

SHORT REPORT

Comparison of risk factors in HIV-infected men who have sex with men, coinfecting or not with hepatitis C virus (ANRS VESPA2 French cross-sectional national survey)

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ABSTRACT

Objectives HIV-infected men who have sex with men (HIV-MSM) are at high risk of hepatitis C virus (HCV) infection. This study aimed to compare risk factors between HIV-MSM coinfecting with HCV and those who are not, in a national representative survey conducted in France.

Methods The ANRS VESPA2 survey (April 2011–January 2012) collected sociodemographic and behavioural data (through face-to-face administered questionnaires) as well as medical data (physician questionnaire) among 3022 HIV-infected adults recruited in 73 French HIV hospital departments. We identified behavioural correlates of HCV coinfection among sexually active HIV-MSM who participated in VESPA2 (logistic regression models).

Results Ninety-three of the 1037 HIV-MSM of the study population (8.9%) were coinfecting with HCV. The following risk factors were independently associated with HCV coinfection, after adjustment for age and time since HIV diagnosis: current or past injecting drug use, having had at least 20 male sexual partners during the previous 12 months, reporting inconsistent condom use during anal sex with casual partners, and attending sex parties. Individuals reporting at least three sexual risk factors were at the highest risk of being coinfecting with HCV (OR (95% CI): 22.86 (9.74; 53.62), $p < 0.0001$).

Conclusions HIV-MSM reporting several sexual risk factors should be sensitised to risk-reduction behaviours to avoid HCV transmission to sexual partners, and infection or reinfection with HCV.

from sexually transmitted infections (STI) further increases the risk of HCV infection.¹ Quantitative studies conducted in large samples are needed to develop effective HCV risk reduction strategies in HIV-MSM. This study aimed at comparing risk factors between HIV-MSM coinfecting with HCV and those who are not, among individuals included in the French national representative ANRS VESPA2 survey.

METHODS

The ANRS VESPA2 survey

The ANRS VESPA2 survey (April 2011–January 2012, 3022 participants) aimed to describe the living conditions of adult people living with HIV (PLWH) followed-up in French hospitals. Participants' socio-demographic, economic and behavioural characteristics were collected using face-to-face administered questionnaires. Interviewers were trained to adopt non-judgmental attitudes in order to limit potential social desirability bias in participants' answers. Hospital physicians in charge of participants completed a medical questionnaire. Data were weighted and calibrated to be representative of all adult PLWH followed-up in French hospitals in 2011.⁵ The ANRS-VESPA2 study was approved by the French National Commission for Data Protection and Liberties (CNIL) (approval number DR-2010-368).

Study population

Men participating in VESPA2 who defined themselves as bisexuals, gays, homosexuals, or who reported at least one male sexual partner during the previous 12 months were characterised as MSM. The study population included sexually active MSM (behaviours during the previous 12 months) with available data on HCV coinfection.

Variables

The following sociodemographic characteristics were tested for a possible relationship with HCV coinfection: age, educational level, employment status, monthly household income, reporting financial difficulties or not, and reporting satisfactory housing conditions or not.

INTRODUCTION

During the last decade, in Western countries, the incidence of hepatitis C virus (HCV) coinfection has dramatically increased among HIV-infected men who have sex with men (HIV-MSM).¹ In addition, reinfection after spontaneous clearance or successful therapy is frequent in this population of gay men with HIV.² Phylogenetic studies of circulating HCV strains suggest a high prevalence of sexual HCV transmission in HIV-MSM, especially in Europe.¹ Sexual risk behaviours³ and HCV circulation are facilitated in recreational drug users and alcohol abusers.⁴ Genital ulceration arising



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Antiretroviral treatment (ART) status, HIV viral load (detectable vs undetectable) and CD4 cell count at most recent assessment, and history of STIs during the previous 12 months were also analysed. Time since HIV diagnosis was dichotomised using year 1996 (advent of highly active ART in France) as a cut-off.

Behavioural characteristics included current or past injecting drug use (IDU), binge drinking (ie, consuming at least six alcohol drinks on one specific occasion), and sexual life characteristics. The latter included frequenting virtual venues (internet, mobile phone and advertisements) and frequenting physical venues (saunas, bars, night clubs, public places, sex parties, etc) to find partners.

With respect to sexual risk behaviours, the following data were recorded: the number of male sexual partners during the previous 12 months, inconsistent condom use (ICU) during insertive and/or receptive anal intercourse, fist-fucking, having sex under the influence of alcohol or drugs (including ecstasy, cocaine, gamma-Hydroxybutyric acid (GHB), amphetamines, ketamine, mephedrone), sex partying, and having paid, or having been paid, for sex during the previous 12 months. Sexual practices with one's main partner during the previous 12 months were distinguished from those occurring with (a) casual partner(s) during the most recent sexual encounter.

Statistical analyses

Univariate logistic regression analyses were used to identify potential sexual and drug-related correlates of HCV coinfection in sexually active HIV-MSM. All variables with a *p* value <0.20 in these analyses were considered eligible for multivariate testing (A). A second multivariate model (B) was then built by replacing eligible sexual risk factors with a 'risk-level' variable (low, medium, high) corresponding to one, two, or minimum three sexual risk factors among eligible variables. Interaction between age and time since HIV diagnosis was tested. Missing values (monthly household income) were not imputed. A step-wise forward selection procedure with an entry threshold at *p*=0.05 was used to identify the final multivariate models. The stability of the results obtained was checked after excluding all individuals reporting current or past IDU from the study population (sensitivity analysis). Stata/SE V12.1 software for Windows (Stata Corp LP, USA) was used for all the analyses. Analyses were performed on weighted data. The weighting procedure accounted for the sampling technique and the heterogeneous rates of non-participation in the survey between the subpopulations of PLWH.

RESULTS

Among the 1337 MSM participating in Vespa2, 1040 reported sexual activity during the previous 12 months. Data on HCV coinfection, assessed using hospital physicians' report in the medical questionnaire, was available for 1037 of the latter (study population).

Overall, 25% of these 1037 HIV-MSM reported being in a stable partnership only, 41.9% reported having casual partners only, while 32.8% reported having a main partner and casual partners. Ninety-three individuals (8.9%) were HCV coinfecting (please see web only table). Among sexually active coinfecting MSM, 33.3% reported a history of IDU, 3.5% reported current IDU, 22.6% reported having at least one STI during the previous 12 months, and 8% reported having had sex under the influence of drugs. Half the latter reported they had done so with casual partners. Two individuals who reported drug use during sex with casual partners also reported a history of IDU, while one reported current IDU.

HCV correlates in the univariate analyses included time since HIV diagnosis, current or past IDU, STIs during the previous 12 months, number of male sexual partners during the previous 12 months, and sexual risk behaviours with casual partners (Web only Table). ART status, HIV viral load and CD4 count were not significantly associated with HCV infection. Among MSM diagnosed HIV-positive before 1996, younger individuals were significantly more likely to be HCV coinfecting than their older counterparts.

In the multivariate model A, current or past IDU, reporting at least 20 male sexual partners in the previous 12 months, ICU with casual partners and sex partying were all independently associated with HCV coinfection, after adjustment for age and time since HIV diagnosis.

Multivariate model B confirmed these results and showed that reporting at least three sexual risk factors (high-risk level category) was a strong independent correlate of HCV coinfection. The risk factors most frequently reported in this category were having at least 20 male sexual partners during the previous 12 months, and ICU during anal intercourse.

The sensitivity analysis excluding individuals with current or past IDU from the study population confirmed the pattern of HCV-associated sexual risk factors (data not shown).

DISCUSSION

Statement of principal findings

This study shows a high prevalence of history of IDU in HIV-MSM co-infected with HCV living in France, and higher rates of risky sexual behaviours^{1 6} among sexually active HIV-MSM coinfecting with HCV, compared with those who are not coinfecting.

Strengths and weaknesses of the study

This is the first quantitative study conducted in a national sample representative of HIV-infected adults followed-up in hospitals which compares the risk factors in sexually active HIV-MSM, coinfecting or not with HCV. Due to its cross-sectional design, data concerning individuals' behaviours at the time of HCV diagnosis were not available. Nevertheless, these findings bring valuable information about the risk of HCV transmission to sexual partners, or reinfection with HCV among coinfecting HIV-MSM. One-third of co-infected individuals had a history of IDU, a well-known risk factor for HCV infection. It seems probable that most of these patients acquired HCV through a parenteral route, while the remaining of the study population may have been infected with HCV by sexual transmission. This heterogeneity of individuals' characteristics and transmission groups may have influenced the results and conclusions of the study. However, the latter were confirmed in the sensitivity analysis excluding individuals with current or past IDU from the dataset. Data concerning vaccination for HAV and HBV were not available in this study. It would have been interesting to correlate vaccination intake and high-risk profiles in HIV-MSM.

Relation to other studies

The results obtained confirm those of qualitative^{7 8} and quantitative⁹ studies previously conducted in France in smaller samples.

Multiple sexual partnerships and ICU during anal sex with casual partners are confirmed as major risk factors among coinfecting HIV-MSM.^{9 10} Additionally, the combination of such sexual risk factors is shown to dramatically increase the odds of HCV coinfection in HIV-MSM.

Self-reported STIs, and the practice of fist fucking⁹ were found to be associated with HCV infection in the univariate analyses, which underlines the potential role of genital lesions in HCV infection.¹ A stronger relationship would probably have been observed between the presence of STIs and HCV infection had all reported STIs being medically documented. The lack of data concerning preventive behaviours during sexual practices provoking physical injury (eg, bleeding), such as the use of gloves, might have slightly modified the significance of the association between fist fucking and HCV infection.

Similarly, reporting drug use during sex was significantly associated with HCV infection only in the univariate analyses. However, the overall prevalence of drug use during sex (during the previous 12 months) was 8% in our study. This is in stark contrast to the 13.2% for amphetamines and 47.2% for GHB (for the 6 months preceding acute HCV infection diagnosis) observed in the HEPAIG study.⁹

We observed higher risks of HCV coinfection in younger individuals diagnosed with HIV in the pre-ART era than in their older counterparts, which may be due to high mortality rates among the oldest coinfecting individuals.

Finally, the use of virtual or physical venues to find sexual partners was frequently reported in the study population, but not significantly associated with HCV status, which suggests that these practices cannot be used per se to define the risk profiles of HCV coinfecting HIV-MSM.

Meaning of the study, implications for clinicians and policymakers

These findings may help decision makers target interventions to reduce HCV transmission risk in sexually active HIV-MSM, including improving access to harm reduction tools tailored for MSM who are still using drugs and promoting education about HCV-associated sexual risk reduction strategies in HIV-MSM. The focus should be placed on sensitising individuals with several sexual risk factors to prevention behaviours in order to avoid HCV transmission to sexual partners and infection or reinfection with HCV.

Unanswered questions and future research

Further research is needed to characterise the HCV-infected HIV-MSM who did not report sexual activity and to identify potential risk behaviours in this population. The potential role of medically diagnosed STIs on HCV coinfection should also be further studied.

Key messages

- ▶ History of injecting drug use is highly prevalent among sexually active HIV-infected men who have sex with men (HIV-MSM) and who are co-infected with HCV.
- ▶ Co-infected HIV-MSM report significantly more sexual behaviors at risk of HCV transmission than the other HIV-MSM.
- ▶ Multiple sexual partnership and inconsistent condom use during anal sex with casual partners are the two sexual risk behaviors most often reported by co-infected HIV-MSM.
- ▶ HIV-MSM with several sexual risk factors need to be sensitized to the risks of HCV transmission and infection or reinfection.

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Contributors FM participated in the data analysis and interpretation of results, wrote the manuscript draft, and revised it following suggestions from the coauthors. BD performed the statistical analyses and collaborated in the writing of the manuscript. NL, MSM, PR and LS-T participated in the interpretation of results, revised the manuscript before submission, and complemented it with contextual data. MPC and BS chose the main directions for data analysis and participated in the interpretation of results. FL, RD-S, BS, MPC and MSM were also involved in the design and conducting of the Vespa2 survey. All authors approved the final version of the manuscript.

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Web only Table – Multivariate analysis of risk profiles among HIV-infected men who have sex with men (MSM) co-infected or not with HCV: data from the French national survey ANRS VESPA2

	All individuals	HCV co-infected		Univariate analyses		Multivariate model A		Multivariate model B	
	n=1037	yes	no						
		(n=93)	(n=944)						
	% of individuals or mean (SE)	% of individuals or mean (SE)		OR [95% CI]	p-value	AOR [95% CI]	p- value	AOR [95% CI]	p-value
SOCIO-DEMOGRAPHIC CHARACTERISTICS									
Age (in years)	47 (10)	46 (8)	47 (10)	0.99 [0.97; 1.01]	0.29	0.94 [0.89; 0.99]	0.04	0.94 [0.89; 0.99]	0.03
Educational level (1 missing value)									
- primary school	33.9	33.6	37	1.30 [0.58; 2.91]	0.51				
- high school (ref.)	19.4	19.7	16.7	-	-				
- university	46.7	46.7	46.3	1.17 [0.56; 2.43]	0.66				
Employed	66.7	66.8	65.0	0.92 [0.48; 1.78]	0.81				

Monthly household income per adult equivalent (€)(12 missing values)	2378 (1685)	2200 (1653)	2395 (1688)	0.99 [0.99; 1.01]	0.49				
Financial difficulties¹	46.0	57.8	44.8	1.69 [0.93; 3.06]	0.08				
Comfortable housing² (3 missing values)	78.1	80.0	77.9	1.13 [0.97; 2.27]	0.72				
HIV-RELATED CHARACTERISTICS & HISTORY OF STIS									
HIV diagnosis after 1996	53.8	40.8	55.1	0.56 [0.32; 0.98]	0.04	0.02 [0.01; 0.53]	0.02	0.02 [0.01; 0.41]	0.01
HIV diagnosis after 1996*Age (interaction term)	-	-	-	-	-	1.07 [1.01; 1.15]	0.04	1.07 [1.01; 1.15]	0.03
Not receiving ART	7.2	2.0	7.7	0.24 [0.04; 1.31]	0.10				
Undetectable HIV viral load (17 missing)	76.1	70.1	76.6	0.72 [0.35;1.48]	0.36				

values)									
CD4>500 (<i>cells/mm³</i>)(4 missing values)	63.7	53.4	64.7	0.63 [0.35; 1.11]	0.11				
STI during the previous 12 months³	13.0	22.6	12.1	2.12 [1.11; 4.05]	0.02				
BEHAVIORAL CHARACTERISTICS									
Current or past IDU (1 missing value)	5.7	33.3	3.0	16.06 [7.92; 32.56]	<0.0001	20.26 [9.52;43.1]	<0.0001	18.86 [8.96;39.73]	<0.0001
Binge drinking⁴ (1 missing value)	55.6	60.3	55.1	0.81 [0.43; 1.52]	0.50				
Finding sexual partners in virtual venues⁵	34.5	38.4	34.1	1.21 [0.65; 2.26]	0.55				
Finding sexual partners in physical venues⁶	55.3	49.4	55.9	0.77 [0.43; 1.39]	0.38				

SEXUAL RISK BEHAVIORS

No. of male sexual partners during the previous 12 months ♦

- 1	28.8	17.3	29.9	0.65 [0.30; 1.44]	0.28		
- 2 to 4 (ref.)	23.7	21.2	23.9	-	-		
- 5 to 9	13.4	14.0	13.4	1.18 [0.38; 3.71]	0.77		
- 10 to 19	13	10.5	13.2	0.90 [0.35; 2.29]	0.81		
- at least 20	21.1	37.0	19.5	2.14 [0.97; 4.70]	0.06	2.76 [1.45; 5.24]	0.002

ICU during insertive or receptive anal

intercourse ♦

- no (ref.)	76.5	65.0	77.7	-			
- yes, only with main partner	14.7	13.2	14.9	1.06 [0.44; 2.55]	0.89		
- yes, with casual partners ⁸	8.7	21.8	7.5	3.50 [1.61; 7.61]	0.002	2.77 [1.18; 6.49]	0.02

Fist-fucking (*fisting*)

- no (ref.)	91.9	85.8	92.5	-			
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- yes, only with main partner	3.3	3.2	3.3	1.03 [0.21; 4.98]	0.97		
- yes, with casual partners ⁷	4.8	11	4.2	2.83 [0.96; 8.38]	0.06		
Using drugs during sex⁸							
- no (ref.)	96.0	92.1	96.4	-			
- yes, only with main partner	2.9	3.8	2.8	1.40 [0.35; 5.7]	0.66		
- yes, with casual partners ⁷	1.1	4.2	0.8	5.56 [1.63; 19.00]	0.007		
Using alcohol during sex							
- no (ref.)	84.7	90.8	84.1	-			
- yes, only with main partner	9.5	6.5	9.7	0.61 [0.20; 1.88]	0.39		
- yes, with casual partners ⁸	5.8	2.7	6.1	0.42 [0.11; 1.59]	0.20		
Participating in sex parties⁹	3.8	11.3	3.1	4.01 [1.87; 8.63]	0.001	3.79 [1.30; 11.02]	0.01
Having paid/having been paid for sex during the previous 12 months	4.6	7.2	4.3	1.72 [0.68; 4.37]	0.25		

HCV RISK LEVELS¹⁰

-low risk (ref.)	88.4	67.6	90.4	-		-	
-medium risk	8.5	14.1	8.0	2.36 [0.86; 6.44]	0.10	2.88 [0.90; 9.25]	0.075
-high risk	3.1	18.3	1.6	14.35 [6.80; 32.7]	<0.0001	22.86 [9.74; 53.62]	<0.0001

AOR = adjusted odds ratio; ART = antiretroviral therapy; CI = confidence interval; ICU = inconsistent condom use; IDU = injecting drug use; OR = odds ratio; SE = standard error; STI = sexually transmitted infections.

A: Multivariate analysis including all eligible variables (p<0.20 in the univariate analyses).

B: Multivariate analysis including all eligible variables except sexual risk behaviors, which were replaced by the three-level categorical risk variable.

◆ Variable categories with not significantly different odds ratio were grouped together in the multivariate analyses.

¹ Individual's perceptions.

² Owners or renters who reported satisfactory or very satisfactory housing conditions were considered to have comfortable housing.

³ At least one among the following sexually transmitted infections (STIs): syphilis, lymphogranuloma venereum (LGV), gonorrhea, condyloma, other STIs (self-report).

⁴ Defined as consuming at least six alcohol drinks on one specific occasion.

⁵ Including internet, mobile phone and advertisements.

⁶ Including backrooms, saunas, bars, night clubs, adult video shops, outdoor gay meeting places, public places, sex parties, and friends' home.

⁷ Whether or not condom was used with the main partner.

⁸ Among: ecstasy, cocaine, GHB, amphetamines, ketamine, mephedrone.

⁹ During the most recent sexual encounter with a casual partner.

¹⁰ A risk-level variable was defined as follows: a “low risk” category included individuals having a maximum of one risk factor among eligible sexual risk factors, a “medium risk” category included those having two risk factors, and a “high risk” category included those having at least three risk factors

Résumé

Objectifs: Les hommes infectés par le VIH qui ont des rapports sexuels avec d'autres hommes (HSH-VIH) présentent un risque élevé d'infection par le virus de l'hépatite C (VHC). Cette étude vise à comparer les facteurs de risque d'infection/transmission du VHC entre les HSH-VIH co-infectés par le VHC et les HSH-VIH non co-infectés, à partir des données d'une enquête nationale menée en France.

Méthodes: L'enquête ANRS-Vespa2 (avril 2011-janvier 2012) a permis de recueillir des données socio-démographiques et comportementales (questionnaires-patient en face à face) et des données médicales (questionnaires-médecin auto-administrés) auprès de 3022 adultes infectés par le VIH recrutés dans 73 services hospitaliers français. Les facteurs comportementaux associés à la co-infection par le VHC ont été identifiés chez les HSH-VIH sexuellement actifs participant à l'enquête (régression logistique).

Résultats:

Au total, 93 HSH-VIH étaient co-infectés par le VHC, parmi les 1037 individus de la population d'étude (8.9%). Après ajustement sur l'âge et le délai depuis le diagnostic VIH, les facteurs de risque suivants étaient significativement associés à la co-infection: usage actuel ou passé de drogues par injection, avoir eu au moins 20 partenaires sexuels masculins au cours des 12 derniers mois, usage non systématique du préservatif pendant les rapports anaux avec des partenaires occasionnels, et participation à des *sex parties*. Les individus rapportant au moins 3 facteurs de risque sexuels présentaient le risque le plus élevé de co-infection (OR[IC à 95%]: 22,86[9,74; 53,62], $p < 0,0001$).

Conclusions: Il est crucial de sensibiliser les HSH-VIH présentant plusieurs facteurs de risque aux comportements de prévention afin d'éviter la transmission du VHC aux partenaires sexuels et l'infection ou la réinfection par le VHC.

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