INTRODUCTION

Viral sexually transmitted infections (STIs) constitute an important cause of morbidity among the sexually active population. Human immunodeficiency virus (HIV) and hepatitis B virus (HBV) are among those viruses that may lead to severe chronic infections and sequelae. Infection with HBV is known to be an important sexually transmitted disease;\(^1\)\-\(^6\) approximately 50% of infections are thought to be acquired by sexual contact.\(^7\) Perinatal transmission represents an additional efficient route of infection.\(^8\)\(^,\)\(^9\) Hepatitis C virus (HCV) is also thought to be transmitted sexually, although to a much lesser extent than HBV.\(^8\)\(^,\)\(^12\)\(^,\)\(^14\) Similar to HBV, HCV can also be transmitted vertically, especially in women who are co-infected with HIV.\(^15\)\(^,\)\(^16\)

In Uruguay, there is a lack of information regarding the prevalence of HBV, HCV, and HIV viral infections in persons who practice commercial sex work. Seroprevalence surveys conducted among female commercial sex workers (CSWs) in Uruguay and other countries in South America seem to indicate a relatively low HIV prevalence of less than 1% (Montano SM and others, unpublished data).\(^17\) In contrast, initial estimates of HIV prevalence among male transvestite CSWs in Montevideo have ranged between 19.9% (in 2001) and 21.5% (in 1999), with an observed yearly incidence of 17.3% (Serra M and others, unpublished data and Russell K and others, unpublished data).

In the present study, we determined the cross-sectional seroprevalence of HBV, HCV, and HIV among a large group of male transvestite CSWs in Montevideo and sought to identify potential risk factors predisposing to infection with these agents.

MATERIALS AND METHODS

Study population. A convenience sample of male transvestite CSWs in Montevideo was interviewed during the period of March through August 1999. Study participants were recruited during the evening hours at working locations such as streets, discoteques, and nightclubs. Recruitment was carried out by a group of Ministry of Health (MOH) workers previously trained on counseling for HIV and STI prevention. In preparation for this study, meetings were held with transvestite organization leaders to solicit support and explore methods for enhanced participation. Individual interviews were conducted primarily in the street; study goals were explained and pretest counseling was offered.

Volunteers were sampled only after initial written informed consent was obtained. The study protocol was reviewed and approved by Institutional Review Boards at the Uruguayan MOH and at the U.S. Naval Medical Research Center (Bethesda, MD). Along with counseling, printed and oral information on HIV/STI prevention was given, and condoms and lubricant gel products were provided as requested by study participants.

Specimen processing. A single blood sample (7−10 mL) was obtained, allowed to clot for 1−2 hours, and centrifuged, and the serum was separated and frozen at −20°C within three hours of collection for later testing. Individuals were provided with a coded, preprinted card, devoid of name or other personal identifiers to ensure anonymity. This preprinted card, which only contained the subjects’ study code without any name or other identifier information, was used by study subjects to obtain results of testing in an anonymous fashion and only after the person presented himself to request test results.

Serologic testing. Evidence of hepatitis B surface antigen (HBsAg) carriage was assessed using an immunochromatographic technique (Determine HBsAg; Abbott Laboratories, Abbott Park, IL) and evidence of past/present HBV infection was assessed by presence of antibodies to hepatitis B core antigen (anti-HBC) with a microenzyme immunoassay (MIA Corezyme IMx; Abbott Laboratories, Weisbaden-Delkenheim, Germany). Past exposure to HCV was determined with an enzyme immunoassay (EIA) (HCV UBI; Organon-Teknika, Boxtel, The Netherlands). Past infection with HIV was determined with an enzyme immunoassay (EIA) (HCV UBI; Organon-Teknika, Boxtel, The Netherlands). Past infection with HIV was determined by EIA screening (HIV 1/2, MEIA-IMx; Abbott Laboratories, Abbott Park, IL) with immunoblot confirmation (New LAV Blot 1; Sanofi-Pasteur, Marnes-La-Coquette, France) of repeatedly reactive serum samples.

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SEXUAL TRANSMISSION OF HEPATITIS B VIRUS, HEPATITIS C VIRUS, AND HUMAN IMMUNODEFICIENCY VIRUS TYPE 1 INFECTIONS AMONG MALE TRANSVESTITE COMERCIAL SEX WORKERS IN MONTEVIDEO, URUGUAY

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Abstract. Prostitution may constitute a risk behavior for infection with hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). We conducted a seroepidemiologic study among 200 male transvestite commercial sex workers (CSWs) in Montevideo, Uruguay in 1999. Evidence of exposure to HBV, HCV, and HIV was found in 101 (50.5%), 13 (6.5%), and 43 (21.5%) individuals, respectively. Positivity for HIV was correlated with age (OR \(= 2.15\), 95% confidence interval \(= 1.01–4.67\)) and HCV (OR \(= 3.47\), 95% CI \(= 0.90–12.79\)) infection. Predictors of infection were older age (\(\geq 26\) years; \(P < 0.01\)) for all 3 viruses and time in CSW (\(\geq 5\) years; \(P < 0.05\)) for HBV and HIV. Prior history of use of drugs (OR \(= 3.54\), 95% CI \(= 1.09–11.52\)) and sexual contact with foreigners (OR \(= 9.2\), 95% CI \(= 1.16–73.12\)) were found to be associated only with HCV infection. Sexual transmission of these viruses constitutes a significant problem among male transvestite CSWs.
Data analysis. Seroprevalence rates were compared by means of chi-square and Fisher’s exact tests with 95% confidence intervals (CIs). Stratified analysis for associations of HIV status and HBV-HCV markers were conducted using Mantel-Haenszel chi-square tests. Analysis of risk factors was conducted using univariate, bivariate (adjustment for an age greater than 26 years versus a younger age), and multivariate unconditional logistic regression methods.

RESULTS

Of 205 individuals who were approached for participation in this study, 200 (98%) agreed to participate. Most (92%) were born in and residents of Uruguay and the remaining 8% were foreign individuals who came from either bordering countries (Argentina and Brazil) or other countries such as Nicaragua or Spain. The sociodemographic characteristics of study group subjects are shown in Table 1. Approximately three-fourths were less than 36 years of age (range = 18–58 years, median = 29 years), most (78%) engaged in street-based commercial sex work, and few (1%) were recognized being engaged in a marital (i.e., stable monogamous) relationship.

The extent of sexual contacts varied greatly, with a mean of approximately 20 partners per week (range = 1–51, median = 20). Approximately two-thirds of subjects reported between 11 and 30 clients per week and 15% reported more than 30 clients per week. Of the 192 male transvestite CSWs for whom data was available, 51 (27%) had engaged in prostitution for a period of less than five years. Non-injecting drug consumption was common in 73 (37%) of subjects admitting inhalational drug use. Of these, 50 (69%) reported cocaine use and 28 (38%) reported marijuana use. Intravenous drug use (IDU) was infrequent, reported by only six (3%) of the subjects.

Overall, anti-HBc positivity was found in 101 (50.5%) of the study subjects, HBsAg carriage in only six (3%), antibodies to HCV in 13 (6.5%), and HIV positivity in 43 (21.5%). The distribution of these markers by age group, marital status, and workplace location is shown in Table 2. Individuals more than 25 years of age had significantly higher (P < 0.01) rates of infection for all three viruses. Higher risks of infection with HBV were found in older subjects (odds ratio [OR] = 2.06, 95% CI = 1.08–3.96), whereas risk of HCV infection was also found to be higher (OR = undefined) when compared with younger subjects. More importantly, the risk of HIV infection was found to be almost five times higher in older subjects (OR = 4.70, 95% CI = 1.70–16.05). In addition, street-based subjects appeared to have sustained a higher HBV infection rate than others (OR = 1.70, 95% CI = 0.89–3.26).

The statistical associations between HIV infection status and HBV and HCV seroprevalences are shown in Table 3. The seroprevalences of HBV and HCV were found to be significantly higher (P < 0.05) among HIV-positive subjects (OR for HBV = 2.15, 95% CI = 1.01–4.67; OR for HCV = 3.47, 95% CI = 0.90–12.79). These positive statistical associations between hepatitis B and hepatitis C and past HIV infection were seen to occur after stratification by age.

Univariate data analysis showed nonsignificant differences in terms of IDU and HIV, HBV, or HCV serostatus. However, the study sample was too small to be able to evaluate IDU as a risk factor since the number of subjects with such a history was too small (n = 6). Likewise, no association was detected between sexual contact frequency (judged by the number of weekly clients) and HIV, HBV, or HCV serostatus.

We also found a statistically significant (P < 0.05) direct correlation between length of time in commercial sex work and HBV/HIV seroprevalence (Table 4). For HBV, a risk more than two times higher was documented (OR = 2.27, 95% CI = 1.12–14.64) for those with five or more years as a CSW, whereas for HIV, a risk almost three times higher was found (OR = 2.57, 95% CI = 0.98–7.96).

Age-adjusted bivariate (Table 5) and multivariate unconditional logistic regression analysis were performed, taking into consideration all variables found to be significant on univariate analysis or thought to be of biologic importance in determining risk for infection with any or all of the three viruses. Prior use of drugs (adjusted AOR [AOR] = 3.54, 95% CI = 1.09–11.52) was found to be associated with prior HCV infection, but not HBV infection. Older age (AOR = 4.33, 95% CI = 1.39–13.51) and prior use of intravenous drugs (AOR = 20.98, 95% CI = 1.40–314.54) were also significantly associated with risk of HIV infection.

In addition, a history of sexual contact with foreigners was also found to be a significant factor only for HCV infection (AOR = 9.22, 95% CI = 1.16–73.12). It should be noted that a majority of subjects, approximately two-thirds, had sustained sexual contact with Americans (i.e., from the United States); contacts with Europeans and Africans occurred in only approximately one-fourth of the subjects.

DISCUSSION

Commercial sex work is a recognized means of employment in many parts of the world. Considerable variation exists in terms of type and distribution of such trade practices exist. The diversity in the types of commercial sex work prac-
ticed by heterosexual women, transgendered persons, and transvestite men reflects, to some extent, the variety of client demands for sexual services.18 Unfortunately, such client-based sexual services are often performed in an unprotected fashion and invariably result in increased transmission of sexually transmitted infections19 with HIV-1, HBV, and possibly HCV.

In Uruguay, commercial sex work is regulated by law and CSWs are registered and controlled on a regular basis in accordance with the policies of the MOH and Department of Interior, under supervision of government authorities (Law 8080 in 1895, modified by decree number 10, MOH, July 22, 1932). However, it is well recognized that unregistered CSWs exist, thus, making it difficult for MOH authorities to accurately estimate the population at risk or reliable rates of STIs. Particularly difficult is estimation of the population of transvestite men at risk. Nevertheless, approximately 2,000 transvestite men are estimated to be engaged in commercial sex in the city of Montevideo alone (Viñoles J, unpublished data).

The seroprevalence of HBV in Uruguay is very low and similar to that estimated from the 1970s to the 1990s for blood donor populations in the United States.19,20 Only approximately 4% of the blood donor population have evidence of past infection as reflected by the presence of anti-HBc, and approximately 4% of the blood donor population have evidence of blood donors in Uruguay is only 0.3%,24 which approximates the rate for HIV infection (21.5%) and the demonstrated sexual promiscuity reported by study subjects.

What is especially interesting in this case, however, is the risk of HCV infection was increased almost four-fold in those with HIV-1 status. This was most likely due to the fact that these three viruses share similar routes of transmission. This correlates well with the published literature, which indicates sexual transmission as a main factor for HBV infection21 and as a secondary factor in HCV acquisition.19,26

Evidence of a previous infection with HBV in this group of transvestites was very high when compared with volunteer blood donors in Uruguay in 1998, both for anti-HBc (51% versus 4%) as well as for HBSAg (3% versus 0.2%).21 This is most likely due to the presence of sexual risk factors for infection in this group, as suggested by the concomitant high rate for HIV infection (21.5%) and the demonstrated sexual promiscuity reported by study subjects.

**TABLE 2**
Distribution of markers for hepatitis B and C and HIV by sociodemographics*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number tested</th>
<th>HCV positive no. (%)</th>
<th>HBSAg positive no. (%)</th>
<th>Anti-HBc positive no. (%)</th>
<th>HIV positive no. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18–25</td>
<td>65</td>
<td>0 (0)</td>
<td>1 (1.5)</td>
<td>25 (38.5)</td>
<td>5 (7.7)</td>
</tr>
<tr>
<td>26–35</td>
<td>80</td>
<td>7 (8.8)†</td>
<td>4 (5.0)</td>
<td>41 (51.3)‡</td>
<td>23 (28.8)§</td>
</tr>
<tr>
<td>&gt;35</td>
<td>55</td>
<td>6 (10.9)†</td>
<td>1 (1.8)</td>
<td>35 (63.6)§</td>
<td>15 (27.3)§</td>
</tr>
<tr>
<td>Marital status¶</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>2</td>
<td>1 (50.0)</td>
<td>0 (0)</td>
<td>2 (100.0)</td>
<td>2 (100.0)</td>
</tr>
<tr>
<td>Single or widowed</td>
<td>163</td>
<td>8 (4.9)</td>
<td>4 (2.5)</td>
<td>86 (52.8)§</td>
<td>36 (22.1)</td>
</tr>
<tr>
<td>Concupinate</td>
<td>33</td>
<td>3 (9.1)</td>
<td>1 (3.0)</td>
<td>11 (33.3)§</td>
<td>3 (9.1)</td>
</tr>
<tr>
<td>Divorced</td>
<td>1</td>
<td>1 (100.0)</td>
<td>0 (0)</td>
<td>1 (100)</td>
<td>1 (100)</td>
</tr>
<tr>
<td>Workplace location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prostitution house</td>
<td>3</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>2 (66.7)</td>
<td>2 (66.7)</td>
</tr>
<tr>
<td>Bar</td>
<td>26</td>
<td>2 (7.7)</td>
<td>0 (0)</td>
<td>12 (46.2)</td>
<td>5 (19.2)</td>
</tr>
<tr>
<td>Discotheque</td>
<td>9</td>
<td>1 (11.1)</td>
<td>1 (11.1)</td>
<td>3 (33.3)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Street</td>
<td>155</td>
<td>11 (7.1)</td>
<td>5 (3.2)</td>
<td>85 (54.8)§</td>
<td>38 (24.5)</td>
</tr>
<tr>
<td>Home</td>
<td>19</td>
<td>1 (5.3)</td>
<td>0 (0)</td>
<td>6 (31.6)</td>
<td>2 (10.5)</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>2 (66.7)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

* HIV = human immunodeficiency virus; HCV = hepatitis C virus; HBSAg = hepatitis B surface antigen; Anti-HBc = antibodies to hepatitis B core antigen.
† P < 0.01, increasing prevalence with age; OR = 1.70–16.05 for subjects more than 25 years of age.
‡ P < 0.01, increasing prevalence with age; OR = 2.06, 95% confidence interval (CI) = 1.08–3.96 for subjects more than 25 years of age.
§ P < 0.01, increasing prevalence with age; OR = 4.70, 95% CI = 1.70–16.05 for subjects more than 25 years of age.
¶ One individual had unknown data on marital status.
* Eight subjects had unknown data. For definitions of abbreviations, see Tables 2.

**TABLE 3**
Correlation of HIV status and markers for hepatitis B and C*

<table>
<thead>
<tr>
<th>HIV status</th>
<th>Number tested</th>
<th>HCV positive no. (%)</th>
<th>HBSAg positive no. (%)</th>
<th>Anti-HBc positive no. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>43</td>
<td>6 (14.0)†</td>
<td>3 (7.0)</td>
<td>28 (65.1)‡</td>
</tr>
<tr>
<td>Negative</td>
<td>157</td>
<td>7 (4.5)</td>
<td>3 (1.9)</td>
<td>73 (46.5)§</td>
</tr>
</tbody>
</table>

* For definitions of abbreviations, see Table 2.
† P < 0.05, higher prevalence in HIV-positive group; odds ratio (OR) = 3.47, 95% confidence interval (CI) = 0.98–12.79.
‡ P = 0.08, higher prevalence in street-based; OR = 1.70, 95% CI = 0.89–3.26 for street-based subjects.
§ P < 0.05, higher prevalence in group with 5 or more years, OR = 4.70, 95% CI = 1.70–16.05 for subjects more than 25 years of age.

**TABLE 4**
Seropositivity for hepatitis and HIV markers by length of time as a commercial sex worker (CSW) Montevideo, Uruguay, 1999*

<table>
<thead>
<tr>
<th>Length of time as a CSW (years)</th>
<th>Number tested</th>
<th>HCV positive no. (%)</th>
<th>HBSAg positive no. (%)</th>
<th>Anti-HBc positive no. (%)</th>
<th>HIV positive no. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>51</td>
<td>2 (3.9)</td>
<td>3 (5.9)</td>
<td>19 (37.3)</td>
<td>6 (11.8)</td>
</tr>
<tr>
<td>≥5</td>
<td>141</td>
<td>11 (7.8)</td>
<td>2 (1.4)</td>
<td>81 (57.4)†</td>
<td>36 (25.5)‡</td>
</tr>
</tbody>
</table>

* Eight subjects had unknown data. For definitions of abbreviations, see Tables 2.
† P < 0.05, higher prevalence in group with 5 or more years; odds ratio (OR) = 2.27, 95% confidence interval (CI) = 1.12–14.64.
‡ P < 0.05, higher prevalence in group with 5 or more years, OR = 2.57, 95% CI = 0.98–7.96.
HIV-infected subjects. This association, as in the case of hepatitis B, potentially reflects similar routes of transmission, especially the suggestion that hepatitis C may be sexually transmitted since the frequency of IDU in this population was very low (only 3% of the study subjects) and a history of sexual contact with foreigners was found to be a significant risk factor. In comparison, HCV transmission among other risk groups such as hemophiliacs and patients on chronic renal dialysis is well documented, and previous studies in Montevideo have documented very high HCV prevalence rates among hemophiliacs (91%), in HIV-infected patients (44%), and in patients undergoing chronic hemodialysis (10%) (Cardozo A and others, unpublished data). The overall prevalence of HCV among volunteer blood donors in Uruguay has been found to be only 0.3%, which is comparable to the general population rates seen in other developed countries such as the United States.

Sexual transmission of HCV has been found to play an important role in previous studies among homosexuals, but has not been previously evaluated among male transvestite populations. Although the overwhelming evidence points to sexual transmission playing a secondary role in transmission of hepatitis C, there is some evidence that this route may be of greater importance among individuals with many sexual partners, who sustain frequent STIs and who practice unprotected sexual (including anal) intercourse. Such activities are commonly seen among male transvestite CSWs in Uruguay (Serra M and others, unpublished data and Russell K and others, unpublished data).

The prevalence of HIV infection reported in this group of transvestites (21.5%) is particularly high, especially when compared with data from other sentinel studies in Uruguay. Studies performed among female CSWs in Uruguay in 1999–2001 have documented an HIV seroprevalence rate between 0.3% and 0.7% (Montano SM and others, unpublished data). In the general population, as judged by the prevalence in antenatal patients, a rate of only 0.3% has been documented (Serra M, unpublished data), whereas among volunteer blood donors a rate of only 0.07% has been observed.

This definitively supports the notion that these male transvestite CSWs have an increased risk of contracting an HIV infection.

Few previous studies have examined the risk for infection with HBV, HCV, or HIV among transgendered individuals. One study performed in Amsterdam in 1996 found an HIV seroprevalence of 24% in transvestite sex workers, whereas in Rome, a high HIV prevalence (74%) was observed among transvestite intravenous drug users who participated in the sex trade. In Karachi, Pakistan, a serologic study conducted in 1998 among 208 transvestites showed an HBsAg prevalence of 3.4%; however, no HIV infections were observed. In Athens, Greece, among 43 male-to-female transsexual prostitutes, 65.1% were infected with hepatitis B and 4.7% with hepatitis C. Lastly, a study carried out in 1990–1991 among 53 transvestite sex workers in Atlanta, Georgia showed a prevalence of 68.9% for HIV and 80% for HBV.

To diminish the risk of contracting STIs, short-term educational programs on HBV/HCV and HIV/AIDS prevention and effective interventions should be implemented. Such prevention activities must then be evaluated. As part of this assessment, it is essential that prevalent STIs and their associated risk factors be continuously monitored in high-risk groups of male transvestite and female CSWs. Preventive measures, such as vaccination for HBV, can thus be appropriately tailored to these hard-to-reach high-risk groups, thus reducing the emerging impact such viral STIs have among them.

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