

Original Article

Hepatitis C in several risk groups of Kosovo

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Abstract

Introduction: Infections with hepatitis C are on the rise. The statistics on the general population of Kosovo infected with hepatitis C is lacking. The study tends to detect sero-prevalence in the following risk groups: haemodialysis patients; patients of surgical units, internal medicine units, and mental health units; HIV-diagnosed patients, health professionals, and women in the prenatal period. A number of institutions, providers of medical care to these groups' patients, have been targeted.

Methodology: A total of 378 samples were collected from various institutions, with 347 of them being tested for anti-HCV and 31 being tested for RT-PCR assays.

Results: From the total of 387 samples, 72 samples (19.05%) resulted positive. The highest number was recorded in haemodialysis centres. In other groups, a low prevalence was recorded.

Conclusions: The study can conclude that high prevalence of HCV infection still remains a major health problem, especially in haemodialysis centres. In the future, it is planned to expand the study in the future to include other risk categories or the entire population.

Key words: Hepatitis C; haemodialysis; surgery; internal medicine; mental health; HIV; health professionals.

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Introduction

Globally, morbidity and mortality caused by hepatitis C virus (HCV) infection is on the rise. More than 14 million people are affected by hepatitis C infection in European region, according to a World Health Organization (WHO) data from last year [1]. The global HCV prevalence is 2.5%, ranging from 2.9% in Africa to 1.3% in the America, with a global viremia rate of 67% (118.9 million HCV RNA positive cases), ranging from 64.4% in Asia to 74.8% in Australia [2]. HCV prevalence in Europe is estimated to be around 1.7%, with about 13 million cases, with the lowest prevalence (0.9%) reported from Western Europe (except for some rural areas in southern Italy and Greece) and the highest prevalence (3.1%) reported from Central Europe, specifically Romania and Russia [3].

HCV caused 333,000 fatalities in 1990, 499,000 in 2010, and 704,000 in 2013, according to research estimates from the Global Burden of Disease [4,5]. Cirrhosis of the liver, hepatocellular cancer, and liver failure are all cases that result in death as a result of HCV complications [6].

The primary mode of transmission is through the blood, and since the widespread screening of blood donors, the chance of HCV infection as a result of blood

transfusion or organ donation has dropped to one infected person per 100,000 [7]. HCV, however, continues to spread in many countries through the transfusion of untested blood. HCV has been found in haemodialysis patients, with anti-HCV positivity rates ranging from 1 to 70% (depending on the nation) [8]. It is worth noting that the prevalence of anti-HCV positive patients in long-term dialysis wards in northern Europe is less than 5%, about 10% in most of Southeast Europe and the United States, and about 10-70% in many developing countries such as Africa, northern Asia, and southern America [9]. Needle piercing, unsafe injection, and inadequate sterilization of infected medical equipment are ways of spreading HCV infection in health facilities in industrialized countries, and they continue to be the main route of HCV transmission to poor regions of the world [10]. As a result of percutaneous injury, approximately 16,000 health care personnel worldwide became infected with HCV in 2000 [10]. In affluent nations, the biggest risk of HCV infection is linked to the use of intravenous drugs and the replacement of contaminated needles, with this form of transmission accounting for around 60% of new HCV infections [11]. Needle drug users can also spread the infection by sharing drug-dispensing devices [12]. Other routes of transmission

include the use of tattoos, piercings, and acupuncture, all of which have contributed to HCV's spread. HCV can also be transmitted from one person to another through sexual contact. During pregnancy and childbirth, vertical transmission (mother-child) occurs at a rate of roughly 4% [13].

Kosovo has a population of 1.7 million people, according to the Kosovo Agency of Statistics [14]. In Kosovo, information on HCV infection is lacking. There are no data on the prevalence of HCV in the general population that authors are aware of. The absence of information on the prevalence of HCV virus infection in the general population and at-risk groups is a signal that more research is needed.

Through studying vulnerable groups, a realistic image of the hepatitis C epidemiology model in Kosovo can be presented. Haemodialysis patients, surgical wards, internal medicine wards, and mental health wards patients, HIV-diagnosed patients, health professionals, and women in the pregnant period will all be included in the study. Advocacy in responsible policy-making bodies, strengthening strategies for testing the population with indication and also health professionals focusing on avoiding HCV infections, strengthening hepatitis C screening service plans, and so on will be the research's contribution. Government agencies can use research suggestions to build national hepatitis policies, preventive initiatives, and treatment protocols.

Methodology

Study design

Data on healthcare services and systems is readily available from the Kosovo Statistical Agency [14]. Nonetheless, part of the data is from 2017 and others are from 2019. Furthermore, data on the number of visits to hemodialysis centers exists, but not on the overall number of patients undergoing hemodialysis. As a result, it was not possible to determine the overall number of patients that fell into the hepatitis C risk categories. Therefore, the sample was calculated using the total population of Kosovo, which, according to the Kosovo Statistical Agency, is estimated to be 1,782,115 as of December 31, 2019. With a 95% confidence level and a 5% confidence interval, the sample size for the total population of 1,782,115 is 384. The primary goal was to gather 384 blood samples from 5 institutions with the highest number of patients from high-risk groups. A handful of samples were destroyed during the testing phase, resulting in a total of 378 samples for analysis.

Ethical approval

Leaders of institutions were fully informed, and they were also given the ethical permission by the ethical board. Sampling was carried out by the employees of institutions under the authority of the institution's head. In only one facility the personnel asked the patients if their partners were infected and if they were receiving intramuscular and intravenous treatment. That was done to acknowledge a theory about transmission routes. All of the patients were asked to give their consent, and those who refused were removed from the trial.

HCV detection method

The Elecsys Anti HCV II assay is an in vitro diagnostic test for detecting hepatitis C virus (HCV) antibodies in human serum and plasma [15]. Immunoassay electrochemiluminescence “ECLIA” is the method of work. Anti-HCV tests can be performed alone or in combination with other tests (e.g., HCV RNA) to detect HCV infection and identify infected individuals' blood and blood products. Samples that were taken from the HIV patients, were tested with PCR test. Kits that were used for those tests are SACACE.

Statistical analyses

All statistical analyses were undertaken using SPSS computer software (version 25, SPSS Inc., USA).

Results

A total of 52 (69.3%) of the 75 cases included from the first health care institution were found to be positive, while 23 (30.7%) were found to be negative. Positive cases are 37.3% male and 32% female when broken down by gender, whereas negative cases are 14.7 % male and 16% female.

In terms of vocations, 25.3% of positive cases are housewives, 14.7% are physical workers, 9.30% are unemployed, 5.3% are retired, 4% are teachers and 4% are nurses, 2.7% are miners, and 1.30% are agronomists, farmers, and economists. The study also included medical technicians who work in the haemodialysis facility, however all of them came back negative.

In the second health-care facility, out of 150 cases, 63 (42%) were female and 87 (58%) were male. After the testing, 11.3% of the 150 patients (6% of the male gender and 5.3% of the female gender) tested positive for anti-HCV. The percentage of instances that were found to be negative was 88.7% (36% male and 52.7% female).

From the total number of cases in second institution, 5 cases (3.30%) were retired, 5 cases (3.30%) were housewives, 4 cases (2.70%) were unemployed, 1 case (0.70%) was a teacher, 1 case (0.70%) was a farmer, and 1 case worker, were among the total number of patients in the second institution. It should be mentioned that a significant proportion of individuals refused to divulge their occupation.

The study only comprised the unit of Obstetrics and Gynaecology at the third health care facility, where 71 blood samples from pregnant women were taken. All of the tests turned out to be negative. It should be emphasized that the study comprised 17 instances of 15 to 24 years old women, 37 cases of 25-34 years old women, 15 cases of 35-44 year old women, and two instances of 45-54 year old women.

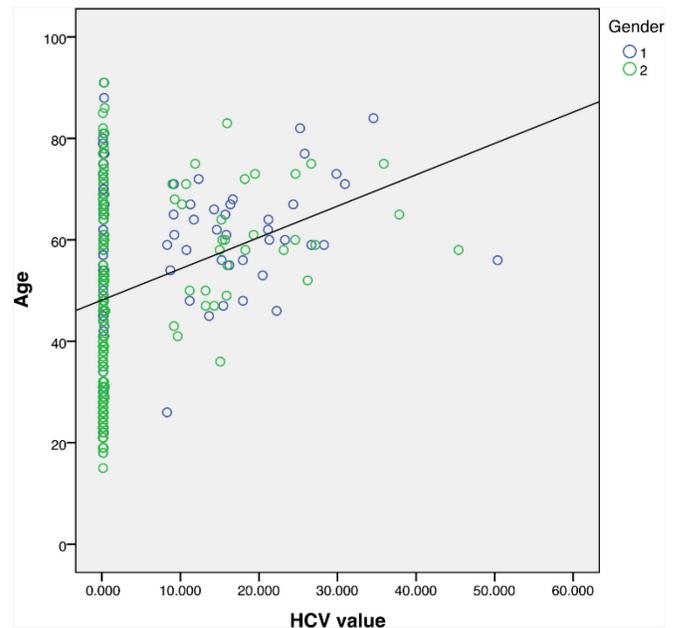
When the women in the study were asked if and how often they used intravenous or intramuscular medications, just 1.4% said they used these methods. In terms of determining transmission routes, this is intriguing. Furthermore, all of the respondents said no to the question of whether the spouse had a communicable disease. As a result, the concept that asymptomatic hepatitis C virus cases exist among pregnant women was proven to be false in our case.

A total of 51 people responded from the fourth institution, with 39 (76.5%) females and 12 (23.5%) males. Only 2% of the instances were positive, and they were both retired males.

A total of 31 samples of fifth institution were also included in a study. There were 27 (87.1%) males and 4 (12.9%) females among the 31 HIV positive respondents tested with RT-PCR [16] for Hepatitis C at Kosovo National Health Institute (the fifth institution). Only 6.5% of them, all males, were infected with HCV.

Pearson Correlation, which assesses the degree of linear association between two variables, was used to determine the correlation between qualities. The Pearson Correlation Coefficient is represented by the

Figure 1. Correlation between anti-HCV antibody, age and gender.



letter "r" and ranges from -1 to 1. The anti-HCV antibody value, age, and gender are the first three correlations given, as presented in Table 1. According to [17], the diagnostic threshold for determined the most appropriate value to be 12.27.

The Pearson correlation coefficient between anti-HCV antibody levels and age is 0.283, indicating that these two factors have a decent association. As a result, one may assume that as one's age increases, so does the value of anti-HVC antibodies.

The Pearson correlation coefficient for anti-HCV antibody value and Gender, on the other hand, is -0.352, indicating a strong negative correlation between the two variables. Negative correlation occurs when one variable rises or falls as the other rises or falls. Men have the lowest value (-0.205) in this case, which is coded with number 1, and women have the highest value (-0.352) in this situation, which is coded with

Table 1. Correlation between anti-HCV antibody value, age and gender.

	Anti-HCV antibody Value	Age	Gender
Anti HCV Value			
Pearson Correlation	1	0.283**	-0.205**
Sig. (2-tailed)		0	0
N	347	347	347
Age			
Pearson Correlation	0.283**	1	-0.352**
Sig. (2-tailed)	0		0
N	347	347	347
Gender			
Pearson Correlation	-0.205**	-0.352**	1
Sig. (2-tailed)	0	0	
N	347	347	347

number 2, as shown in Figure 1. Based on these findings, it can be deduced that anti-HVC antibody levels rise with age in men; the older a male gets, the greater his anti-HVC antibody levels get.

Another correlation that has been calculated is the one between anti-HCV antibody value and alanine aminotransferase (ALT) as presented in Table 2 and Figure 2, with $\alpha = 0.05$ taken for significance evaluation.

The number of findings is 225, and the Pearson Correlation Coefficient for anti-HCV antibody value and ALT is 0.109, showing that these two variables have a poor relationship. Furthermore, value of $p = 0.104$ indicates that the test is not significant (so there is no significant relationship between anti-HCV antibody Value and ALT).

The same conclusion can be drawn from the Table 3 association between anti-HCV antibody value and aspartate aminotransferase (AST) value. The total number of results is 225, yet the Pearson Correlation Coefficient for anti-HCV antibody Value and AST is 0.081, showing a weak connection between the two variables. On the other hand, $p = 0,224$, greater than α , concluding that the test is not significant (i.e. there is no significant relationship between anti-HCV antibody Value and AST).

Discussion

From the total of 378 samples that were tested from different health care institution (including different units among them), 72 samples (19.05%) resulted positive.

In first haemodialysis unit from 75 cases, 52 of them or 69.3% resulted positive, while 23 of them or

30.7% resulted as negative and in second haemodialysis unit from 60 patients, 23.3% were positive and 76,6% were negative.

Meanwhile, in the population of persons infected with HIV-AIDS, a low incidence of hepatitis C was found. Of these 31 HIV-positive cases, tested by RT-PCR for hepatitis C at the National Institute of Public Health of Kosovo, 6.5% resulted also infected with HCV. In the Surgery unit, a total of 14.7% patients were involved, and 13.3% were negative and 1.3% positive, the psychiatry unit with an inclusion of 2.7%, where all participants were negative, while the Internal Medicine unit with an inclusion of 32.7%, and from them were 32% negative and 0.7% positive.

Furthermore, the study involved also gynaecology and obstetrics units in different health care institution. From 86 cases that were tested for anti HCV in those institutions, none of them resulted positive.

For the rest of the risk groups, a total of 51 respondents was presented, from whom 39 (76.5%) were female and 12 (23.5%) male. Only two of them resulted in being positive. After further inquiry with the patients about their life style, it was found out that one of positive cases used to practice tattooing and the second one had a history of visiting surgery unit.

Since in the literature, it is mentioned that there exist a high percentage of HCV and HIV co-infection, the study included also the total number of HIV positive

Figure 2. Correlation between anti-HCV antibody value and ALT.

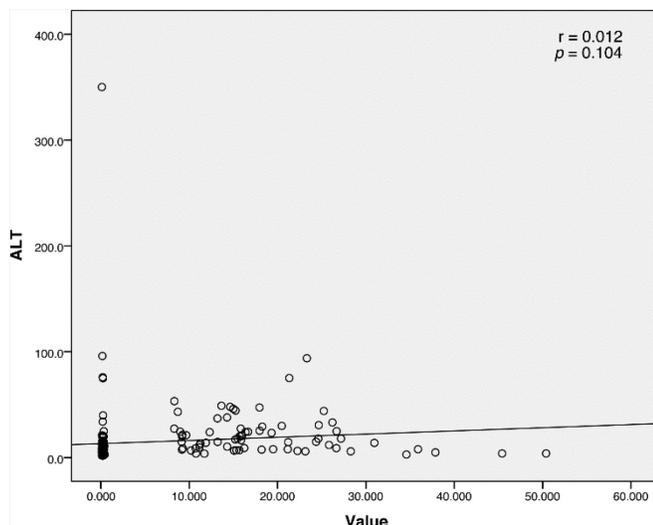


Table 2. Correlation between anti-HCV antibody value and ALT.

	Anti-HCV antibody value	ALT
Anti-HCV antibody value		
Pearson Correlation	1	0.109
Sig. (2-tailed)		0.104
N	347	225
ALT		
Pearson Correlation	0.109	1
Sig. (2-tailed)	0.104	
N	225	225

Table 3. Correlation between anti-HCV antibody value and AST.

	Anti-HCV antibody value	AST
Anti-HCV antibody value		
Pearson Correlation	1	0.081
Sig. (2-tailed)		0.224
N	347	225
AST		
Pearson Correlation	0.081	1
Sig. (2-tailed)	0.224	
N	225	225

cases in Kosovo. But, even though a co-infection was found, it resulted in small number of only 2 cases.

Limitations of this study are linked to the costs of performing RT-PCR test and thus relying in tests for identifying anti-HCV antibody.

Conclusions

This research is unique in Kosovo since it collects data from the most vulnerable demographics when it comes to hepatitis C. Other studies on hepatitis C in Kosovo have been conducted in the past, but they differ from ours in that the authors in [18,19] only looked at two risk groups: haemodialysis patients and blood donors.

The study can conclude that high prevalence of HCV infection still remains a major health problem among patients on haemodialysis centres. Furthermore, it can be added to the conclusion that from initial hypothesis that there might exist asymptomatic cases of hepatitis C virus among pregnant women turned out to be untrue.

With the Pearson Correlation analysis, a good relationship between anti-HCV value and Age was found and therefore it can be concluded that if age increases, an increase in anti-HVC Value will be presented. Moreover, the analysis was performed also on relations between anti-HCV value and gender, where this correlation is more evident in male and the older a male is, the higher the anti - HVC values he has.

In the future, the tendency is to perform a study with general population and not only focus on risk groups. Furthermore, that study will have to be done through RT-PCR tests.

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