HIV and Other Sexually Transmitted Infections Among Female Sex Workers in Kinshasa, Democratic Republic of Congo, in 2002

JUDITH M. VANDEPITTE,* FAUSTIN MALELE, MD,† DIEU-MERÇI KIVUVU, MD,† SAMUEL EDIDI,‡
JÉRÉMIE MUWONGA,‡ FRANÇOIS LEPIRA,§ SAID ABDELLATI,* JOELLE KABAMBA, MD,§
CATHERINE VAN OVERLOOP, MD,† AND ANNE BUVÉ, MD*

Objective: The objective of this study was to determine the prevalence and risk factors of HIV and other sexually transmitted infections (STIs) among female sex workers (FSWs) in Kinshasa, Democratic Republic of the Congo, in 2002.

Study Design: A cross-sectional study was conducted among FSWs presenting for the first time at the STI clinic of Matonge, Kinshasa. The women were interviewed about sociodemographic characteristics, type of sex work, and sexual behavior. Blood was taken for HIV, syphilis, and herpes simplex virus type 2 serology. Vaginal secretions were collected on swabs for the diagnosis of gonorrhea, chlamydia, and trichomoniasis.

Results: The overall HIV prevalence was 12.4% but varied within the different categories of FSWs: 11.8% in hotel-based, 24.0% in home-based, and 20.0% in street-based FSWs; 10.0% in homeless FSWs; and 6.6% in *Masquées* (clandestine sex workers). The overall herpes simplex virus type 2 seroprevalence was 58.5%.

Conclusions: The prevalence of HIV and other STIs seems to have stabilized since the beginning of the project in 1988.

From the *Institute of Tropical Medicine, STD/HIV Research & Intervention Unit, Antwerp, Belgium; †Médecins Sans Frontières Belgium, Kinshasa, DRC Congo; ‡Laboratoire National de Référence SIDA et IST (LNRS), Kinshasa, DRC Congo; and §Programme National de Lutte contre le SIDA et les IST (PNLS), Kinshasa, DRC Congo*

THE CLINIC OF MATONGE IN Kinshasa started up in 1985 as a research centre for HIV/sexually transmitted infection (STI). It was a collaboration among the Congolese government, the Centers for Disease Control and Prevention of Atlanta, and the Institute of Tropical Medicine, Antwerp. The center consisted of an STI clinic where diagnosis, based on laboratory results, treatment, and condoms were offered exclusively to female sex workers (FSWs) and their partners. The clinic succeeded to survive during the political instabilities in the early 1990s, and in 1993, Médecins Sans Frontières (MSF) took over the running of the clinic, which continues to function today. Syndromic management of STIs, using the World Health Organization-standardized algorithms, intensive health education, and condom promotion, are the pillars of the program. In the meantime, also peer education and outreach activities were organized in the community encouraging sex workers to visit the Matonge clinic.

In 1988, a cross-sectional survey was conducted among FSWs in Kinshasa. In this study, participants were actively recruited at their place of work (hotel-, home-, or street-based sex workers) and sent to the Matonge clinic for diagnosis and treatment. Of the women attending the clinic, 35% were HIV-seropositive and 75% had at least one STI: 16% had serologic evidence of active syphilis, 23% gonorrhea, 13% *Chlamydia trachomatis* infections, 22% trichomoniasis, and 5% were diagnosed with genital ulcer disease.[1]

Political instability and war since 1993 have driven the Democratic Republic of Congo into a deep socioeconomic crisis. Young girls in Kinshasa as well as married, abandoned, or widowed women are pushed into prostitution as a survival mechanism. In addition to these categories of sex workers, new "categories" have emerged. The so-called *Phaseures* are homeless girls or women selling sex to survive. This group consists of street children, orphans, girls who have abandoned their families, and abandoned women. The so-called *Masquées* are women involved in clandestine and/or occasional sex work. This very heterogeneous group comprises women who need additional money to survive but who do not want to be recognized openly as commercial sex workers. In 2001, among women presenting at the Matonge clinic, 39% were Masquées, 28% were home-based sex workers, 18% were hotel-based, 3% were street-based, and 12% were *Phaseures*.

In this changed context and after more than 10 years of interventions targeting sex workers in Kinshasa, we set out to assess the prevalence of HIV infection and other STIs among sex workers attending the clinic in Matonge for the first time in 2002.

Methods

Study Population and Data Collection

All women involved in sex work presenting for the first time at the STI clinic in Matonge between September and December 2002 were eligible to participate in the study. Study procedures were explained to all eligible women and they were offered pre- and posttest counseling for HIV before informed consent was obtained to participate in the study.

A standardized questionnaire was developed for the data collection. A trained nurse interviewed the participants on sociode-

mographic characteristics, type of sex work, client recruitment, and condom use. In addition, information on current gynecologic symptoms or complaints was recorded.

After the interview, the study participants were requested to give a blood sample that was tested for HIV, syphilis, and herpes simplex virus type 2 (HSV-2). A physician carried out a clinical examination, including a pelvic examination. Vaginal secretions were collected on swabs for the diagnosis of gonorrhea, *C. trachomatis* infection, and trichomoniasis.

The patients were treated on the spot following the guidelines for the syndromic management of STIs. They also received health education and free condoms and were invited to return after 1 week for additional treatment, if indicated.

Laboratory Procedures

At the pelvic examination, 2 vaginal secretion specimens were collected. The first one was inoculated onto a culture medium for *Trichomonas vaginalis* (InPouch TV; Biomed Diagnostics, San Jose, CA). The InPouch culture medium was incubated for 5 days if no growth was observed after 3 days of incubation at 36°C. The second swab was stored at −20°C until shipment to Antwerp for further processing. There, the swab was tested for *Neisseria gonorrhoeae* and *C. trachomatis* using the Strand Displacement Amplification Assay (SDA; Probetec; Becton Dickinson, Sparks, MD). Samples testing positive on the SDA were confirmed with the Amplicor CT/NG polymerase chain reaction (PCR) test (Roche Diagnostic Systems Inc., Branchburg, NJ).

Syphilis serology was assessed with the rapid plasma reagin (RPR) test, Macro-Vue RPR Card Test (Becton Dickinson, Le Pont de Claix, France) and the *Treponema pallidum* particle agglutination (TPPA Serodia; Fujirebio, Tokyo, Japan). Women were considered to have active or untreated syphilis if they tested positive on the RPR and the TPPA.

Testing for HIV was done in Kinshasa using a dual testing strategy (Enzygnost HIV1/2 plus; Dade Behring, Marburg, Germany; HIV-Determine; Abbott Laboratories, Tokyo, Japan). Positive results were reconfirmed in the HIV/STI laboratory of the Institute of Tropical Medicine in Antwerp (ITM), Belgium, using the Vironostica HIV Uni-form II plus O ELISA test (BioMérieux, Boxtel, The Netherlands).

Finally, type-specific HSV-2 antibodies were determined using a commercially available enzyme-linked immunosorbent assay (Kalon Biologic Ltd., Aldershot, U.K.).

Trichomonas culture, syphilis, and HIV testing were done at the Laboratoire National de Référence SIDA et IST (LNRS). Aliquots of serum samples were shipped to ITM, Antwerp, for HSV-2 serology and external quality control of the HIV and syphilis serology.

Statistical Methods

Data were entered in Epi-info 4.06 (Centers for Disease Control and Prevention, Atlanta, GA) and analyzed using Stata 8.0 (Stata Inc., TX). The study population was described by summary statistics (percentages, means, and medians). The prevalence of HIV and other STIs were compared in the different types of sex workers using the Fisher exact test. Risk factors for HIV infection were examined first by univariate analysis. Continuous data such as age, time in prostitution, age at first sex, numbers of clients, and cost per sex act were categorized according to the mean or median. Odds ratios (with 95% confidence intervals) were used to measure the magnitude of the association with HIV infection. All variables for which a P value <0.10 was obtained in the univariate analysis were considered as potential confounders and included in the final model for multivariate logistic regression.

Ethical approval for the study was obtained from the Ethics Committee of the Institute of Tropical Medicine, the Programme National de Lutte contre le Sida (PNLS) and Médecins Sans Frontières.

Results

Sociodemographic Characteristics, Sex Work, and Condom Use

Between September and December 2002, 585 women presented spontaneously and for the first time to the clinic in Matonge and 502 (81%) agreed to participate. Table 1 describes the characteristics of the study population in terms of sociodemographic characteristics, type of sex work, and condom use.

TABLE 1. Characteristics of the FSWs Attending the Sexually Transmitted Infection Clinic in Matonge in Kinshasa (n = 502)

Characteristics	No. (%)
Age (yrs)	
<20	136 (27.1%)
20–24	178 (35.5%)
25–29	113 (22.5%)
30–39	63 (12.5%)
≥40	12 (2.4%)
Category of FSW	
Hotel-based	17 (3.4%)
Home-based	146 (29.1%)
Street-based	10 (2.0%)
*Phaseures**	40 (8.0%)
*Masquées**	289 (57.5%)
Level of education	
None	11 (2.2%)
Primary	136 (27.1%)
Secondary	327 (65.1%)
Higher	28 (5.6%)
Age at first sex (yrs)	
≤12	81 (16.1%)
13–14	134 (26.7%)
15–16	174 (34.7%)
≥17	113 (22.5%)
Time in prostitution (months)	
≤12	136 (27.1%)
13–24	107 (21.3%)
25–36	98 (19.5%)
>36	161 (32.1%)
Have a stable partner	
Yes	301 (60%)
No	201 (40%)
Number of clients per week	
≤10	104 (20.7%)
11–15	183 (36.5%)
16–20	135 (26.9%)
>20	80 (15.9%)
Condom use with client	
Always	134 (26.7%)
Sometimes	333 (66.3%)
Never	35 (7.0%)
Condom use last working day	
Always	371 (73.9%)
Sometimes	69 (13.7%)
Never	62 (12.4%)
Cost per sex act (CF)[†]	
≤500	290 (57.8%)
>500	212 (42.2%)
Cost per night (CF)[†] (n = 438)	
<1,500	203 (46.4%)
≥1,500	235 (53.6%)

Phaseures are homeless people working as FSWs; *Masquées* are involved in clandestine/occasional sex work.
[†]Congolese francs: 450 CF = 1 Ç.
FSWs indicates female sex workers.

TABLE 2. Comparison of Characteristics of *Masquées* (clandestine/occasional FSWs) With the Other Types of FSWs (hotel-, home-, street-based, *Phaseures*)

Characteristic	*Masquées* (n = 289)	Other (n = 213)	*P*
Mean age in years (range)	21 (12–32)	27 (10–46)	0.000
Primary school or no education (%)	75 (26.0)	72 (33.8)	0.06
Median no. of months in prostitution (range)	24 (1–228)	36 (1–324)	0.0008
Mean age at sexual debut (range)	15 (7–20)	15 (8–23)	0.41
Has a steady partner (%)	185 (64.0)	185 (54.5)	0.03
Median no. of clients during last working day (range)	3 (1–8)	3 (1–6)	0.04
Mean no. of clients per week (range)	16 (4–49)	15 (1–35)	0.04
Consistent condom use with clients (%)	72 (24.9)	62 (29.1)	0.3
Consistent condom use during the last working day (%)	207 (71.6)	164 (77.0)	0.09
Median cost per sex act (range)*	500 (150–20,000)	500 (100–10,000)	0.91
Median cost per night (range)*	1,500 (400–40,000)	1,500 (500–20,000)	0.24

*Congolese francs: 450 CF = 1 Ç.
FSWs indicates female sex workers.

Seventeen women (3.4%) recruited their clients in hotels (hotel-based), 146 (29.1%) at home (home-based), and 10 (2.0%) on the street (street-based FSW); 40 (8.0%) were homeless people, living and working on the street (*Phaseures*) and 289 (57.5%) were women involved in clandestine or occasional sex work (*Masquées*). The mean age of the participants was 23 years (range: 10–46 years). The P*haseures* were on average younger than the other women and the home-based FSWs were older (mean age: 18 and 29 years, respectively). Nearly 30% of the women had never been to school or had only reached the primary school level. Sixty percent reported having a steady partner, ranging from 40% among the street-based sex workers to 82% among those working in hotels. The median duration of sex work was 3 years, but 27% of the participants had worked as FSWs for ≤1 year. The mean age at sexual debut was 12 years for the *Phaseures* and 15 years for the other categories of FSWs. Overall, the women recruited an average number of 16 clients a week. Only 27% declared consistent condom use (always) with clients, 66% not consistent condom use (not always), and 7% never used a condom. However, when recalled for the last working day, 74% of the women reported condom use with all clients, 14% with some of the clients, and 12% did not use a condom with any of them.

Any differences between *Masquées* and the other categories of women who do openly acknowledge working as sex workers were further explored. *Masquées* were younger, were involved in sex work for a shorter period, and recruited by average more clients than the other FSWs (Table 2). The rate of consistent condom use was similar in both groups.

Prevalence of HIV and Other Sexually Transmitted Infection

Table 3 presents the prevalence of HIV and other STI for the different categories of sex workers. Overall, 12.4% (95% confidence interval [CI]: 9.62–15.58) of the women were HIV-seropositive. The home-based FSWs were most affected (24.0%, 95% CI: 17.30–31.73) followed by the street-based FSWs (20.0%, 95% CI: 2.52–55.61), the hotel-based (11.8%, 95% CI: 1.46–36.44), the *Phaseures* (10.0%, 95% CI: 2.79–23.66), and finally the *Masquées* (6.6%, 95% CI: 4.00–10.08).

Sixty-two percent of the study participants had at least one STI. *N. gonorrhoeae* and *C. trachomatis* were detected in, respectively, 7.8% and 8.4% of the women, and 2.2% of women were dually infected. The *Phaseures* had the highest rates of

TABLE 3. Prevalence of HIV and Other Sexually Transmitted Diseases Among Sex Workers Attending the Sexually Transmitted Infection Clinic in Matonge, 2002 (n = 502)

		Category of Sex Workers					
	Total Study Population	Hotel-Based (N = 17)	Home-Based (N = 146)	Street-Based (N = 10)	*Phaseures* (N = 40)	*Masquées* (N = 289)	*P* Fisher Exact Test
HIV	62/501 (12.4%)	2 (11.8%)	35 (24.0%)	2 (20.0%)	4 (10.0%)	19 (6.6%)	0.000
Herpes simplex virus type 2	293/501 (58.5%)	13 (76.5%)	109 (74.7%)	5 (50.0%)	21 (53.5%)	145 (50.7%)	0.000
Syphilis*	13/502 (2.6%)	1 (5.9%)	6 (4.1%)	0	1 (2.5%)	5 (1.7%)	0.323
Neisseria gonorrhoeae	39/499 (7.8%)	3 (17.6%)	10 (6.9%)	1 (10.0%)	9 (22.5%)	16 (5.6%)	0.004
Chlamydia trachomatis	42/499 (8.4%)	2 (11.8%)	7 (4.9%)	0	7 (17.5%)	26 (9.0%)	0.093
Trichomonas vaginalis	43/502 (8.6%)	2 (11.8%)	11 (7.5%)	3 (30.0%)	9 (22.5%)	18 (6.2%)	0.002

*Rapid plasma reagin + *Treponema pallidum* particle agglutination +.

TABLE 4. Factors Associated With HIV in Female Sex Workers Attending the Matonge Clinic: Univariate Analysis (n = 501) and multivariate Analysis Using Logistic Regression (n = 457)

Characteristics	No. HIV-Positive (%)	Crude Odds Ratio (95% confidence interval)	P	Adjusted Odds Ratio (95% confidence interval)	P
Age (yrs)					
≤23	14/275 (5.1%)	—	—	—	—
>23	48/226 (21.2%)	5.03 (2.64–9.58)	0.00	3.43 (1.49–7.89)	0.004
Category of sex worker					
Phaseures	4/39 (10.3%)	1.62 (0.52–5.06)	0.40	—	—
Hotel-based	2/17 (11.8%)	1.89 (0.40–4.94)	0.41	—	—
Street-based	2/10 (20.0%)	3.55 (0.70–18.09)	0.10	—	—
Home-based	35/146 (24.0%)	4.48 (2.41–8.34)	0.00	—	—
Masquées	19/289 (6.6%)	—	—	—	—
Education level					
No or primary	18/146 (12.3%)	—	—	—	—
Secondary or more	44/355 (12.4%)	1.01 (0.56–1.81)	0.98	—	—
Time in prostitution (yrs)					
≤3	23/249 (9.1%)	—	—	—	—
>3	39/252 (15.7%)	1.80 (1.04–3.12)	0.03	1.57 (0.78–3.18)	0.21
Age at first sex (yrs)					
≤15	21/214 (9.8%)	—	—	—	—
>15	41/287 (14.3%)	1.53 (0.88–2.70)	0.13	—	—
Average no. of clients per week					
≥16	23/279 (8.2%)	—	—	—	—
<16	39/222 (17.6%)	2.38 (1.36–4.13)	0.002	2.69 (1.39–5.21)	0.003
Having a stable partner					
Yes	36/300 (12%)	—	—	—	—
No	26/201 (13%)	0.19 (0.63–1.87)	0.76	—	—
Average condom use with client					
Not always	42/368 (12.4%)	—	—	—	—
Always	20/133 (15.0%)	1.37 (0.77–2.44)	0.28	—	—
Condom use during last working day					
Not always	9/131 (6.9%)	—	—	—	—
Always	53/370 (14.3%)	2.27 (1.08–4.76)	0.03	3.05 (1.21–7.71)	0.02
Cost per sex act (Congolese francs)					
≤500	33/296 (11.1%)	—	—	—	—
>500	29/205 (14.1%)	1.31 (0.77–2.24)	0.32	—	—
Cost per night (Congolese francs)					
≤1,500	21/203 (10.3%)	—	—	—	—
>1,500	36/235 (15.3%)	1.57 (0.88–2.79)	0.12	—	—
Neisseria gonorrhoeae (PCR)					
Positive	8/39 (20.5%)	—	—	—	—
Negative	54/459 (11.8%)	0.52 (0.22–1.19)	0.11	—	—
Chlamydia trachomatis (PCR)					
Positive	4/41 (9.8%)	—	—	—	—
Negative	58/457 (12.7%)	0.34 (0.46–3.92)	0.59	—	—
Trichomonas vaginalis (Inpouch)					
Negative	53/459 (11.6%)	—	—	—	—
Positive	9/42 (21.4%)	2.09 (0.94–4.62)	0.06	1.78 (0.63–5.01)	0.28
Herpes simplex virus type 2 serology					
Negative	3/205 (1.5%)	—	—	—	—
Positive	58/293 (19.8%)	16.62 (4.89–56.52)	0.00	9.26 (2.77–31.01)	0.00
Syphilis (rapid plasma reagin + *Treponema pallidum* particle agglutination +)					
Negative	58/488 (11.9%)	—	—	—	—
Positive	4/13 (30.8%)	3.30 (0.98–11.11)	0.04	1.77 (0.40–7.92)	0.46

PCR indicates polymerase chain reaction.

gonorrhea and chlamydia, 22.5% and 17.5%, respectively. The overall prevalence of *T. vaginalis* was 8.6%, but reached 20.5% and 30.0% in *Phaseures* and street-based FSWs, respectively. Positive RPR and TPPA, suggesting active untreated syphilis, were found in 2.6% of the study population. HSV-2 infection was the most prevalent STI, ranging from 50% in the *Masquées* and street workers up to approximately 75% in hotel- and home-based sex workers.

Factors Associated With HIV Infection

Older age, type of sex work ("other" vs. *Masquées*), longer time in prostitution, fewer numbers of clients per week, consistent condom use during the last day, positive HSV-2 serology, and active syphilis were independently associated with HIV infection in univariate analysis. After multivariate analysis, HIV infection remained statistically significantly associated with increasing age, fewer number of clients per week, consistent condom use in last working day, and HSV-2 infection (Table 4).

Discussion

Among FSWs attending for the first time the Matonge STI clinic in Kinshasa, in 2002, 12.4% were found to be HIV-infected. The study population consisted of different categories of FSWs: women recruiting clients in hotels, at home, or on the street; homeless women involved in sex work; and clandestine FSWs. A similar cross-sectional study conducted in 1988 among hotel-, home-, and street-based sex workers in Kinshasa found an HIV prevalence of 35%.[1] The HIV prevalence among the same 3 categories of FSWs in the current study was 22.5%, suggesting a decline in HIV prevalence. Also, the prevalence of other STIs decreased in the 3 overlapping categories: the prevalence of syphilis dropped from 16% in 1988 to 3.5% in 2002, gonorrhea from 23% to 8.1%, chlamydial infection from 13% to 5.2%, and trichomoniasis from 22% to 9.2%. In 2002, more sensitive laboratory tests were used for the diagnosis of STI compared with 1988. In the current study, gonorrhea and chlamydial infections were detected using PCR versus culture in 1988, and *T. vaginalis* was isolated by culture versus microscopy in 1988. So the actual decline in prevalence of other STIs may be even more pronounced.

Decreasing trends in prevalence of HIV and other STIs have also been observed in other settings where STI/HIV prevention programs were implemented for FSWs. In Abidjan, Côte d'Ivoire, the HIV prevalence dropped from 89% to 32% between 1992 and 1998[2]; in Cotonou, Benin, from 53% in 1993 to 41% in 1999[3]; and in Bobo-Dioulasso, Burkina Faso, there was a decrease from 57% to 41% from 1994 to 2000.[4] All 3 studies also reported a significant decline in the STI prevalence. It is believed that changes in sociodemographic characteristics and shifts of the nationalities of the women may have played a role but that it was mainly the change in sexual behavior and the improved STI case management that had contributed to this success.

However, the decline in HIV and other STIs in the overlapping categories of FSWs in Kinshasa should be interpreted with caution; the studies in 1988 and in 2002 were both cross-sectional, conducted 14 years apart, and were not specifically designed to assess trends over time. The study populations had been selected in different ways. In 1988, sex workers were approached at their place of work and invited to the clinic in Matonge, whereas in 2002, we enrolled sex workers presenting spontaneously and for the first time at the clinic. Although the activities in the Matonge clinic are well accepted throughout the sex worker communities in Kinshasa, the actual coverage of the clinic is not known, so some selection bias may have occurred. Nevertheless, the results of the current study confirm that the HIV prevalence in Kinshasa does not increase dramatically as one would expect in a context of profound political and social instability. Also, Mulanga-Kabeye et al found a stabilization of HIV prevalence in selected population groups, including FSWs, in Kinshasa.[5]

Sexual behavior changes are difficult to quantify and their impact on the HIV/STI epidemic even more. Condom promotion and distribution is one of the major interventions offered by the MSF FSW Project in Kinshasa. Condom use is difficult to evaluate, because it relies on self-reported behavior.[6] In the current study, only 27% of the women reported consistent condom use with clients, 66% answered sometimes, and 7% never. However, when they were asked to recall condom use during the last working day, 74% answered always, 14% sometimes, and 12% never. In contrast in 1988, 8% of hotel-based, 6% of home-based, and 20% of street-based sex workers reported regular condom use.[1]

The current study has demonstrated furthermore that the sex worker population may have changed considerably over time. At the beginning of the project, the clinic could easily categorize all women according to the place where clients were recruited, i.e., in hotels, at home, or on the street. By 2002, 2 new categories had appeared: the *Phaseures* and the so-called *Masquées*, the latter making up 58% of the clinic population in 2002. Although the *Masquées* did not want to be considered FSWs, they were not significantly different from the other self-acknowledging sex workers in terms of sexual behavior; they recruited even slightly more clients per day or per week and had a comparable pattern of condom use. Almost 7% of them were HIV-infected and 50.7% had HSV-2 antibodies; the prevalence of the other STI was comparable in both groups. The univariate analysis of risk factors for HIV infection showed that the *Masquées* were nearly 4 times less at risk than the other FSWs. However, this association disappeared in the multivariate analysis.

The multivariate analysis showed furthermore that FSWs with fewer clients per week were more at risk of being HIV-infected than those with more clients per week. A similar negative association between HIV infection and numbers of partners was found among men living in rural Tanzania.[7] A possible explanation is that HIV-infected sex workers may have to reduce their workload because of HIV-related illness.

HSV-2 antibodies were detected in 58.5% of our study population and this was also the main risk factor for HIV infection (adjusted odds ratio: 9.26, $P = 0.00$). Home- and hotel-based FSWs had the highest HSV-2 seroprevalence (74.5% and 76.5%, respectively). The age-specific HSV-2 seroprevalence increased gradually: from 39.3% in women ≤19 years to 82.7% in those of 30 years and more. These findings are consistent with results from other studies conducted among FSWs in African settings. In Lagos, Nigeria, 59% of FSWs had HSV-2 antibodies,[8] 73% in Nairobi, Kenya,[9] 91% in Cotonou, Benin, 84% in Yaoundé, Cameroun, 94% in Kisumu, Kenya, and 87% in Ndola, Zambia.[10]

In conclusion, the Matonge clinic in Kinshasa, which opened in 1985, was one of the first initiatives targeting FSWs in sub-Saharan Africa. Many efforts have gone into improving the sexually transmitted disease case management and making the population aware of the threat of HIV and how it can be prevented. The clinic managed to continue functioning during the war of the early 1990s. Now, more than 10 years later, the prevalence of HIV and other STIs in the FSW population seems, at least, to have stabilized, if not declined.

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