interviewed and subjected to venipuncture for collection of blood sample. The study population consisted of male individuals who attended the health unit of the state penitentiary of Florianópolis. **Results:** The prevalence of HCV infection was 5.4%. Regarding behavioral variables, 95 (64.6%,  $p < 0.0507$ ) subjects reported consuming alcohol and 7 (4.8%,  $p < 0.0476$ ) reported having already used injectable drugs. **Conclusions:** The prevalence of HCV infection in the studied population was higher than that in the general populations.

**Keywords:** HCV. Prevalence. Prison. Drug injection.

Hepatitis C is a viral infection that becomes chronic in 80% of cases and may result in the development of liver cirrhosis or liver cancer<sup>1</sup>. The virus was first described in 1989 and is currently the world's leading cause of chronic liver disease. Recent estimation by the World Health Organization indicates a 1% prevalence of HCV infection in the global population, which represents approximately 71 million people infected, with 1.34 million deaths caused by consequences of the viral infection<sup>2</sup>.

Many studies have reported the prevalence of HCV, but little is known about the prevalence of the virus in the prison population. The goal of the present study was to estimate the prevalence of HCV infection in the prison population in the greater Florianópolis area. The goal of the present study was to estimate the prevalence of HCV infection in the prison population in the greater Florianópolis area. Studies such as the present study may promote the improvement and development of strategies to reduce HCV transmission<sup>3</sup>.

The participants of the present study were male subjects treated at the health unit of the state penitentiary of Florianópolis, State of Santa Catarina, south region of Brazil between March and October 2015. This penitentiary has only male inmates, and at the time of the study, the incarcerated population consisted of 979 individuals. Initially, according to our calculation of the minimum population size<sup>4</sup>, it was necessary to obtain data from 103 volunteers from the prison population; however, we chose to increase the population size, considering the possibility of withdrawals or exclusions. Thus, the population consisted of 147 subjects. Because the number of subjects may represent a study limitation, a larger population can better show the prevalence of HCV infection. This study only included male individuals who agreed to participate and signed a consent form. The subjects responded to a questionnaire, with an interviewer reading the questions aloud and transcribing the obtained answers. The present study was conducted ethically and the study protocol was approved by the Research Ethics Committee of HEMOSC (CAAE: 40296114.0.0000.0110).

The questionnaire sought to obtain the following data: age, use of injectable drugs, sharing of needles and syringes to inject drugs, and alcohol consumption. Regarding the use of injectable drugs, if the answer was yes, the interviewer asked if the individual had shared injecting equipment. In addition,

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regarding consumption of alcohol, the subject decided whether he considered himself an alcohol consumer. The researchers did not inquire the dose or the time of consumption. After the interview, the subjects were subjected to collection of biological sample through venipuncture. Blood samples were sent to the immunology laboratory of Professor Polydoro Ernani de São Thiago University Hospital, where detection of anti-HCV antibodies was carried out using a direct chemiluminescence technique on an ADVIA Centaur® XP (Siemens®).

The data obtained from the interview and the collected biological sample were tabulated in the Microsoft Excel 2016® software and then subjected to statistical analysis using the MedCalc® 14.8.1 software. Initially, the studied population was characterized by descriptive statistical analysis of the variables of interest. Afterward, the relation between the data and the frequency of positivity to HCV infection markers was verified using the Fisher's Exact Test. The level of significance was set at 0.05 and the confidence interval was 95% (95% CI).

Next, 147 serum samples were analyzed with eight reagents for anti-HCV marker. The prevalence of HCV in the study population was 5.4%. The participants' ages ranged from 18-55 years, with a mean age of 29 years (95% CI 27-31). Regarding behavioral variables, 95 (64.6%) subjects reported consuming alcohol prior to incarceration, among these, 8 subjects were anti-HCV reagents. Furthermore, 7 (4.8%) of the total number of subjects reported having already used injectable drugs, and 2 of them were anti-HCV reagent. Among the injectable drug users (IDUs), 4 (57.1%) admitted having previously shared injection material (**Table 1**).

According to a survey by the National Penitentiary Department (DEPEN), 55% of the prison population of Brazil consists of individuals between 18 and 29 years of age<sup>5</sup>. In this regard, the population profile in the present study is compatible with the prison population in the country because 53.8% of the subjects were in the age group of 18 to 29 years old.

Although the prevalence of HCV infection in Brazil is 0.7%<sup>6</sup>, the average prevalence of HCV infection among the prison population is 13.6%<sup>7</sup>. Similar records to the present study were reported in studies carried out in the city of Ribeirão Preto, State of São Paulo (8.7%)<sup>8</sup> and in the city of Manhuaçu, State of Minas Gerais (4.8%)<sup>9</sup>. The high prevalence of HCV infection found in penitentiaries reflects a high risk of transmission among this population. The risk persists despite them being arrested because the spread of the disease is facilitated by the prison conditions, such as overcrowded cells, poor infrastructure, and poor access to health services, as well as by risk behaviors such as sharing of needles or other sharp materials, making of tattoos without sterile materials, and unprotected sexual relations<sup>10</sup>.

The use of injectable drugs represents a significant mean of HCV transmission. In the present study, among HCV-positive individuals, 25% admitted having used injectable drugs. In addition, most IDUs (57.1%) stated that they had already shared an injection material to use drugs. Because the act of sharing injectable material increases the risk of transmitting infectious agents<sup>11</sup>, it is important to develop a prevention strategy to stop the sharing of these materials, either through provision of sterile materials or by treating the drug addicts<sup>12</sup>. Despite not reaching a statistical significance, another behavioral factor that tended to increase the risk of HCV infection was alcohol consumption, with all HCV-positive individuals reported consuming alcohol. The prevalence of HCV infection among alcohol users was 7 to 10 times higher than that in the general population because hepatocytes, the target cells of HCV, are also the site of alcohol metabolism. Oxidative stress caused by alcohol consumption affects virus replication and the host innate immune response, resulting in an increased susceptibility to HCV infection<sup>13</sup>.

The recent advent of direct-acting antivirals (DDA) treatment provides the opportunity to reduce the prevalence of hepatitis C in vulnerable populations, such as IDUs and prisoners. These highly effective new therapies should be prioritized for these groups because they have a considerable

**TABLE 1:** Relationship between behavioral variables and reactivity to HCV.

Variable	Number of individuals n (%)	HCV n (%)		P value*
		Not reagent	Reagent	
Alcohol consumption	147 (100%)			0.0507
No	52 (35.4%)	52 (100%)	0 (0%)	
Yes	95 (64.6%)	87 (91.6%)	8 (8.4%)	
Injectable Drug Use	147 (100%)			0.0476
No	140 (95.2%)	134 (95.7%)	6 (4.3%)	
Yes	7 (4.8%)	5 (71.4%)	2 (28.6%)	
Injection Material Sharing	7 (100%)			0.4666
No	3 (42.9%)	3 (100%)	0 (0%)	
Yes	4 (57.1%)	2 (50%)	2 (50%)	

\* Fisher's exact test.

risk of onward transmission to others<sup>3</sup>. These drugs have shown excellent efficacy with highly sustained virological response (>90%), short treatment duration (8 or 12 weeks), and good safety<sup>14</sup>.

The prevalence of HCV infection in the studied population was higher than that in the general population. Furthermore, drug injection showed a significant statistical relation to HCV infection markers. Imprisonment can be an opportunity to assist some of the vulnerable populations that often do not have access to health services. The benefits can favor the society at large because the prison population is dynamic and most prisoners return to their community and social lives after their sentence has been served, increasing the risk of disease transmission. In this regard, studies such as the present study are important to show the reality in these populations and to corroborate in the fight to eradicate HCV.

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#### Conflict of Interest

The authors declare that there is no conflict of interest.

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