

Sexually Transmitted Diseases as a Risk for Acquiring HIV Infection among the Population of Men Who Have Sex with Men – A Case-Control Study

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ABSTRACT

At the beginning of the 1980-ies, HIV infection and AIDS were described for the first time, this among the population of men who have sex with other men. Nearly thirty years later, the MSM population is still a population under heightened risk for acquiring HIV infection and other sexually transmitted diseases. This study investigates sexually transmitted diseases as a risk for HIV infection. A total of 296 men who have sex with men (MSM) were included in this case control study. Differences among the frequencies of sexually transmitted diseases among the MSM of HIV positive and HIV negative status were tested. The history of HIV positive more often states falling ill with sexually transmitted diseases than this was the case before they became HIV positive, unlike those MSM who are not HIV infected (45.9%:11.1% that is OR 6.79, 95% CI 3.49-13.19). Hepatitis B infection is more frequent in HIV positive MSM (11.5%:1.9%; OR 6.58, 95%CI 1.86-23.3). The frequency of gonorrhea in case history of HIV positive MSM is significantly higher than in the HIV negative group (11.5% : 3.8%, OR 3.24, 95%CI 1.13-9.34). In the group of HIV positive MSM, unlike the HIV negative group, syphilis (14.8:1.0%, OR 17.74, 95%CI 3.43-122.87) and genital herpes (8.2%:0.5%, OR 18.39, 95%CI 2.03-424.7) are more frequent. The results of this study will be used in future preventive activities focused on the population of MSM, as a population under particular risk for acquiring sexually transmitted infections.

Key words: MSM, HIV/AIDS, sexually transmitted infections

Introduction

The first patient with HIV infection and AIDS in Croatia was registered in 1985. Since then, a continuous monitoring of HIV/AIDS in the country conducted by epidemiology services as well as the analysis of the epidemiology situation and proposal and the implementation of HIV/AIDS prevention and control measures are being conducted^{1,2}.

According to all epidemiological indicators, Croatia is a country with a low spread of this infection, with a prevalence under 1% (0.02%) in the general population. The highest prevalence was found within the MSM group (7/232=3%, 95%CI=1.3-6.3%) and commercial sex workers (1/70=1.4%, 95%CI=1-7.8%)³. During the long-term sur-

veillance, a large number of characteristics, that is, risk factors in groups of heightened risk for HIV/AIDS transmission became known onto which focused control and education measures are being undertaken^{1,2,4,5}.

Through the entire period of monitoring and surveillance of HIV/AIDS patients in Croatia (since 1986), the most common route of transmission is through sexual intercourse among men who practice sex with men. Men who practice sex with men (MSM) are a group under heightened risk for acquiring HIV infection in the entire world⁶⁻¹².

According to most recent data of the Epidemiology Service of the Croatian National Institute of Public Health (March 2010) for the period 1985–2009, in 48.5% of the HIV infected, the infection occurred among the MSM. The

MSM accounted for 68.7% of the newly diagnosed HIV infections in 2009, while a year earlier, in 2008, this rate was higher : – 74.6% of the newly diagnosed HIV infection¹³.

The interest of epidemiologists monitoring the HIV/AIDS situation in the country and conducting control and prevention measures, as well as the interest of all experts in the field of HIV and the society as a whole, lies primarily in detection of those risk factors among the MSM population, onto which preventive or other counterepidemic measures can have an influence. The existing surveillance system of HIV/AIDS in Croatia has been supplemented by introducing the »Second generation of epidemiology surveillance and intervention«, which includes monitoring behavioral indicators as risk behaviors, monitoring other sexually transmitted infections as well as the monitoring of prevalence by conducting successive cross-sectional studies of populations under heightened risk. In this way, the effectiveness of counterepidemic measures can be followed in time but also, this enables a timely recognition of a possible increase of risks among those populations^{2,14}.

The most frequent risks for HIV infection in MSM are the manner of sexual relations, the number of sexual partners and sexual relations with women¹⁵⁻¹⁷. Within the framework of a wider research of risk factors for HIV infection in the population of MSM, in this study risk for other sexually transmitted diseases and their correlation with HIV infection has been investigated.

Methods

The research was conducted within the framework of the project »Scaling-up HIV/AIDS Response in Croatia« which was implemented 2003–2006, as part of the Program HIV5 »Improving HIV infection and AIDS monitoring« – the project of the Ministry of Health and Social Welfare, the main implementator of which, was the Croatian National Institute of Public Health. The project was financed from the donation of the Global Fund to Fight Tuberculosis, AIDS and Malaria (GFTAM). Studies were conducted within most at risk groups, including the MSM.

The researchers – epidemiologists of the Croatian National Institute of Public Health and County Public Health Institutes recruited the respondents with the help of non-governmental organizations in direct contact with populations with risk behaviors (LET, TERRA, HELP, ISKOR-AK) and the Croatian Red Cross as well as researchers from around Croatia. The research was conducted in seven cities, Zagreb, Split, Rijeka, Zadar, Slavonski brod, Osijek and Dubrovnik. Owing to the fact that this population is hard to reach, all MSM respondents of age were included who were willing to take part in the study (convenience sampling). A questionnaire designed for the study was used to gather socio-demographic and risk data related to HIV infection. The respondents were informed about the aim of the research and after giving informed consent, filled in the anonymous questionnaire and gave a sample of blood for testing on HIV. Testing was con-

ducted in the laboratory of the Virology Department of the Croatian National Institute of Public Health (ELFA test), and in case of a positive result, the confirmatory testing was done at the »Fran Mihaljević« University Hospital for Infectious Diseases (Western-blot test).

Despite a higher prevalence of HIV infection found among the MSM group (3.3%; 95%CI 0.9-5.7) than with other risk groups among which studies were conducted (commercial sex workers and their clients, intravenous drug users, migrant workers and others)¹⁸, a relatively small number of infected persons was found. Moreover, all MSM patients who were treated for HIV/AIDS at the »Dr. Fran Mihaljević« University Hospital for Infectious Diseases were included into the study, the majority of which, were found to be of HIV positive status (and treated) in the period 2000 – 2006.

There was a total of 296 respondents. Two groups were found among them: those MSM found to be of HIV positive status (patient group) and those MSM whose HIV status was negative (control group).

Data on frequency of sexually transmitted diseases in this study were obtained from case history of the respondents, based on voluntary and anonymous questionnaires.

All the respondents were interviewed using the same questionnaire, however, questions related to a history of sexually transmitted diseases or current sexually transmitted diseases among those respondents who were patients of the university hospital, were modified so that they pertained to the period before and after the respondents were diagnosed with HIV.

The question that was related to sexually transmitted diseases for both the patient and control group was worded as follows:

Have you been (or are you) infected with:

- hepatitis B virus
- hepatitis C virus
- gonorrhea
- syphilis
- genital herpes
- I have not been infected

The patient group of respondents (those for whom HIV infection was confirmed) numbered 71 MSM, while 252 MSM who were found to be of HIV negative status belonged to the control group.

A case-control study was conducted in which differences in the frequency of sexually transmitted diseases among the two groups were tested and exposure odds ratio was determined. Data analysis was conducted using the SPSS package version 17.01. The effect of age as a biological confounder was neutralized by conducting multiple logistic regression. The level of statistical significance was set at 5%.

The research was approved by the Ethics committees of the Croatian National Institute of Public Health and the »Dr. Fran Mihaljević« University Hospital for Infectious Diseases.

TABLE 2
MULTIPLE LOGISTIC REGRESSION FOR AGE AND
SYPHILIS

	Odds Ratio	95% confidence interval
Age	1.05	(1.009-1.092)
Syphilis	9.35	(1.797-48.642)

Results

To the question whether they have been infected by a sexually transmitted disease, the answer was given by 268 MSM, that is by 90.5%. Among the patient group 61 respondents answered to this question, which equals to 85.9% and among the control group 207 respondents answered to this question, that is 92%. Only for the question related to gonorrhea one additional person among the control group gave an answer. Other results are shown in Table 1.

Among the patient group, 28 patients or 45.9% stated having been infected with one of the listed sexually transmitted diseases and within the control group, 23 respondents or 11.1% stated having been infected with one of the listed sexually transmitted diseases which represents a significant difference (OR 6.79, 95% CI 3.49-13.19).

Among the patient group, the highest number of respondents (9 respondents or 14.8%) stated having been infected with syphilis, followed by hepatitis B and gonorrhea with 7 diseased respondents for each disease which amounts to 11.5%. Five persons stated having been infected with genital herpes, that is 8.2%. Among the patient group, there was no response recorded of knowledge of having been infected with hepatitis C. Three men from the patient group stated having been infected with sexually transmitted diseases several times. One patient stated having been infected with gonorrhea, syphilis and genital herpes in the past. The second patient with sev-

eral sexually transmitted diseases in history mentions being infected with hepatitis B, syphilis and genital herpes while the third patient states being infected with syphilis and genital herpes.

According to the questionnaire, the results among the control group show that 8 respondents of 3.9% have been infected with hepatitis C. The same number of control group respondents, that is 8 (3.9%) state having been infected with gonorrhea. Four respondents (1.9%) stated having been infected with hepatitis B, two with syphilis (1.0%) and one respondent with genital herpes (0.5%) (Figure 1).

Hepatitis B infection was present in history of 7 respondents (11.5%) from the patient group in comparison to 4 respondents (1.9%) from the control group. There is a higher probability of hepatitis B infection among the patient group (OR 6.58, 95% CI 1.86-23.30).

On the basis of the questionnaire, no respondent from the patient group was infected with hepatitis C, while there were 8 respondents (3.9%) from the control group who were infected with hepatitis C. Seven respondents from the patient group (11.5%) stated in the questionnaire that they have had gonorrhea as well as 8 respondents (3.8%) from the control group. There is a higher probability of infection with gonorrhea among the patient group (OR 3.24, 95% CI 1.13-9.34).

Among the patient group, 9 respondents stated having been infected with syphilis which makes 14.8% and in the control group two respondents, which makes 1.0% (OR 17.74, 95% CI 3.43-122.87).

Genital herpes infection was reported by 5 respondents (8.2%) from the patient group and one respondent (0.5%) from the control group (OR – 18.39, 95% CI 2.03-424.70).

As the patient group was of older average age (median of 33 years of age) than the control group (median at 29 years of age), the neutralization of age as a biological confounder was conducted using multiple logistic regression. There is a significantly higher probability of syphilis pres-

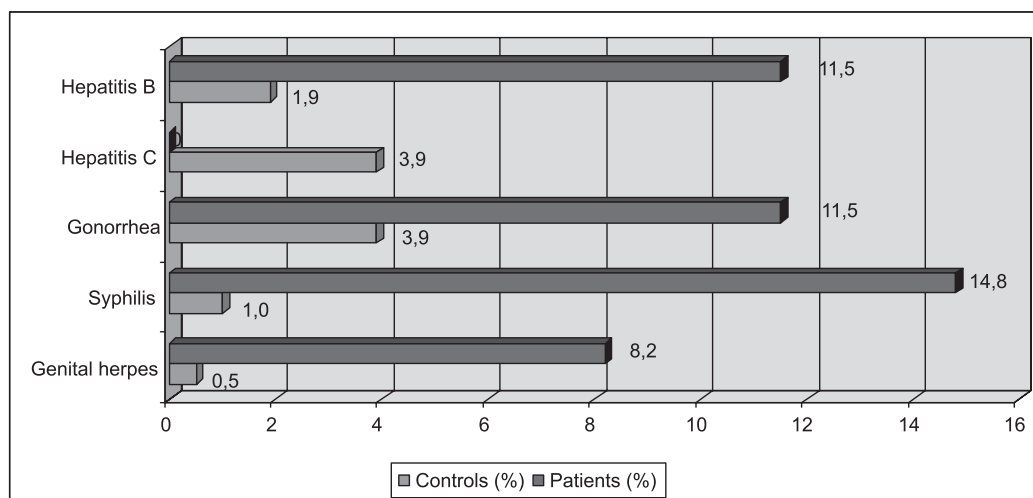


Fig. 1. Sexually transmitted diseases among the patient group and the control group.

TABLE 1

THE FREQUENCY OF POSITIVE ANSWERS ON SEXUALLY TRANSMITTED DISEASES WITH THE MSM PATIENT GROUP AND MSM CONTROL GROUP IN CROATIA AND THE RESULTS OF BIVARIATE LOGISTIC REGRESSION

Sexually transmitted disease	Patients N(%)	Controls N(%)	TOTAL N(%)	OR	95% CI (OR)
Hepatitis B	7/61 (11.5)	4/207 (1.9)	11/268 (4.1)	6.58	1.86–23.3
Hepatitis C	0/61 (0.0)	8/207 (3.9)	8/268 (3.0)		
Gonorrhoea	7/61 (11.5)	8/208 (3.9)	15/269 (5.6)	3.24	1.13–9.34
Syphilis	9/61 (14.8)	2/207 (1.0)	11/268 (4.1)	17.74	3.43–122.87
Genital herpes	5/61 (8.2)	1/207 (0.5)	6/268 (2.2)	18.39	2.03–424.70
Total	28/61 (45.9)	23/207 (11.1)	51/268	6.79	3.49–13.19

ence in case history of HIV patients than in controls, regardless of age (CI 1.797 – 48.642). Multiple logistic regression confirmed that persons with syphilis in history have a 9.35 higher chance of acquiring HIV infection (Table 2).

Discussion

A higher risk of sexually transmitted diseases with HIV patients is most probably a consequence of the same risk factors that lead to HIV infection^{19,20}. A higher risk for HIV infection cannot be neglected among persons with other sexually transmitted diseases that make the entrance of HIV virus at sexual transmission^{21,22} easier.

Even though the aim of this study was primarily to determine the difference in frequency of sexually transmitted diseases among the MSM patient group and MSM control group, thus contributing to the knowledge on risks from HIV infection among the population of MSM, a comparison of prevalence of sexually transmitted diseases among the Croatian MSM is possible with the results of other studies of prevalence of sexually transmitted diseases.

The sample of MSM population in our research represents the majority of MSM HIV patients in Croatia in the period 2000–2006, since all of them are treated at the same university hospital and the sample from general MSM population in Croatia, which represented the available MSM population in various parts of Croatia in the period 2003–2006.

The seroprevalence study conducted by Božičević et al. objectively determines the infection using microbiology diagnostics, while case history (questionnaire) in our research speaks, in the majority of the studied sexually transmitted diseases, on clinically manifest diseases²³. This justifies the differences in »prevalence« of diseases in these two researches. In our research, the »prevalence« of sexually transmitted diseases (calculated on the total sample of MSM in the research that is on both patient and control groups) is systematically lower than the one obtained using microbiological research on the MSM sample: Hepatitis B 4.1%: 7.7%, syphilis 4.1%: 10.6%, herpes gen-

italis 2.2%: 9.4% gonorrhoea 5.6%: 13.2%. The differences are greater than expected, in spite of the above mentioned objective differences in determining the infection. This also is indicated by a higher prevalence of HIV infected: 4.5% in the research conducted by Božičević et al., than the prevalence of 3.3% found in the research conducted by the Croatian National Institute of Public Health²⁴. Since in the research conducted by Božičević et al. the recruited respondents were mostly from Zagreb area, it should be reminded that several epidemics of syphilis and gonorrhoea among the MSM population were registered in Zagreb in the period 2004–2006, which was not the case with other parts of the country. Epidemiology of HIV/AIDS in Zagreb is somewhat different from the rest of the country, with a dominant infection among the MSM population.

The MSM patient group in this research has significantly more often recorded hepatitis B in history (11.5%, OR 6.58) and syphilis (14.8%, OR 17.74) unlike the control group. These values are also higher than the prevalence of these diseases found by Božičević et al. (hepatitis B 11.5%:7.7%, syphilis 14.8%:10.6%).

The research conducted by Vilibić et al. shows a prevalence of hepatitis C infection among the MSM population of 2.9% which corresponds with our research on a total sample of MSM (3%)²⁵. In the population of voluntary blood donors in Croatia, prevalence of hepatitis C infection at first donorship amounts to 0.06%²⁶.

Classic sexually transmitted diseases in Croatia are in constant regression, with a syphilis incidence of 0.7/100000 in 2009 and a gonorrhoea incidence amounting to 0.4/100000²⁷. This is corroborated by the data from Clinics for sexually transmitted diseases in Dubrovnik where in the last 20 years, a total of 29 patients with syphilis and 183 gonorrhoea patients²⁸ were registered. This data confirms the low incidence of syphilis and gonorrhoea in Croatia as in other developed European countries. Having in mind the results of this study, the MSM population in Croatia is a group under heightened risk of gonorrhoea and syphilis.

A research conducted in Spain in the period 2003–2007 among the MSM population with newly diagnosed HIV infection, shows that almost a third (31%) of that

population were found to have had an infection with other sexually transmitted diseases, particularly syphilis (15.2%) and gonorrhea (3.8%)²⁹.

Similar results were found in Sydney, Australia, where syphilis prevalence among the HIV infected MSM was 19% and among those MSM not infected with HIV 3%³⁰. A significantly higher prevalence of syphilis was found in San Francisco, which amounted 44.4%³¹.

In Turkey, HIV prevalence of 1.8%, syphilis prevalence of 10.8% and hepatitis B prevalence of 3.6%. The HIV prevalence in Uzbekistan was found to be 10.8%, syphilis prevalence is 7.8% and hepatitis C prevalence 10.8%, while in Bulgaria syphilis prevalence amounts to 8.5%, hepatitis B prevalence is 6.7% and hepatitis C prevalence is 5.2%. In Albania, HIV prevalence among the MSM population is 0.8%, of syphilis 1.2% and of hepatitis B 17.6%³².

Guo HX et al. conducted a research among the MSM population in two cities in China during 2006 and 2007. A prevalence of HIV amounting to 5.8% has been found, prevalence of hepatitis B 11.1%, for hepatitis C 0.7% and syphilis 27.7%. Prevalence of HIV was significantly high-

er in this research than in previous research conducted in 2003, while for hepatitis B and hepatitis C no statistically significant differences were found³³.

Based on our results, we can conclude that in the case of presence of sexually transmitted diseases with the MSM or data on history of sexually transmitted diseases with the MSM (syphilis, gonorrhea, hepatitis B and genital herpes), the patients should be advised to be counseled and tested for HIV infection. Sexually transmitted diseases are a marker for highly risky sexual behavior by which HIV infection can be transmitted.

The limitations of this study could be a faulty memory of the respondents having in mind that they gave answers pertaining to their life before they were infected with HIV.

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SPOLNO-PRENOSIVE BOLESTI KAO RIZIK ZA HIV INFEKCIJU U POPULACIJI MUŠKARACA KOJI IMAJU SEKS S DRUGIM MUŠKARCIMA U HRVATSKOJ – CASE-CONTROL ISTRAŽIVANJE

SAŽETAK

Početak osamdesetih godina prošlog stoljeća HIV infekcija i AIDS su prvi put opisani i to unutar populacije muškaraca koji imaju seks s drugim muškarcima. Nakon gotovo trideset godina, MSM populacija je i dalje populacija pod visokim rizikom za HIV infekciju kao i za infekciju drugim spolno prenosivim bolestima. U ovom radu su razmatrane spolno prenosive bolesti kao rizik za HIV infekciju. U case – control studiji uključeno je 296 muškaraca koji imaju seksualne odnose s muškarcima (MSM). Testirane su razlike u frekvenciji spolno prenosivih bolesti između HIV pozitivnih i HIV negativnih MSM. HIV pozitivni MSM u anamnezi češće navode obolijevanje od spolno prenosivih bolesti, prije nego li su postali HIV pozitivni, za razliku od MSM koji nisu zaraženi HIV-om (45,9%:11,1% odnosno OR 6,79, 95% CI 3,49-13,19). Hepatitis B infekcija je češća u HIV pozitivnih MSM (11,5%:1,9%; OR 6,58, 95%CI 1,86-23,3). Frekvencija gonoreje u anamnezi HIV pozitivnih MSM je značajno veća nego li u HIV negativnoj grupi (11,5%:3,8%, OR 3,24, 95%CI 1,13-9,34). U grupi HIV pozitivnih MSM za razliku od HIV negativne grupe češće su i sifilis (14,8:1,0%, OR 17,74, 95%CI 3,43-122,87) i genitalni herpes (8,2%:0,5%, OR 18,39, 95%CI 2,03-424,7). Rezultati ovog istraživanja će se koristiti u budućim preventivnim aktivnostima usmjerenim prema populaciji MSM, kao posebno rizičnoj populaciji za infekciju spolno prenosivim bolestima.