

Prevalence of Human Immunodeficiency Virus, Chlamydia trachomatis, and Neisseria gonorrhoeae and Risk Factors for Sexually Transmitted Infections Among Immigrant Female Sex Workers in Catalonia, Spain

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Objectives: To determine the prevalence of human immunodeficiency virus (HIV), *Chlamydia trachomatis* (CT), and *Neisseria gonorrhoeae* (NG) among immigrant female sex workers (FSW) according to their geographic area of origin and identify possible risk factors independently associated with current infection with CT and/or NG.

Study Design: Cross-sectional study of 357 FSW in Catalonia in 2005. Information on sociodemographic and sex work characteristics, use of alcohol and drugs, sexual practices, and the use of social and health care services was collected. Oral fluid and urine samples were collected to determine the prevalence of HIV and CT/NG, respectively. Factors independently associated with CT/NG were assessed using multivariate logistic regression models.

Results: A total of 36.4% of women were from Eastern Europe, 34.5% from Latin America, and 29.1% from Africa. Overall CT and NG prevalence were 5.9% [95% confidence interval (CI): 3.7–8.9] and 0.6% (95% CI: 0.1–2.0), respectively. No differences were observed by geographic origin. Three African women were HIV positive (overall HIV prevalence was 0.8%, 95% CI: 0.2–2.4). In multivariate analysis, younger age and unprotected sex with clients were associated with the presence of CT/NG.

Conclusions: The prevalence of sexually transmitted infections among FSW in Catalonia was lower than in other European countries. Even though the prevalence of HIV was only 0.8%, it could increase in the future given the high vulnerability of these women and their wide geographic mobility. It is necessary to continue with the work carried out by nongovernmental organizations (harm reduction programs, outreach programs, and safe sex workshops) as well as to facilitate the access to health centers, especially for the youngest women.

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AT THE BEGINNING of the 1990s, no more than 35% of female sex workers (FSW) in Spain were immigrants.^{1,2} However, recent studies show that the composition of this group has changed and immigrant women now account for more than 70% of all FSW.^{3–5} The increasing number of immigrants has also been observed in other parts of Europe^{6–8} and not only among FSW.⁹ A 2004 study on sex work (SW) in Barcelona revealed that 67% of FSW were from other countries, mainly from Latin America, sub-Saharan Africa, and Eastern Europe (Meroño, M. Estudi del treball sexual femení de carrer a Barcelona ciutat, Àmbit Prevenció 2004. Unpublished data). The differences in cultural and religious background and attitudes to health and sex, as well as difficulties experienced in gaining access to health care and obtaining information, could make this population more vulnerable to human immunodeficiency virus (HIV) and other sexually transmitted infections (STI).

Most studies in Europe and the United States have shown that HIV infection among FSW is associated to a large extent with the use of intravenous drugs (IDU).^{10,11} In Spain, several studies have also shown that the prevalence of HIV among FSW who use injected drugs is greater than among those who do not.^{1–3,12–14} At present, FSW who are also IDU are a minority within the collective^{5,13}; therefore, problems associated with injecting drugs have given way to new issues related to the growing phenomenon of immigration in Spain.

FSW have traditionally been considered an important source of transmission of HIV and other STI because of the high number of sexual partners. However, as in many Western countries,⁸ commercial sex in Spain has had little relevance for the transmission of HIV to the general population. Studies carried out in Spain show a low prevalence of HIV in FSW, which generally ranges from 0.2% to 1.0%.^{3,15–17} By contrast, other Spanish studies have shown a higher prevalence of other STI.^{15,17}

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STI pose a serious problem for public health in terms of morbidity, complications, and sequelae. The consequences of these infections are aggravated by their potential contribution to the transmission of HIV infection.¹⁸ The prevalence of STI among FSW can vary depending on the geographic area and the types and conditions of SW.^{19,20} A recent study carried out in Barcelona in which 95% of the study population was composed of immigrants¹⁶ found a 4.7% prevalence of *Chlamydia trachomatis* (CT) and a 3.7% prevalence of *Neisseria gonorrhoeae* (NG). Furthermore, in agreement with other similar studies,^{5,6,15,17,20} differences were also found about geographic origin.

In our milieu, very few studies examine or monitor the prevalence of HIV/STI risk behaviors in FSW using repeat cross-sectional approaches. In this sense, given the high presence of immigrant FSW in Catalonia, epidemiologic data that help to better describe these infections in this collective are important. Furthermore, identifying those factors that increase vulnerability to HIV/STI will help to improve preventive measures. The objectives of this study were to determine the prevalence of HIV, CT, and NG in immigrant FSW in Catalonia according to their geographic origin and identify possible risk factors associated with CT and NG.

Methods

A cross-sectional study was carried out in Catalonia during 2005 as part of Integrated HIV/STI Surveillance System²¹ with the collaboration of the nongovernmental organization (NGO) Àmbit Prevenció. Most community-based organizations that provide services to FSW in Catalonia were contacted as "key informants" before starting the survey in order to identify the main sites where prostitution took place. A convenience-stratified sample was considered given that the distribution of FSW by country of origin was not homogeneous throughout Catalonia. Stratification for the survey was defined according to geographic origin of women (Spain, Latin America, Eastern Europe, and Africa) and Catalonia's region (Barcelona, Tarragona, Lleida, and Girona). Proportional allocation was used; that is, the sampling fraction in each of the strata was taken in proportion to the size of the total population. Enrollment took place from January to December on the street and at different premises where prostitution is exercised (clubs, bars, and private apartments). The sample was composed of 400 FSW over 18 years of age, but for the purposes of the study we restricted the analysis to the 357 immigrant women.

Written informed consents were obtained from the participants. Information on behavior was collected by means of a structured and anonymous questionnaire adapted from that used by Médicos del Mundo in 2002⁵ and administered by women trained interviewers. The questionnaire was pilot tested in a sample of 20 FSW. The Spanish questionnaire was translated into Rumanian, Russian, and English, and included questions on sociodemographic characteristics, consumption of alcohol and illegal drugs, SW characteristics, sexual practices (vaginal, anal, and oral) with clients and stable partners, and the use of social and health care services. The reference period was 6 months.

After previous informed consent, oral fluid samples were collected anonymously using the OraSure device (EpiTope Inc. USA) to determine the prevalence of HIV infection, and urine samples were taken to determine the presence of NG and CT. Detection of anti-HIV antibodies was performed using Vironostika HIV Micro-ELISA Oral Fluid (BioMérieux),²² whereas NG and CT were detected using the DNA amplification technique BDProbeTecTM ET System for CT/NG Assays (BD Diagnostic Systems). For both techniques, negative and positive controls were included in each run. Negative controls were always negative and positive controls

within accepted range. An internal control was used also in the CT/NG assay to exclude negative results caused by inhibition.

Once all women had been interviewed, they were each given 12 euros, prevention material, and a card that provided them with free and anonymous access to a health center without the need to make an appointment where, if they wished, they could have a gynecological examination done and be screened for HIV and other STI.

Statistical Analysis

A descriptive analysis was performed for the main variables. The prevalence of the sociodemographic, SW, behavioral, CT, NG, and HIV characteristics was compared for women according to their geographic area of origin using Pearson's χ^2 test and the Fisher exact test. For quantitative variables, means were compared through ANOVA. Estimations of STI and HIV prevalence and their respective 95% confidence intervals (95% CI) were obtained by using the exact method when appropriate.²³ Sampling was proportional to the stratification, that is, based on the relative frequency of each stratum about the total population. Consequently, there were no individual differences in the probability of selection, and it was not necessary to correct by weighting.²⁴

In order to identify possible risk factors associated with the presence of CT and NG in urine logistic regression models were performed. We did not include HIV in the analysis because only 3 women were infected, and it may be transmitted by routes other than sexual. The outcome variable was constructed by combining the results of both infections that are exclusively transmitted by sexual contact to increase the numerators of the analysis, and it was defined as the presence or absence of either STI (CT/NG). Odds ratio (OR) and its 95% CI were computed. The model-building strategy was to consider all significant univariate associations at level 0.20 as a potential risk factor for the adjusted multivariate model. The significance level for all the analyses was 5%, and the software package used was SPSS, version 12 (Madrid, Spain).

Results

Information was obtained for 357 immigrants FSW (response rate: 93%). The main characteristics of the sample are shown in Table 1. By Catalan region, 47.6% were recruited in Barcelona, 19% in Tarragona, 17.1% in Girona, and 16.2% in Lleida. More than half worked in bars, clubs, or private apartments (68.6%), and 31.4% worked on the street. By geographic area of origin, 130 (36.4%) were from Eastern Europe, 123 (34.5%) from Latin America, and 104 (29.1%) from Africa, with the main countries of origin being Brazil, Nigeria, and Romania.

The mean age was 28 years (range: 18–60), and women from Eastern Europe were the youngest (mean age: 25 years). Most FWS had primary and secondary education (78.3%), whereas African women had the lowest educational level (33% claimed not to have completed primary school). A quarter of the sample lived alone, and 39.8% lived with friends or people from their country of origin. Most women come to Catalonia because of economic reasons, especially women from Latin America (88.6%) and from Eastern Europe (86.9%). Among all FSW studied 37.3% had been in Catalonia for less than 1 year, and 30.2% had a residence permit. A high proportion of women from Eastern Europe had been in Catalonia for less than 1 year (46.2%), and they were the ones with the least residence permit (13.1%).

Time spent in commercial SW was under 2 years for 36.9%, and this percentage was lower in Latin American women (26.2%). The mean age at which women began SW was 24 years, whereas those

TABLE 1. Sociodemographic, Behavioral, and Sex Work Characteristics of Immigrant FSW According to Geographical Area of Origin

| Variables | Total No. (%) | Latin America N = 123 No. (%) | Africa N = 104 No. (%) | Eastern Europe N = 130 No. (%) | P* |
|---|------------------|-------------------------------------|------------------------------|--------------------------------------|----------|
| Recruitment site | | | | | 0.001 |
| Barcelona | 170 (47.6) | 60 (48.8) | 60 (57.7) | 50 (38.5) | |
| Tarragona | 68 (19) | 23 (18.7) | 6 (5.8) | 39 (30) | |
| Lleida | 58 (16.2) | 18 (14.6) | 20 (19.2) | 20 (15.4) | |
| Girona | 61 (17.1) | 22 (17.9) | 18 (17.3) | 21 (16.2) | |
| Venue type | | | | | <0.0001 |
| Street | 112 (31.4) | 33 (26.8) | 46 (44.2) | 33 (25.4) | |
| Bar/club | 214 (59.9) | 67 (54.5) | 54 (51.9) | 93 (71.5) | |
| Private apartment | 31 (8.7) | 23 (18.7) | 4 (3.8) | 4 (3.1) | |
| Mean age (yr) [SD] | 28 [7.7] | 32 [8.2] | 27 [6.3] | 25 [6.4] | <0.0001† |
| Educational level | | | | | <0.0001 |
| Primary (incomplete) | 48 (13.8) | 4 (3.3) | 34 (33) | 10 (8.1) | |
| Primary (complete) | 114 (32.7) | 44 (36.1) | 27 (26.2) | 43 (34.7) | |
| Secondary | 159 (45.6) | 69 (56.6) | 36 (35) | 54 (43.5) | |
| University | 29 (8) | 5 (4.1) | 6 (5.8) | 17 (13.7) | |
| Living alone | 96 (26.9) | 30 (24.4) | 33 (31.7) | 33 (25.4) | NS |
| Living with an steady partner | 83 (23.2) | 29 (23.6) | 13 (12.5) | 41 (34.5) | <0.01 |
| Living with parents/family/children | 68 (19) | 35 (28.5) | 20 (19.2) | 13 (10) | 0.001 |
| Living with friends/people from her country | 142 (39.8) | 43 (35) | 44 (42.3) | 55 (42.3) | NS |
| Come because of economical reasons | 300 (84) | 109 (88.6) | 78 (75) | 113 (86.9) | 0.01 |
| Time in Catalonia | | | | | 0.025 |
| 12 mo or more | 224 (62.7) | 81 (65.9) | 73 (70.2) | 70 (53.8) | |
| Less than 12 mo | 133 (37.3) | 42 (34.1) | 31 (29.8) | 60 (46.2) | |
| Residence permit | 107 (30.2) | 64 (52) | 26 (25.7) | 17 (13.1) | <0.0001 |
| No. children | | | | | <0.0001 |
| None | 161 (34.6) | 24 (19.5) | 57 (54.8) | 80 (62.5) | |
| 1 | 102 (29.3) | 42 (34.1) | 25 (24) | 35 (27.3) | |
| 2 or more | 128 (36.1) | 80 (62.5) | 35 (27.3) | 13 (10.2) | |
| Time as sex worker | | | | | <0.001 |
| 2 yr or less | 128 (36.9) | 32 (26.2) | 46 (46) | 50 (40) | |
| More than 2 yr | 219 (63.1) | 90 (73.8) | 54 (54) | 75 (60) | |
| Mean age at starting sex work [SD] | 24.3 [6.2] | 26.6 [6.9] | 23.8 [5.2] | 22.4 [5.5] | <0.0001† |
| More than 10 clients/wk (last 6 mo) | 165 (48.4) | 69 (57) | 27 (28.1) | 69 (55.6) | <0.0001 |
| Usual use of alcohol | 171 (47.9) | 73 (59.3) | 40 (38.5) | 58 (44.6) | <0.001 |
| Consumption of illegal drugs (at any time) | 82 (23) | 39 (31.7) | 9 (8.7) | 34 (26.2) | <0.0001 |
| Use of health services (last 6 mo) | 223 (62.5) | 82 (66.7) | 61 (58.7) | 80 (61.5) | NS |
| Use of social services (last 6 mo) | 129 (36.3) | 44 (35.8) | 47 (54.4) | 38 (29.5) | 0.039 |
| Consistent use of condom (clients) | | | | | |
| Vaginal sex (last 6 mo) (n = 356) | 342 (96.9) | 118 (96.7) | 100 (99) | 124 (95.4) | NS‡ |
| Anal sex (last 6 mo) (n = 36) | 29 (85.3) | 23 (88.5) | 2 (66.7) | 4 (80) | NS‡ |
| Consistent use of condom (partners) | | | | | |
| Vaginal sex (last 6 mo) (n = 171) | 21 (12.4) | 6 (10.5) | 10 (20.4) | 5 (7.8) | NS |
| Anal sex (last 6 mo) (n = 39) | 7 (17.9) | 5 (18.5) | 1 (25) | 1 (12.5) | NS‡ |

*Pearson χ^2 .

†ANOVA.

‡Fisher exact test.

NS indicates nonsignificant.

from Eastern Europe had started earlier (22 years). Almost half (48.4%) had more than 10 clients per week, although this figure was lower for the African women (28.1%).

Alcohol was consumed (1 or more times a week) by 47.9% of the women, and 23% had taken some type of illegal drug at some time. African women took the least drugs and alcohol (8.7% and 38.5%, respectively). Only 1 woman (0.3%) reported to have injected drugs. During the last 6 months, 62.5% and 36.3% of the women had attended health care and social services, respectively. Fewer women from Eastern Europe visited the social services (29.5%).

Sexual Behavior

Most women reported they had always used condoms in the previous 6 months during sexual intercourse with clients (96.9%

and 85.3% for vaginal and anal sex, respectively). By contrast, among the 174 women with a steady partner, only 7.8% used a condom consistently during vaginal intercourse (12.5% for anal intercourse). No differences were observed according to geographic origin in the frequency of condom use (Table 1).

Prevalence of HIV and STI

The overall prevalence of CT was 5.9% (95% CI: 3.7–8.9). Although women from Eastern Europe showed a greater prevalence (8.5%, 95% CI: 4.3–14.6), the differences were not statistically significant. NG was detected in urine in only 2 women from Africa (0.6%, 95% CI: 0.1–2.0). As far as the oral fluid samples were concerned, 3 African women were HIV-positive (overall HIV

TABLE 2. Prevalence of *C. trachomatis*, *N. gonorrhoeae*, and HIV in Immigrant FSW According to Geographical Area of Origin

| | Total n/N (%) | Latin America n/N (%) | Africa n/N (%) | Eastern Europe n/N (%) |
|--|------------------|--------------------------|--------------------------|---------------------------|
| <i>C. trachomatis</i> (urine)* | 21/355 (5.9) | 7/123 (5.7) | 3/102 (2.9) [†] | 11/130 (8.5) [†] |
| <i>N. gonorrhoeae</i> (urine) [‡] | 2/353 (0.6) | — | 2/104 (1.9) | — |
| HIV (oral fluid) [§] | 3/357 (0.8) | — | 3/104 (2.9) | — |

**P* (Pearson χ^2) >0.05.

[†]Comparison between African and Eastern European FSW for CT: *P* = 0.08.

[‡]*P* (Fisher exact test) >0.05.

[§]*P* (Fisher exact test) = 0.026.

prevalence was 0.8%, 95% CI: 0.2–2.4) (Table 2). Two of the 3 HIV-positive women arrived in Catalonia over the last 12 months, and none of them reported as having injected drugs.

Factors Associated With Current CT and/or NG Infection

In the univariate logistic regression analysis, age, and unprotected sexual intercourse with clients during the last 6 months were associated with the presence of an STI. The risk of STI was greater in women aged 20 or under (OR = 5.23) compared with those over 20. The risk of STI was 5-fold higher in women who had not used a condom consistently with clients during sexual intercourse than in those who had always used a condom (OR = 5.02) (Table 3). Finally, in the multivariate analysis adjusted by geographic area of origin and time of arrival in Catalonia, age (OR = 5.29; 95% CI: 1.7–16.5) and unprotected sex with clients (OR = 5.26; 95% CI: 1.2–22.0) remained significant about the univariate analysis.

Discussion

As in other European countries,^{6–8} prostitution in Catalonia is undeniably linked to immigration, a fact that should be taken into account by the new health care policies for FSW. The precarious legal, socioeconomic, working, and family situation in which FSW find themselves and their geographic mobility can increase their vulnerability to HIV and other STI. In our study, 70% of the women were illegal immigrants, which could lead to abusive situations and economic exploitation.

The prevalence of STI among FSW in Catalonia reported in this study is lower than that observed in other European countries.^{8,25} The prevalence of CT (5.9%) was similar to that reported by Vall et al. in FSW in Barcelona (4.7%),¹⁶ although the prevalence of NG was lower (0.8% vs. 3.7%). CT and NG prevalence were similar to those reported in 2006 among sexually active young people in Catalonia (5.4% and 0.5% among women 16–24 years, respectively).²⁶ It is important to highlight that the prevalence of CT in women from Eastern Europe was higher than that of the other FSW—a result that has been reported elsewhere,^{5,8,16,17,25} although these differences were not significant. Nevertheless, study data suggest that these women are more vulnerable to STI, given their youth, short period of residence in Catalonia, and poorer access to social services. In fact, different NGOs have experienced some difficulties in targeting interventions at this group.^{16,25}

Logistic regression analysis showed that the prevalence of CT/NG is associated with young age and unprotected sex with clients. Like in other studies,²⁷ the greatest prevalence of STI was found in women less than 20 years of age. Furthermore, inconsistent use of condoms with clients also proved to be a risk factor for STI. Even though most women have protected sex with their

clients, insisting on consistent and correct use of condoms is still a preventive strategy that should be continued not only with clients but also with steady partners. Given the obstacles many women encounter when trying to negotiate the use of men condoms with their partners, the use of female condoms is an alternative that they could use to better protect themselves against HIV/STI. It is precisely with noncommercial partners that we observe most unprotected sex^{2,15,16,25}; this change in behavior is how FSW differentiate between their working and emotional lives. Although we could not corroborate this fact in our study, STI are more likely to be transmitted during private relations, and some authors have found a relationship between the diagnosis of STI and the number of noncommercial partners.²⁸ Early diagnosis and effective treatment is an essential component of STI control programmes. If possible, sexual partners of an infected person should be notified of their exposure to the infection and encouraged to seek treatment.

Similar to other studies carried out in Spain,^{3,15–17} a low prevalence of HIV was observed, which once again indicates that the stigma of HIV/AIDS prostitution is unjustified. In fact, only 3 women proved to be HIV positive, and all 3 were from Africa. This is consistent with the greater HIV prevalence observed in African women, and some authors claim that this is because of the low level of protected sex in their countries of origin, where HIV rates are high.⁵ The fact that none of them were IDU reinforce that the HIV transmission had been through sexual contact. The low frequency of IDU use among immigrant FSW has been reported before.⁵ Even though the prevalence of HIV was only 0.8%, it could increase in the future, given the high vulnerability of these women and their wide geographic mobility. Therefore, it is important to continue monitoring STI in this group.

The main limitation of this study is the impossibility of obtaining a probabilistic sample of FSW, which, together with their high mobility and other modes of less visible SW, such as Internet-based prostitution, implies that the sample studied may not be representative of the FSW in Catalonia. Nevertheless, the refusal bias was very low (7%). Second, as this was a cross-sectional study, it was not possible to establish a causal relationship between the risk factors analyzed and the prevalence of STI. This could be achieved through prospective studies. Furthermore, possible biases concerning memory and underreporting of some risk behaviors may have been introduced. In this sense, we attempted to create an anonymous atmosphere for the interviews and used simple and understandable language. Finally, the nucleic acid amplification technique used in urine samples has a sensitivity of 83% (74.2–88.2) for CT and 86.3% (76.7–92.8) for NG whereas specificities are 97.1% and 99.1% respectively, compared to culture as reported by the manufacturer. The detection of anti-HIV antibodies in oral fluid has a sensitivity and specificity of 98.6% and 97.7%, respectively. Given these sensitivities, prevalence data may have been

TABLE 3. Univariate Analysis of the Risk Factors Associated With Infection by *C. trachomatis* and/or *N. gonorrhoeae* (CT/NG) in FSW

| Variables | CT/NG | | OR | (95% CI) | P |
|---|--------|-------|------|------------|-------|
| | n/N | P (%) | | | |
| Geographical area of origin | | | | | |
| Latin America | 7/123 | 5.7 | 1 | — | — |
| Africa | 5/104 | 4.8 | 0.84 | 0.26–2.72 | 0.767 |
| Eastern Europe | 11/130 | 8.5 | 1.53 | 0.57–4.09 | 0.394 |
| Venue type | | | | | |
| Street | 7/112 | 6.3 | 1 | — | — |
| Bar/club | 14/214 | 6.5 | 1.05 | 0.41–2.68 | 0.919 |
| Private apartment | 2/31 | 6.5 | 1.03 | 0.20–5.25 | 0.967 |
| Area of enrollment | | | | | |
| Outside Barcelona | 8/187 | 4.3 | 1 | — | — |
| Barcelona | 15/170 | 8.8 | 2.16 | 0.89–5.24 | 0.087 |
| Age | | | | | |
| Over 20 | 17/328 | 5.2 | 1 | — | — |
| 20 or under | 6/27 | 22.2 | 5.23 | 1.87–14.64 | 0.002 |
| Time in Catalonia | | | | | |
| 12 mo or more | 13/224 | 5.8 | 1 | — | — |
| Less than 12 mo | 10/133 | 7.5 | 1.32 | 0.56–3.10 | 0.524 |
| Educational level | | | | | |
| Primary (incomplete) | 4/48 | 8.3 | 1 | — | — |
| Primary (complete) | 5/114 | 4.4 | 0.50 | 0.13–1.97 | 0.324 |
| Secondary/university | 13/187 | 7.0 | 0.82 | 0.25–2.64 | 0.742 |
| Living alone | | | | | |
| No | 18/261 | 6.9 | 1 | — | — |
| Yes | 5/96 | 5.2 | 0.74 | 0.27–2.06 | 0.566 |
| Living with an steady partner | | | | | |
| No | 17/274 | 6.2 | 1 | — | — |
| Yes | 6/83 | 7.2 | 1.18 | 0.45–3.09 | 0.739 |
| Living with parents/family/children | | | | | |
| No | 17/289 | 5.9 | 1 | — | — |
| Yes | 6/68 | 8.8 | 1.55 | 0.59–4.09 | 0.377 |
| Living with friends/people from her country | | | | | |
| No | 11/215 | 5.1 | 1 | — | — |
| Yes | 12/142 | 8.5 | 1.71 | 0.73–4.0 | 0.214 |
| Come because of economical reasons | | | | | |
| No | 5/57 | 8.8 | 1 | — | — |
| Yes | 18/300 | 6 | 0.66 | 0.24–1.87 | 0.437 |
| Residence permit | | | | | |
| No | 17/247 | 6.9 | 1 | — | — |
| Yes | 6/107 | 5.6 | 0.80 | 0.31–2.10 | 0.655 |
| Usual use of alcohol | | | | | |
| No | 4/186 | 7.5 | 1 | — | — |
| Yes | 9/171 | 5.3 | 0.68 | 0.29–1.62 | 0.387 |
| Drugs (at any time) | | | | | |
| No | 23/275 | 7.6 | 1 | — | — |
| Yes | 3/82 | 2.4 | 0.30 | 0.07–1.32 | 0.111 |
| Age at starting sex work | | | | | |
| 20 yr or under | 9/108 | 8.3 | 1 | — | — |
| Over 20 | 12/241 | 5.0 | 0.58 | 0.23–1.41 | 0.228 |
| Time as sex worker | | | | | |
| 2 yr or less | 10/128 | 7.8 | 1 | — | — |
| More than 2 yr | 11/219 | 5.0 | 0.62 | 0.26–1.51 | 0.297 |
| Clients/wk (last 6 mo) | | | | | |
| 1–10 | 11/176 | 6.3 | 1 | — | — |
| More than 10 | 10/165 | 6.1 | 0.97 | 0.40–2.34 | 0.942 |
| Unprotected sex (clients)—last 6 mo | | | | | |
| No | 19/337 | 5.6 | 1 | — | — |
| Yes | 3/13 | 23.1 | 5.02 | 1.27–19.77 | 0.021 |
| Unprotected sex (partner)—last 6 mo | | | | | |
| No | 1/24 | 4.2 | 1 | — | — |
| Yes | 9/149 | 6.0 | 1.48 | 0.18–12.23 | 0.717 |
| Children | | | | | |
| Yes | 9/194 | 4.6 | 1 | — | — |
| No | 14/161 | 8.7 | 1.96 | 0.82–4.65 | 0.128 |

somewhat underestimated for CT and NG. From our experience in this study and that of others, the use of alternative specimens made possible their collection outside health care centers and among populations that are difficult to reach and also increased acceptability, although the methods of choice for the diagnosis of HIV and NG/CT use serum and endocervical exudate, respectively.

Despite its limitations, this study shows that immigrant FSW, depending on their country of origin, have specific social and cultural peculiarities and, therefore, a specific approach should be adopted for each group, which should involve cultural mediators. Furthermore, the legal and personal restrictions under which these women usually work as well as their high mobility could lead to an increase in the prevalence of HIV/STI in the future, reinforcing the importance of continued work in this collective by NGOs. This work would include harm reduction and outreach programs, safe sex workshops, and health care, especially for the youngest women. In conclusion, given the high proportion of immigrants, the development of educational, social, preventive and health care strategies that are culturally adapted to this heterogeneous group is required to prevent HIV and STI infections among FSW.

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