Prevalence of anti-HCV in an inmate population

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Summary

Objective: To estimate the prevalence of hepatitis C using a rapid hepatitis C virus (HCV) test in an inmate population from the countryside of Rio Grande do Sul, Brazil. **Methods:** Through a descriptive study, 195 inmates were evaluated by random sampling. **Results:** A total of 9.7% of the inmates were positive. In this analysis, the variable injectable drug use was predictive of HCV infection. **Conclusion:** The high prevalence of positive serology for HCV observed among the inmates is of particular concern, as it is much higher than in the general population. Therefore, it is necessary to conduct specific approach campaigns to gather more information on infectious diseases in prison settings, as well as to provide appropriate treatment to prevent viral dissemination.

Keywords: Hepatitis C; prisons; prevalence; risk factors.

Study conducted at Universidade de Santa Cruz do Sul
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Submitted on: 02/08/2012
Approved on: 05/28/2012

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Conflict of interest: None.

Introduction

Hepatitis C virus (HCV) infection has a worldwide distribution, with high prevalence rates in prisons, where the disease is increasingly disseminated among inmates. The inmate population is considered as high risk for infections related to confinement conditions, including HCV. The prevalence rates found in several studies of inmates are high, ranging from 3.1% to 52%, which is of particular concern[1-7].

Chronic HCV infection is a worldwide public health problem, as it progresses slowly, with the risk of causing chronic liver disease, cirrhosis, and even hepatocellular carcinoma[6,8]. It has been estimated that approximately 170 million people (3% of the world population) are infected; in Brazil, the estimates are few, ranging between 1.5% and 10%. Population-based and blood donor-based studies revealed prevalence rates lower than those estimated, classifying Brazil as low endemicity[9-11].

HCV is transmitted mainly through the parenteral route, by sharing blood-contaminated materials. The use of illicit drugs, tattoos, occupational exposure, inmate populations, and sharing of personal items such as manicure nail pliers and shaving razors are considered significant risk factors[8,10,12].

The impact of HCV infection is not restricted to inmate populations; it is disregarded and needs specific approaches regarding the epidemiological profile[3,6,13]. Thus, this study aimed to estimate the HCV prevalence using a rapid test in an inmate population in the countryside of the state of Rio Grande do Sul, Brazil, as well as to identify the epidemiological characteristics related to HCV infection.

Methods

A descriptive inquiry study was conducted at the Regional Penitentiary of Santa Cruz do Sul (PRSC), from November, 2010 to November, 2011. PRSC is a small detention facility, which houses 386 inmates in closed and 159 in semi-open regime. However, this study included only closed-regime inmates.

The sample size calculation was performed using Epi Info software 6.0, based on the 6% prevalence of anti-HCV (determined by a pilot study), using a standard error of 2 percentage points, 99% confidence level, and 10% for losses and refusals. The study participants were selected by simple random selection, using the list provided by the prison administration. All those who chose to participate read and signed an informed consent, and were interviewed after answering an epidemiological questionnaire.

The variables analyzed were: gender, age, marital status, educational level (according to years of schooling), skin color, injectable drug use, alcoholism, blood transfusion (before 1993), homosexual relations, liver disease, and presence of tattoos. To investigate the prevalence of anti-HCV, the qualitative immunoassay test HCV Rapid Test Bioeasy (ROCHE®) was used, with 100% sensitivity and 99.4% specificity for detection of specific anti-HCV antibodies in whole blood samples. The test results were analyzed according to the manufacturer's instructions.

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) software, release 18.0. Descriptive statistics and bivariate comparisons were performed. In the bivariate analyses, the chi-squared (c^2) or Fischer's exact test were used to verify the presence of associations between data for differences of proportion. Differences were considered significant if the p-value did not exceed 0.05. This study was approved by the CEP/UNISC, under protocol number 2696/10. All ethical principles contained in resolution 196/96 of the National Health Council were followed.

Results

A total of 195 individuals were tested, representing 50.5% of those who were sentenced to the closed regime. There was a prevalence of anti-HCV of 9.7%. Table 1 shows the demographic characteristics of prison inmates. The mean age of the tested individuals was 33 years (± 10.4), ranging from 19 to 69 years. 16 (8.2%) inmates reported having had a blood transfusion prior to 1993, and five (2.6%) reported homosexual relations.

Table 2 presents the risk variables related to HCV infection. Of the 9.7% of inmates with positive anti-HCV result, 38.9% reported using injectable drugs ($p < 0.0001$), and 13.8% had tattoos ($p = 0.05$), acquired before or after incarceration. The use of illicit drugs was considered a risk factor for hepatitis C infection in this study.

Discussion

Inmate populations are characterized by marginalization and drug use, especially illicit drugs. These characteristics, combined with the poor conditions of imprisonment, including overcrowding in Brazilian prisons, result in a high prevalence of infectious and contagious diseases, such as hepatitis C[14].

The study population was characterized by young individuals, i.e., 70.8% aged between 18 and 38 years. This fact was also observed in other studies with inmate populations[5,6]. The age of the diagnosed individuals ranged between 30 and 59 years of age.

The anti-HCV positive population was predominantly male; the same has been observed in studies by other authors[5,6,14]. According to data from the Epidemiological Report of Viral Hepatitis, confirmed cases of hepatitis C between 1999 and 2009 reached a total of 60,908. Of these, 37,147 (61.0%) cases were males[10]. It is noteworthy that the vast majority of inmates are men, a fact that relates to their higher HCV prevalence.

Table 1 – Sociodemographic characteristics of the studied inmate population of the Presídio Regional de Santa Cruz do Sul, Brazil

Variables	n = 195	%
Gender		
Male	179	91.8
Female	16	8.2
Age (years)		
18-38	138	70.8
39-49	42	21.5
> 49	15	7.7
Skin color		
White	120	61.5
Non-white	75	38.5
Marital status		
In a relationship	87	44.6
Single	108	55.4
Schooling		
High school (incomplete/complete)	138	70.8
College (incomplete/complete)	52	26.7
Illiterate	5	2.6

The prevalence of positive serology for anti-HCV found in this study population was 9.7%, characterizing this population as high-risk, whereas the prevalence of hepatitis C in the general population in Brazil is 1.5%. The finding of higher rates of positive serology among inmates than in the general population is probably due to the problems related to risk factors, which are higher in this population. This finding is similar to those in the studies described in Table 3.

A study conducted in the Penitentiary of Ribeirão Preto, in the state of Sao Paulo, showed a prevalence of HCV of 8.7% among male inmates; the main risk factors were age > 30 years, presence of tattoos, and injectable drug use with shared needles[2]. A similar prevalence (8.5%) was observed in a study performed in São Paulo with the homeless population; of these, 50% were injectable drug users, and 17.1% reported having been inmates[1]. A study conducted in Pakistan by Kazi et al. demonstrated a prevalence of 15.2% of positive serology for HCV, which confirms that prisons are places predisposed to the transmission of infectious diseases[15].

Conversely, in the study by Nasir et al., the prevalence of HCV was 36.6% in the Afghanistan[5], while in the city of Tehran, in Iran, a prevalence of 52.0% was observed in the inmate population in 2004[7]. Latimer et al. found a prevalence of 69.2% of HCV infection in a prison in the city of Baltimore[4]. The high prevalence rates observed in

Table 2 – Studied variables regarding the risk behavior for HCV infection in the inmate population at the Presídio Regional de Santa Cruz do Sul, Brazil

Variables	n = 195	HCV positive	%	OR	95 CI%	p
IDU						
Yes	18	7	38.9	8.75	2.51-30.5	< 0.0001
No	177	12	6.8			
Tatoo						
Yes	109	15	13.8	3.35	0.99-12.48	0.05
No	86	4	4.7			

HCV, hepatitis C virus; IDU, injectable drugs user; OR, odds ratio; CI, confidence interval.

Table 3 – Anti-HCV antibodies prevalence in inmate populations in Brazil

Author/year	City/state in Brazil	HCV+ (%)	Tatoo (%)	IDU (%)
Da Rosa et al., 2012* (n = 195)	Santa Cruz do Sul – RS	9.7	13.8	38.9
Santos et al., 2011[17] (n = 422)	Aracaju – SE	3.1	46.2	20.6
Gabe e Lara, 2008[3] (n = 76)	Novo Hamburgo – RS	14.5	—	—
Coelho, 2009[2] (n = 333)	Ribeirão Preto – SP	8.7	19.2	8.5
Brito et al., 2007[1] (n = 330)	São Paulo – SP	8.5	13.3	17.1
Gonçalves, 2005[16] (n = 270)	Goiás – GO	14.8	80	37.5

*Present study; HCV, hepatitis C virus; IDU, injectable drugs user.

several studies are due to the fact that these populations belong to a group that has higher social vulnerability.

Regarding the frequency of risk behaviors, it was observed that 38.9% ($p < 0.0001$) of patients that were HCV-positive reported injectable drug use. In the study by Gonçalves, in a male prison in the state of Goiás, there was a similar proportion of injectable drug use (37.5%) among the inmates that were HCV-positive[16]. Santos et al. found a prevalence of HCV among injectable drug users of 20.6%[17]. Hennessey et al. reported that the use of illicit drugs is the main contributor to high risk for HCV infection[18]. These results are consistent with data from the Brazilian Ministry of Health, which reported injectable drug use as the main route of HCV transmission among documented cases[10]. Thus, the performance of systematic screening, as well as prevention campaigns inside prisons, are essential, as it is estimated that seven million inmates are released annually from prisons and correctional institutions[4].

Regarding the presence of tattoos, the study by Gonçalves has shown that 80% of anti-HCV positive inmates had been tattooed[16]. In this study, the presence of tattoos was observed in 15 (13.8%) anti-HCV positive inmates ($p = 0.05$). The number of tattoos and place where the tattooing was performed (inside or outside the prison) were not evaluated in this study; however, Gonçalves reports that having tattoos made in prison without the use of sterile materials is a very common and frequent practice among inmates, which may be a risk factor associated with increased prevalence of anti-HCV among them[16]. Peña-Orellana et al. also reported that almost 60% of inmates had had tattoos inside the prison[6].

Conclusion

In conclusion, it can be observed that the prison environment provides epidemiological data on a population considered to be high-risk when compared to the population in general for the dissemination of hepatitis C. In this study, 9.7% of the tested inmates were anti-HCV positive, and injectable drug use was a predictor for HCV infection. Therefore, it is necessary that health teams, together with prison officials, promote campaigns on counseling, prevention, control and diagnosis of hepatitis C, supporting the development of individual and collective interventions in order to provide updated information to carriers and thus reduce the rate of infection in this population.

Acknowledgements

To the Administration of the PRSC, for their participation and support, which allowed this work to be carried out. The authors would also like to thank inmate Dieno Duarte de Amaral and nurse Silda Michels, for their invaluable help in this work.

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