

Intravenous drugs abuse as the main risk factor of increasing hepatitis C infection prevalence in prisoners in Zenica, Bosnia and Herzegovina

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ABSTRACT

Aim To determine the prevalence of hepatitis C virus infection (HCV) among prisoners in Zenica prison, and to investigate the relation between HCV and risky behaviors: intravenous drugs use (IDU), tattooing, promiscuity.

Methods This cross-sectional study conducted at the High Security Penitentiary in Zenica involved 200 convicted persons who gave their consents for the research. Their blood was tested by AraGen Hepatitis C Test. Risky behaviors (IDU, tattooing, promiscuity) were tested by an anonymous self-administered questionnaire.

Results The prevalence of HCV was 13% (26/200). There was a statistically significant correlation of HCV infection and drug abuse before imprisonment ($p=0.00$), injection drug abuse before imprisonment ($p=0.00$), tattooing in prison ($p=0.03$) and having sex with homosexual partners ($p=0.00$).

Conclusion The prevalence of HCV in prisoners at Zenica prison was significantly higher than in the general Bosnia and Herzegovina population. Intravenous drugs use had highest risk for HCV infection among prisoners.

Key words: tattooing, homosexuality, substance abuse

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Original submission:

26 September 2016;

Revised submission:

05 December 2016;

Accepted:

08 December 2016.

doi: 10.17392/880-16

INTRODUCCION

An estimated world prevalence of hepatitis C virus (HCV) infection is 2-3% and each year more than 350,000 people die of HCV-related conditions, e.g. cirrhosis and liver cancer (1). The number of reported cases of HCV in European Union increased from 4.3 per 100.000 inhabitants in 1995 to 6.9 per 100.000 inhabitants in 2007 (27,000 - 29,000 new diagnoses/year) (2). Prisoners have a higher risk of HCV infection than the general population (3); depending on the prison system, 3.1-38% of prisoners have HCV (4). Nowadays, the highest number of newly infected persons with hepatitis C virus is found within the group of intravenous drug addicts (5).

A prevalence of viral hepatitis C in the general population in Bosnia and Herzegovina (BH) is estimated to 1-2.4 %. According to the data of the Ministries of Health of the Federation of BH and Republika Srpska there are around 55.000 persons infected with HCV (6). Earlier research conducted in prisons in Bosnia and Herzegovina found the HCV prevalence ranging from 5% in Banja Luka to 8% in Tuzla (7). In 2009 the prevalence of HCV in the Penitentiary in Zenica was 6% (8). The prevalence of HCV infection is rising worldwide (2), and updating of information on prevalence of HCV is crucial for effective interventions to prevent HCV infection and efficient planning of health-care of this population.

The aim of the study was to determine the HCV prevalence in persons serving their imprisonment sentences in the Penitentiary in Zenica and to investigate a relation between HCV and risk behavior (intravenous drug abuse, tattooing, promiscuity).

EXAMINEES AND METHODS

Study design

The study included prisoners at the High Security Male Penitentiary in Zenica, who voluntarily and anonymously participated in the research. The research was conducted in the period between 24 June and 19 July 2013, when a total of 765 persons served their imprisonment sentences. The research included 200 convicts (26% of the total number of convicts), who had given their consents. Inclusion criteria comprised convicted persons who were older than 18 and persons

whose imprisonment sentence was longer than 2 months. Exclusion criteria: failure to cooperate during the research.

The research was conducted as an average epidemiological study approved by the Ministry of Justice of the Federation of Bosnia and Herzegovina.

Methods

The examination was voluntary and anonymous. Questionnaires and blood samples were coded.

The modified questionnaire of the Global Fond (9) was a research instrument used to examine socio-demographic characteristics of prisoners, knowledge, view and behavior before and during imprisonment. The examinees' blood was tested for HCV with AraGen Hepatitis C Test (Morgan Hill, California, USA) in the Section of Healthcare of the High Security Penitential Institution of Zenica.

AraGen Hepatitis C Test is a rapid (point-of-care) enzyme immunoassay (EIA) diagnostic test that does not require laboratory infrastructure or highly qualified professional staff and is used for screening in non-clinical conditions (10). This test detects anti-HCV antibodies against recombinant HCV proteins (11) and may be used as first line screening for hepatitis C (12), and therefore, absence of anti-HCV of AraGen screening test was taken as a criterion of a negative result (13). Since rapid tests are not specific enough, the Centre for Disease Control and Prevention (CDC) has recommended that a person be considered to have serologic evidence of HCV infection only after an anti-HCV screening-test positive result has been verified by a more specific serologic test (14).

Respondents whose tests were positive were examined by an infectious disease specialist at the Cantonal Hospital Zenica for further diagnosis (ELISA and PCR testing) and treatment.

Statistical analysis

Standard methods of descriptive statistics (measures of central tendency and dispersion), Pearson's χ^2 test for determination of statistically significant differences between some characteristics of samples given in non-parametric form were used. Non-parametric Spearman's correlation test was used for the analysis of correlations. Values $p < 0.05$ were considered statistically significant.

RESULTS

The research included a total of 200 male examinees of average age 32.32±8.37 years: 102 (51%) were 18-30 years of age, 68 (34%) were 31-40 years of age, 23 (11%) were 41-50 years of age, five (3%) were 51-60 years of age and two (1%) were older than 60 years.

Two thirds of examinees completed secondary school, 123 (61.5%), while one third of them, 58 (29.0%) completed only primary school, and nine (4.5%) examinees had no formal education. There were 111 (55.5%) unemployed and 80 (40.0%) employed examinees. Total of 136 (68%) examinees were convicted to imprisonment sentences longer than 3 years, and 90 (45%) examinees served their imprisonment sentence for the first time. The highest number of examinees were married or lived in a common law marriage, 95 (47.5%), 74 (37.0%) were single and 31 (15.5%) divorced or widowers.

The HCV test was positive in 26 examinees resulting in the prevalence of HCV in Zenica Penitentiary of 13.0%. The examinees positive to hepatitis C had an average age of 32.31±7.71 years, 50% were younger than 30 years of age.

There was a statistically significant correlation of the infection with HCV and drug abuse before prison (p=0.00), injection drug abuse before prison (p=0.00), tattooing in prison (p=0.03) and having sex with homosexual partners (p=0.00).

Injection drug abuse in prison (p=0.08), tattooing before prison (p=0.19), self-injury in prison (p=0.08), having sex with a permanent partner without condoms (p=0.89), having sex with accidental partners (p=0.09) were not statistically significantly in relation to HCV infection (Table 1).

Among the examinees whose tattoos were made in prison (12.5%) tattooing in prison significantly raises the risk of contracting HCVI (p=0.032). Of the total number of examinees, 63 (31.5%) committed self-injury, 12 (6.0%) were tested positive to HCV. Self-injury is mainly done with used shaving tools, and most commonly among intravenous drug users.

Our study has found that 84.5% of examinees had sex with permanent partners without condoms, and 75.5% had sexual relationship with an accidental partner with no statistically significant difference of the distribution of positive HCV

Table 1. Risk behavior and HCV infection in Zenica Penitentiary

Question	Answer	HCV-	HCV+	p
		No (% of total number)	No (% of total number)	
Drug abuse before prison	No	89 (44.5)	2 (1.0)	0.00
	Yes	85 (42.5)	23 (11.5)	
Abuse of injection drugs before prison	No	136 (68)	7 (3.5)	0.00
	Yes	38 (19.0)	19 (9.5)	
	No	112 (56)	23 (11.5)	
Abuse of injection drugs in prison	I don't want to answer	58 (29)	0 (0.0)	0.08
	Yes	4 (2.9)	3 (1.5)	
Tattooing before prison	No	51 (25.5)	4 (2.9)	0.19
	Yes	103 (51.5)	17 (8.5)	
Tattooing in prison	No	51 (25.5)	4 (2.0)	0.03
	Yes	35 (17.5)	10 (5.0)	
Self-injury in prison	No	123 (61.5)	14 (7.0)	0.08
	Yes	51 (25.5)	12 (6.0)	
Sexual relationship with permanent partner without condoms	No	23 (11.5)	3 (1.5)	0.89
	I don't want to answer	3 (1.5)	2 (1.0)	
Sexual relationship with accidental partner	Yes	148 (75.9)	21 (10.8)	0.09
	No	35 (17.5)	2 (1.0)	
Sexual relationship with homosexual partner	I don't want to answer	12 (6.0)	0 (0.0)	0.00
	Yes	127 (63.5)	24 (12.0)	
Sexual relationship with homosexual partner	No	153 (76.5)	13 (6.5)	0.00
	I don't want to answer	6 (3.0)	12 (6.0)	
	Yes	15 (7.5)	12 (6.0)	

test. Moreover, 13.5% examined prisoners stated that they had had sex with a person of the same sex and this study confirms that having this type of sexual relations in a closed community influences the positive result of hepatitis C.

DISCUSSION

Prevalence of HCV infections among the convicts at the High Security Penitentiary in Zenica, using the AraGen Hepatitis C Test screening test was 13%. It was 6-13 times higher when compared with estimated prevalence among general population of Bosnia and Herzegovina in 2005 (6), and 2 times higher than HCV occurrence in the same institution (6%) (8), which corresponds to the global rise of HCV prevalence (2). An increased risk of HCV occurrence in this population includes drug abuse before prison, injection drug abuse and tattooing in prison and having sex with homosexual partners.

Prisoners have a higher risk of HCV infection (15), prevalence varying from 20.7% in some American prisons to 28% in Canadian prisons; it is higher in prisoners with the history of intravenous drug abuse (16-22). Hepatitis C European Network for Co-operative Research (HENCORE) reported that the prevalence of hepatitis C in intravenous drug

users was over 80% (23). Twenty percent of new infections worldwide are a consequence of intravenous drug abuse, and most chronic infections, especially in developed countries, are attributed to intravenous drug abuse (24).

A dominant factor for spreading of HCV infection in prisons is intravenous drug abuse (25-28). The highest HCV prevalence in intravenous drug user prisoners was found in Iran (88.9%) (29) and Denmark (87%), where the frequency of hepatitis C is 100 times higher in prisons when compared with general population (30).

Tattooing is connected with HCV infection even among those who have no traditional risk factors (31). Prevalence of tattooing has significantly increased in the last ten years (32). Tattooing in prison is of special importance in terms of transmission of blood infections, because tattooing is usually done using unsterile tools (paper clips, sewing needles etc.) (31). In Canadian prisons 12 to 25% of HCV infections are related to tattooing among prisoners in comparison with 6% among the general population (33). In prisoners who were not intravenous drug users in Puerto Rico, USA, 60% of prisoners had a tattoo and 12% of those were HCV infected (34). Examinees in high security prisons such as the High Security Penitentiary in Zenica made their tattoos more frequently in prison than those in semi-open prison facilities (15). The lower prevalence of HCV positivity in those who made tattooing before a prison shows a trend of tattooing with sterile tools.

Self-injury is common auto-destructive behavior of persons serving their imprisonment sentences (35) and it represents a significant predictor of HCV infection in persons serving imprisonment sentences (35).

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The role of sexual activity in the transmission of HCV remains unclear. A cohort study from the USA (2,653 persons) confirms that sexual transmission is still rare, but it is higher for those with risk behaviors such as unprotected intercourse and/or sex with accidental partners (23). Data of the CDC Department for Viral Hepatitis have shown that in 2003 13% of patients with acute HCV infection had anamnestic data on sexual exposure without the presence of other factors (36). In a research conducted in Canada, after the exclusion of intravenous drug users, seroprevalence in men who had sex with other men was only 0.3%, which is lower than seroprevalence of hepatitis C among general population of Canada (0.8%) (37). Data on prevalence of sexual activities in prisons should be interpreted with caution due to embarrassment of being identified as homosexuals (38).

The first step to reduce the spread of HCV infections in prisons is the screening for anti-HCV, and defining the prevalence and incidence in prison. It would be useful to screen all newcomers to prisons for HCV. It is necessary to intensify educational interventions among prisoners and staff about hepatitis C epidemiology. Raising awareness about risks of tattooing in prisons and consequences of unprotected sex is an imperative. Providing toiletries (especially condoms), heightening vigilance to prevent tattooing and intravenous drug use, providing opiate replacement therapy for drug users could help in the prevention of HCV infection.

FUNDING

No specific funding was received for this study.

TRANSPARENCY DECLARATION

Competing interests: None to declare.

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Intravenska zloupotreba droga kao osnovni uzrok povećane prevalencije hepatitisa C u zatvorenika Kazneno-popravnog zavoda Zenica

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SAŽETAK

Cilj Utvrditi prevalenciju infekcije hepatitisa C (HCVI) u osoba na izdržavanju zatvorske kazne u Kazneno-popravnom zavodu Zenica, te povezanost između HCVI-a i rizičnih ponašanja (intravenska upotreba droga (IUD), tetoviranje, promiskuitet).

Metode Presječna studija, provedena u Kazneno-popravnom zavodu Zenica, uključila je 200 zatvorenika koji su dali pristanak za istraživanje. Uzorak krvi je testiran pomoću testa AraGen Hepatitis C. Rizična ponašanja (IUD, tetoviranje, promiskuitet) su ispitana odgovarajućim upitnikom.

Rezultati Zabilježena je prevalencija HCVI 13% (26/200). Nađena je statistički signifikantna povezanost između HCVI-a i injekcijskog korištenja droga prije izdržavanja kazne ($p=0.00$), tetoviranja u zatvoru ($p=0.03$) i spolnih odnosa s istospolnim partnerima ($p=0.00$).

Zaključak Prevalencija HCVI-a u osoba na izdržavanju kazne u Kazneno-popravnom zavodu Zenica je značajno viša u odnosu na opću populaciju u Bosni i Hercegovini. Intravenska upotreba droga predstavlja najznačajniji faktor za HCVI u zatvorenika.

Ključne riječi: tetoviranje, homoseksualnost, intravenska zloupotreba droga