Reviews/Analyses

HIV and female sex workers

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In this review of published findings on human immunodeficiency virus (HIV) infection and risk factors among female sex workers, we summarize the results of seroprevalence studies in different countries and discuss the different patterns of transmission among such workers in various geographical regions. The highest rates of HIV infection occur in sub-Saharan Africa, where the widespread existence of sexually transmitted diseases may play an important role in sustaining transmission. In Europe and North America injecting drug use continues to be the major factor associated with HIV infection among female sex workers, while in Latin America and parts of Asia there is a more mixed pattern of heterosexual and parenteral transmission from injecting drug use. Reviewed also are studies of the risk factors associated with HIV infection among female sex workers, such as drug use, sexual behaviour, the presence of sexually transmitted diseases, and condom use; in addition, we comment on some studies of the clients of sex workers. Finally, we propose directions that future research in this area might take and discuss various interventions that need to be undertaken to reduce HIV transmission among female sex workers.

Introduction

At the beginning of the acquired immunodeficiency syndrome (AIDS) pandemic it was thought that female sex workers might constitute a high-risk group for the transmission of human immunodeficiency virus (HIV). Because seroprevalence studies showed high rates of infection among female sex workers in Africa, it was feared that in Europe and the USA also such women might spread HIV heterosexually. This belief has resulted in increased stigmatization of sex workers, and in some places has led to restrictive legislation, such as mandatory HIV testing and the quarantining of infected persons (*1*).

Sex workers are, however, a heterogeneous group in terms of their working environment, socioeconomic situation, health status, and knowledge and practice of protective measures. The HIV seroprevalence rates among them vary considerably from country to country, within the same country, and from one type of sex worker to another. More than sexual promiscuity *per se*, HIV infection is associated with other risk factors, such as drug injection behaviour, having a steady sexual partner who is an injecting drug user, and infection with sexually transmitted diseases (STDs).

In this article, we review the literature published in English, French, and Spanish on HIV infection among female sex workers in various parts of the world and discuss the principal risk factors associated with acquisition of the virus. We also comment on some HIV studies that have been carried out on the clients of sex workers. Finally, we make proposals for future research efforts and discuss various interventions that need to be undertaken to reduce HIV transmission among sex workers and their clients.

Types of sex work

Although most of the studies do not report HIV seroprevalences by type of sex workers, it is important to recognize that there are many forms of sex work,

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which frequently vary from country to country. In general, individuals who "work the streets" are the most visible in all cultures. However, sex workers also recruit clients in hotels, bars, bus stations, or truck stops; they may be attached to brothels, saunas, or massage parlours, or work as hostesses in clubs; they may maintain a private list of clients and operate from their own homes as independent call-girls; or they may be employed by private agencies such as escort services (*1, 2*). Some forms of sex work, such as Amsterdam's "window prostitutes" (*3*) or India's high-class courtesans, who are accomplished in music and dancing (*4*), may be exclusive to a particular country.

One difficulty in attempting to classify sex workers by type is what criteria to select. Depending on how commercial sex is organized in a particular country or the purpose of the investigation, it may be more useful to categorize such workers by place of client recruitment (e.g., on the streets, in hotels or clubs, from home), type of client (local or foreigner), amount charged, registered versus "freelance", etc. Furthermore, although the different types of sex workers may be well-known in a particular country or area, not all subgroups are equally accessible. It may be possible to recruit a relatively large street sample, since these women can be approached directly and offered incentives to participate (e.g., health care, free condoms, an opportunity to discuss their problems). However, it may be much more difficult to recruit women who work in clubs or brothels, particularly if there is management opposition; and it is virtually impossible to reach women who work privately, such as call-girls or housewives who occasionally supplement the family income in this way. Since representative samples of sex workers are notoriously difficult to obtain, researchers frequently resort to "convenience samples" recruited using various techniques; for example, from STD clinics, drug-treatment centres, through sex workers' organizations, and by advertising in newspapers or magazines. Consequently, the samples may not be representative of the whole population of sex workers in a particular area.

The great variability in the types of sex workers and the large but unknown amount of "hidden" commercial sex (women who work independently, sporadically, and may not even consider themselves to be sex workers) make it impossible, in most cases, to estimate how many women are involved in the sex industry. Thus there are no reliable denominators on which to base estimates of the total amount of HIV infection among sex workers.

These issues limit the extent to which the results of the studies reviewed here can be generalized or compared with one another. Futhermore, several of the studies were carried out some time ago and may no longer be relevant to the current situation; also, sample sizes are often too small to be meaningful. Nevertheless, many investigations yielded similar results, thus strengthening the conclusions reached by individual studies. Hence, with all their limitations, the studies reviewed here give an indication of the magnitude of HIV seroprevalence among sex workers in different countries and the principal risk factors associated with HIV infection.

HIV seroprevalence

It is useful to examine the rates of HIV infection among female sex workers in the light of the general patterns of transmission of the virus that prevail in different geographical regions (*5*).

In North America and Western Europe, most cases of HIV infection are among homosexuals or injecting drug users, with only a small — but growing — proportion of cases arising from heterosexual transmission. Available statistics from countries in these two areas indicate that most cases of HIV infection among female sex workers are associated with drug injection.

In sub-Saharan Africa, HIV transmission is considered to be mainly heterosexual, and there is probably little, if any, injecting drug use. Sex workers have the highest rates of infection in this area and are considered to play an important role in the heterosexual transmission of HIV. The high prevalence of STDs in sub-Saharan Africa is considered to be a major cofactor in the transmission of HIV.

In the Caribbean, the pattern appears to be more mixed between homosexual and heterosexual transmission. In Haiti and the Dominican Republic, for example, male sex workers may have become infected through their contact with male clients, and then passed the infection on to female sex workers who were their lovers.

In many Latin American countries, the predominant modes of HIV transmission appear to be male-to-male and male-to-female. There is also increasing evidence of injecting drug use in a number of countries in this area.

Asian countries had relatively few cases of HIV infection until recently, and no single route of transmission clearly predominates. In the last few years, however, there has been an explosion of HIV infection among those female sex workers, while there is also evidence for injecting drug use in some areas of Thailand (*6*) and India (*7*), and a considerable amount of commercial homosexual activity in Thailand and Indonesia. Much publicity has been given to the phenomenon of "sex tourism" in some of these

countries; however, HIV infection rates are higher among those female sex workers whose clients are local rather than among those whose clients are tourists from industrialized countries (*8*).

In other areas of the world sex workers are likely to be infected with HIV to a greater or lesser extent, in accordance with the local routes of transmission that predominate. For example, in the Middle East, there is probably extensive, but unrecognized, male-to-male sexual contact, while Eastern Europe is thought to have a considerable amount of underground homosexuality and injecting drug use. The economic instability brought about by the recent collapse of communism in many Eastern European countries has probably resulted in an increase in the number of women who exchange sexual services for money in order to support their families (*9*). An additional problem is that condoms were until recently illegal in a number of Eastern European countries such as Romania and Poland. At present, however, no studies of female sex workers in these areas have appeared in internationally circulated journals.

North America and Western Europe

Studies in the USA have generally shown that seroprevalence rates are relatively low among female sex workers, in general, but are much higher among those workers who are injecting drug users (Table 1). For example, of 1396 sex workers, 50% of whom were injecting drug users, who participated in a multicentre study carried out by the Centers for Disease Control (CDC) in 1986–87, 20% of the drug users and 5% of the non-drug users were HIV positive (*10*). Also of 118 sex workers studied in New York in 1985–87, 31% of those who injected drugs versus only 7% of those who did not were HIV positive (*11*). In 1987 a study of large groups of sex workers in Nevada found no cases of HIV infection among 535 women, while 6% of 370 women who injected drugs were infected (*12*). A study in Florida of 90 women in 1987 reported higher rates of infection: 46% of the 63 injecting drug users and 30% of the 27 who did not inject drugs were seropositive (*13*).

The situation in Europe is similar to that in North America in that injecting drug use seems to be the major risk factor for HIV infection among sex workers (see Table 1). Where data are available, seroprevalence rates are much higher among women who are injecting drug users: 40% versus 1% in Paris (1986–88) (*14*); and 36% versus 2% in four Italian cities in 1988 (*15*).

Seroprevalence rates appear to be lower in Germany, perhaps because studies there have involved registered sex workers, among whom injecting drug use is thought to be rare. For example, of 1808 sex workers followed between 1985 and 1988 in Frankfurt, 4% were seropositive (*16*), while in 1985 only 1% of 2000 female sex workers in six German cities were seropositive (no data were available on drug use in these groups) (*17*). A study in Nuremberg in 1986 also found no evidence of HIV infection among 399 female sex workers (only one of whom was an injecting drug user) (*18*).

Female sex workers in France also seem to have low seroprevalence rates: 0% of 56 women in Paris in 1985 (none of whom injected drugs) (*19*); 0% of 58 women in Paris in 1988 (none of whom injected drugs) (*14*); and 5 of 97 women in Toulouse in 1985–89, of whom two injected drugs (*20*).

Studies in Spain follow the European model in showing a large difference between the seroprevalence rates among sex workers who inject drugs and those who do not. For example, in a large study of 531 women in Oviedo in 1986–87, 48% of 65 women who injected drugs were seropositive versus 1% of 466 women who did not (*21*). The results of other studies are similar: 45% versus 2% in a study of 70 women in Seville in 1985 (*22*); 37% versus 5% among 71 women in Catalonia in 1988 (*23*); 71% versus 2% among 313 women in Madrid in 1985–89 (*24*); and 60% versus 0.6% among 244 women in Madrid in 1986–88 (*25*). The most recent Spanish data, from a multicentre cross-sectional study carried out at 6-month intervals between 1989 and 1991, show a slightly higher seroprevalence than most of the earlier studies among women who do not inject drugs: 4% of 761 non-injecting sex workers versus 53% of 218 of those who did inject drugs (*26*).

A multicentre European survey of 866 sex workers from nine European centres (Amsterdam, Antwerp, Athens, Copenhagen, Lisbon, London, Paris, Vienna and eight cities in Spain) carried out in 1990–91 found that the HIV seroprevalence was 32% among women who were injecting drug users and <2% among women who did not inject drugs (*27*).

Sub-Saharan Africa and the Caribbean

Most HIV transmission in these regions is heterosexual, although some parenteral transmission may occur from transfusions, inadequately sterilized needles, or the use of sharp instruments in rituals such as scarification (*28, 29*).

As shown in Table 2, seroprevalence rates in these countries tend to be very high, with many studies reporting that more than a third of sex workers are infected with HIV. Although a study in Ghana in 1985 found that only 1 of 98 sex workers was seropositive (*30*), this probably reflects the later intro-

Table 1: **Summary of the findings of HIV seroprevalence studies among sex workers in North America, Australia, and Europe**

	Year of study	No. HIV positive / No. tested						Reference
		IDU[a]		Non-IDU		Total		
North America								
Canada								
Ottawa	1984	10/50	(20)[b]	0/11	(0)	10/61	(16)	*113*
USA								
Multicentre	1986–87	138/693	(20)	34/703	(5)	172/1396	(12)	*10*
Nevada	1987	NA[c]		NA		0/535	(0)	*12*
Nevada	1987	23/370	(6)	—	—	23/370	(6)	*12*
New York	1985–87	5/16	(31)	7/102	(7)	12/118	(10)	*11*
New York	1988	1/6	(17)	0/72	(0)	1/78	(1)	*114*
Florida	1987	29/63	(46)	8/27	(30)	37/90	(41)	*13*
Australia								
Sydney	1985	0/25	(0)	0/107	(0)	0/132	(0)	*115*
Europe								
England								
London	1985	0/3	(0)	0/47	(0)	0/50	(0)	*116*
London	1986	NA		NA		2/132	(2)	*95*
Greece								
Athens	1984–85	—	—	12/350	(3)	12/350	(3)	*92*
Netherlands								
Amsterdam	1985–87	34/96	(35)	1/21	(5)	35/117	(30)	*117*
Germany								
Six cities	1985	NA		NA		17/2000	(1)	*17*
Nuremberg	1986	0/1	(0)	0/398	(0)	0/399	(0)	*18*
Frankfurt	1985–88	NA		NA		?/1808	(4)	*16*
France								
Paris	1985	—	—	0/56	(0)	0/56	(0)	*19*
Paris	1986–88	4/10	(40)	4/274	(1)	8/284	(3)	*14*
Paris	1988	—	—	0/58	(0)	0/58	(0)	*14*
Toulouse	1985–89	2/?	NA	3/?		5/97	(5)	*20*
Italy								
Two cities	1985–87	13/22	(59)	0/14	(0)	13/36	(36)	*118*
Four cities	1988	41/114	(36)	3/190	(2)	44/304	(14)	*15*
Belgium								
Antwerp	1988	0/4	(0)	1/79	(1)	1/83	(1)	*119*
Spain								
Seville	1985	5/11	(45)	1/59	(2)	6/70	(9)	*22*
Seville	1989–90	2/10	(20)	2/78	(2)	4/88	(4)	*120*
Madrid	1985–89	105/148	(71)	3/165	(2)	108/313	(34)	*24*
Madrid	1986	3/5	(60)	0/38	(0)	3/43	(7)	*121*
Madrid	1986–88	56/94	(60)	1/150	(1)	57/244	(23)	*25*
Oviedo	1986–87	31/65	(48)	7/466	(1)	38/531	(7)	*21*
Valencia	1988	NA		NA		3/53	(6)	*122*
Malaga	1987	NA		NA		3/70	(4)	*123*
Catalonia	1988	3/8	(37)	3/63	(5)	6/71	(8)	*23*
Multicentre	1989–91	115/218	(53)	28/761	(4)	146/1037	(14)	*26*
Europe								
Multicentre; (9 countries)	1990–91	35/110	(32)	11/756	(1.5)	46/866	(5)	*27*

[a] IDU = injecting drug user.
[b] Figures in parentheses are percentages.
[c] NA = not available.

duction of HIV into the country, since 7% of sex workers in Accra were seropositive in 1987 and 16% in 1989 (*29*). In Zaire, studies in Kinshasa found seroprevalence rates of 27% among 377 sex workers in 1985 (*31*) and 35% among 1233 sex workers in 1988 (*32*). A smaller but substantial proportion of seropositivity was reported in a serosurvey carried out in rural Zaire in 1986: 11% of 283 sex workers (*33*). In Kenya an increase in circulation of HIV is clearly evident among sex workers in Nairobi — while only 4% were seropositive in 1981, well over half the women in five subsequent studies were found to be infected (*34–36*).

Nigeria was initially one of the sub-Saharan countries least affected by the HIV pandemic, but studies now show an apparently increasing seroprevalence among female sex workers (e.g., in Borno State from only 0.5% of 767 sex workers in 1986–87 to 5% of 353 sex workers in 1988) (*37*). In 1990, 10% of 546 female sex workers were found to be HIV positive in Lagos State (*38*).

Although Somalia shares a border with Kenya, there was almost no evidence of HIV infection among any of the population groups surveyed in Somalia in 1985, 1987, and 1989; however, 9 of 302 sex workers studied in 1990 were seropositive (*39*).

There are clear indications of HIV infection among Caribbean sex workers, especially in Haiti, one of the countries associated with the earliest cases of AIDS. A study of 350 women in 1987 found that 11% were HIV positive,[a] while in 1987–88 another study reported that the seroprevalence was 37% (*40*). Although the Dominican Republic and Haiti are on the same island, the former has considerably lower rates of infection, varying between 0% in 1984–85 (*41*) and 2.6% in 1987–88 (*42*). Four studies carried out in Martinique in successive years show rising rates of infection, from 33% in 1985 to 50% in 1988 (*43*), although the increase was not statistically significant because of the small sample sizes.

Latin America

Until recently, few cases of HIV infection in Latin America were considered to be associated with injecting drug use since this practice was not thought to be widespread in the region. More recently, however, the situation appears to be changing (Table 3). In Argentina, for example, 33% of the AIDS cases reported in the first quarter of 1991 among over-15-year-olds occurred among injecting drug users.[b]

Currently available data do not show very high rates of infection among sex workers in the region, except in specific locations. In Peru, two studies in

Table 2: **Summary of the findings of HIV seroprevalence studies among sex workers in Africa and the Caribbean**

	Year of study	No. HIV positive/No. tested		Reference
Africa				
Kenya				
Nairobi	1981	5/116	(4)[a]	*34*
Nairobi	1983	32/39	(82)	*34*
Nairobi	1984	45/76	(59)	*34*
Nairobi	1985	174/286	(61)	*34*
Nairobi	1985	50/90	(56)	*35*
Nairobi	1985	259/418	(62)	*36*
Rwanda				
Ngoma	1984	29/33	(88)	*124*
Ghana				
Accra	1985	1/98	(1)	*30*
Zaire				
Kinshasa	1985	101/377	(27)	*31*
Kinshasa	1988	?/1233	(35)	*32*
Equateur Province	1986	31/283	(11)	*33*
Côte d'Ivoire	1986–87	119/390	(31)	*125*
Nigeria				
Borno	1986–87	4/767	(0.5)	*37*
Lagos, Borno, Cross River	1987	9/773	(1)	*37*
Borno	1988	18/353	(5)	*37*
Maiduguri	1988	5/165	(3)	*37*
Lagos	1990	56/546	(10)	*38*
Cameroon				
Yaoundé	NA[b]	12/168	(7)	*78*
Somalia				
Mogadishu	1985	0/85	(0)	*126*
Mogadishu, Chismayu, Merca	1990	9/302	(3)	*39*
Caribbean				
Martinique	1985	5/15	(33)	*43*
	1986	6/16	(37)	*43*
	1987	10/23	(43)	*43*
	1988	5/10	(50)	*43*
Dominican Republic				
Puerto Plata	1984–85	0/61	(0)	*41*
Santiago	1985	1/54	(2)	*41*
12 sentinel posts	1987–88	?/3000	(2.6)	*42*
Haiti	1987	38/350	(11)	—[c]
	1987–88	68/185	(37)	*40*

[a] Figures in parentheses are percentages.
[b] NA = not available.
[c] See footnote *a* at bottom of adjacent column.

[a] *Campagne de prévention contre le SIDA dans le milieu de la prostitution à Port-au-Prince.* IBESR/INTER-AIDE, 1988.

[b] Data from National Programme for the Prevention and Control of AIDS, Buenos Aires, Argentina.

Table 3: **Summary of the findings of HIV seroprevalence studies among sex workers in Latin America**

	Year of study	No. HIV positive / No. tested						Reference
		IDU[a]		Non-IDU		Total		
Mexico								
Guadalajara	1986–87	NA		NA		3/670	(0.4) [b]	*50*
Guadalajara	1986	NA		NA		?/550	(0.4)	*51*
Guadalajara	1989	NA		NA		?/550	(0.2)	*51*
Tijuana	1987	NA		NA		7/100	(7)	*53*
Mexico City	1987–89	NA	(3) [b]	NA		21/961	(2)	*127*
20 cities	1990?	1/51	(2)	12/3561	(0.3)	13/3612	(0.4)	*52*
Peru								
Callao	1986	0/1	(0)	0/139	(0)	0/140	(0)	*44*
	?	NA		NA		7/2449	(0.3)	*45*
Brazil								
Santos	1987	9/59	(15)	14/470	(3)	23/529	(4)	*47*
Santos	1989	3/16	(19)	7/247	(3)	10/263	(4)	*47*
Presidente Prudente	1987	NA		NA		0/100	(0)	*47*
Presidente Prudente	1989	NA		NA		2/100	(2)	*47*
Sorocaba	?	4/7	(57)	2/19	(11)	6/26	(23)	48
Minas Gerais	1987	NA		NA		0/86	(0)	*46*
Rio de Janeiro	1987	NA		NA		3/101	(3)	*46*
Rio de Janeiro	1989?	NA		NA		8/69	(12)	*49*

[a] IDU = injecting drug user; NA = not available.
[b] Figures in parentheses are percentages.

1986 found 0% seropositivity among 140 women (*44*) and 0.3% among 2449 women (*45*). Many studies have been carried out in Brazil: some areas exhibited hardly any signs of infection (0% of 86 women in Minas Gerais in 1987 (*46*); 1% of 200 women in Presidente Prudente in 1987–89 (*47*)). Other areas are beginning to show higher rates: in Santos, 4% of 792 women in 1987–89 (*47*); in Sorocaba, 23% (6 of 26) (*48*); and in Rio de Janeiro, 3% in 1987 (*46*) and 12% in 1989 (*49*) among 101 and 69 women surveyed, respectively.

In Mexico, various studies have reported low levels of infection. Three surveys in Guadalajara yielded seroprevalence rates of only 0.4% among 670 sex workers in 1986–87 (*50*); 0.4% among 550, in 1986 (*51*); and 0.2% among 550, in 1989 (*51*). A more recent multicentre study of 3612 women in 20 cities found only 13 (0.4%) who were HIV positive (*52*). The highest rate reported in this country is for Tijuana, where 7 of 100 workers were found to be HIV positive in 1987 (*53*).

Asia

Although Asia used to be the continent least affected by the pandemic, because of the later introduction of HIV into the population (Table 4), seroprevalence rates are now beginning to rise sharply in some countries, especially among sex workers.

Early studies of large groups of sex workers showed minimal levels of infection: 0% of 237 women in Japan in 1986 (*54*); 0.08% of 25 392 women in 64 cities in the Philippines in 1985–87 (*55*); and 0.1% (only 1 woman) of 680 women in the Philippines in 1990 (*56*).

Two studies in Tamil Nadu, India, yielded HIV infection rates of 2.9% in 1986–87 (*57*) and 1.5% in 1986–89 (*58*), while one study in Delhi found that only one of 701 female sex workers was seropositive (*59*). In Bombay, 6% of 1919 female sex workers studied in 1986–90 were HIV positive (*60*). However, these seroprevalence rates do not reflect the true situation in India. The Indian Council of Medical Research has estimated that 30% of sex workers in Bombay's red-light district may be infected (*61*). Since there are estimated to be around 100 000 female sex workers in Bombay alone, the potential for further spread in considerable (*62*).

Thailand, which seemed to be free of HIV infection according to the findings of a study of 2880 female sex workers in 1985–86 (*63*), had a small

Table 4: **Summary of the findings of HIV seroprevalence studies among sex workers in Asia**

	Year of study	No. HIV positive/ No. tested	Reference
Japan			
Fukuoka	1986	0/237 (0) [a]	*54*
India			
Tamil Nadu	1986–87	30/1025 (2.9)	*57*
Tamil Nadu	1986–89	48/3133 (1.5)	*58*
Delhi	1988	1/701 (0.1)	*59*
Bombay	1986–90	120/1919 (6)	*60*
Thailand			
Bangkok and Pattaya	1985–86	0/2880 (0)	*63*
Four provinces	1988	13/5759 (0.2)	— [b]
Chiangmai	1989	87/238 (36.5)	*64*
Philippines			
64 cities	1985–87	20/25 392 (0.08)	*55*
	1990?	1/680 (0.1)	*56*

[a] Figures in parentheses are percentages.
[b] See footnote *c* on this page.

amount of infection (0.2%) in 1988.[c] More recently, however, a large increase in the number of seropositive sex workers has been noted. In 1989, the HIV seroprevalence was 36% among 238 women who worked in houses of prostitution in Chiangmai, Thailand's second largest city (*64*). HIV seroprevalence levels of up to 50% have been reported in many brothels in northern Thailand. Although Thai sex workers reportedly do not have high levels of injecting drug use, some of their customers do—a group that constitutes over two-thirds of the known cases of HIV infection in the country (*65*).

Risk factors

Drug use

Injecting drug use is the major risk factor associated with HIV infection among sex workers in Western countries. In most cases, infection among injecting drug users probably results from sharing contaminated syringes or needles; however, some women may have acquired HIV through sexual contact with a drug-using partner. Since these two risk factors are often concurrent, it is difficult to evaluate them separately. For example, over half of the drug-injecting sex workers surveyed in the CDC multicentre study had a husband or boyfriend who injected drugs, compared with only 12% among the non-drug-injecting women interviewed (*10*).

The proportion of sex workers who inject drugs varies greatly, depending on the country and type of worker, but most studies report a much higher rate of drug use among women who work the streets. In Spain, for example, a study of over 1500 sex workers from various parts of the country found that over half of those who worked the streets injected drugs, while only 10–22% of the women who operated from city or roadside bars, brothels, etc., were currently injecting drugs or had done so in the past.[d] Similarly, a survey of 208 street sex workers in Glasgow found that 59% injected drugs (*66*).

The use of non-injected recreational drugs may also contribute to HIV transmission, albeit indirectly. For example, marijuana, cocaine, and alcohol may make it psychologically easier to engage in prostitution, which, in turn, may provide the quickest and easiest means to pay for these drugs. While male drug users typically resort to drug dealing or robbery to finance their drug habits, female drug users more frequently exchange sex for money or drugs. For example, one study involving 100 drug-using adolescent females in Miami (one-third of whom injected the drugs) found that 87% reported having engaged in acts of prostitution in the previous year, versus only 5% of the 511 males in the study; of 30 females who used crack cocaine, 90% had exchanged sex for the drug (*67*).

A further problem associated with drug use may be an increased risk of HIV infection through failure to practice safer sex. A number of investigators have reported that the disinhibiting effects of alcohol and other drugs decrease the likelihood of using condoms and may increase the tendency to engage in higher-risk forms of sexual activity (*68–71*). An additional risk may be immunodepression stemming from high levels of alcohol consumption and use of other drugs (*69*).

Sexual behaviour

Most HIV-positive sex workers without a history of drug injection probably acquired the virus through sexual contact with an infected individual. It has been suggested that a large number of different

[c] **Traisupa, A.** *Epidemiological profile of sexually transmitted diseases in various categories of prostitutes in relation to their places of work in South-East Asia.* WHO unpublished document INT/VDT/88.5.

[d] **Estébanez, P. et al.** [*Report of the Project on AIDS and Prostitution*]. Unpublished document, Instituto de Salud Carlos III, Madrid (in Spanish).

sexual partners may be a risk factor for acquiring HIV, but studies report conflicting findings. At least two studies, one in Florida (*13*) and the other in Nairobi (*34*), found that a greater number of sexual partners was a risk factor; however, this association was not observed in a subsequent survey of the Nairobi sample (*72*) or in the CDC multicentre investigation (*1*).

These discrepancies could be due to the different prevalences of HIV infection among the partners of sex workers: the number of partners is of less importance in a community where the HIV prevalence is relatively low (*73*) or where the use of condoms and/or the avoidance of penetrative sex is relatively high. In this connection, several studies in Central Africa found a greater risk of infection among sex workers whose clients came from areas where HIV infection rates were relatively high (*34, 35*).

Anal intercourse, a strong risk factor for HIV infection among homosexuals (*74*), may also be a risk factor for women (*75*). It is difficult to gauge the true extent of this practice among female sex workers, since it may be considered low-status behaviour. Most studies indicate that female sex workers do not practice this activity very frequently (*18, 124*), but it is uncertain whether these findings reflect true behaviour or are an artifact of denial.

In 1985 a study among Nairobi sex workers found that use of oral contraceptives was independently associated with HIV infection (*36*), but no such association was found in a much larger survey of sex workers in Kinshasa, Zaire, in 1988 (*32*). The latter study did, however, note an association between HIV infection and oral self-medication, mainly with antibiotics to prevent or cure STDs. Further studies are needed to determine whether these are real associations or artifacts of other intervening variables.

Sexually transmitted diseases

A major factor that has been associated with sexual transmission of HIV is the presence of STDs. Among the STDs that have been studied in sex workers with respect to HIV infection are gonorrhoea (*34, 35*), syphilis (*76*), chlamydia (*72, 77, 78*), and genital ulcers (*32–36, 79, 80*). The high rate of heterosexual HIV transmission in countries in Central Africa may be related to the high prevalence there of STDs, especially genital ulcers (*34, 35, 72, 81*).

Diseases that cause genital ulcers may facilitate both the transmission of and susceptibility to HIV. For example, it has been suggested that the infectivity of a male index case increases because of the greater concentration of T4 lymphocytes and macrophages in the semen of an infected man; according to a study carried out in 1988, men with inflammation of the genital tract have 19 times more macrophages and six times more T4 lymphocytes than those with no inflammation (*82*). It has been suggested that the greater susceptibility to HIV infection of individuals with genital ulcers could be because the lesions produced in the epithelial mucous membrane facilitate entry of the virus (*73*).

Although many studies have reported an association between seropositivity and STDs, especially genital ulcers, the exact relationship is not clear. There is considerable evidence that genital ulcers are a risk factor for HIV acquisition, but it may also be true that HIV-positive women have an increased susceptibility to genital ulcers (*32*). Evidence for the increased susceptibility of HIV-positive women to genital ulcers comes from a Nairobi study which showed that the prevalence of genital ulcers among HIV-positive sex workers increased as their HIV disease progressed (*80*).

Condom use

The protective effect of condoms against HIV infection has been demonstrated in various studies of sex workers. For example, a study in Zaire found a clear association between seronegativity and condom use during the preceding year (*83*); and in Nairobi, women who reported using condoms at all were three times less likely to seroconvert that those who reported not using them (*84*).

In general, sex workers appear to be increasing their use of condoms, especially in countries or areas where commercial sex is legal or tolerated. (In some European countries, such as Germany (*85*) and the Netherlands (*86*), it is not a crime to engage in commercial sex, though it is illegal to live off the earnings of a sex worker). Among a group of registered sex workers in Nuremberg, condom use with clients was found to be practically universal (*18*). Also, about three-quarters of the sex workers studied in Edinburgh (*87*) and Amsterdam (*88*) reported that they used condoms usually or always. In one study in the USA, 38% of sex workers said they always used condoms with clients (*89*), but only 4% of those interviewed in the CDC multicentre collaborative study reported using condoms every time they had vaginal intercourse (*90*). Over 80% of prostitutes had used condoms at least once during vaginal intercourse in the CDC study, but their use was much more likely with clients (79%) than with nonpaying male partners (16%) (*91*). In response to an education campaign among Greek sex workers, use of condoms with clients increased from 66% in 1984 to 98% at the end of 1985 (*92*).

A number of studies have reported that one of the main reasons for not using condoms is client refusal (*93, 94*). It is also possible that sex workers are less inclined to use condoms in places where their possession may be used as evidence of intent to commit prostitution (*1, 71*).

It has frequently been reported that sex workers use condoms with their private partners much less frequently than with their clients, probably to differentiate between their commercial and private sex lives (*95*). In a study of almost 800 Spanish sex workers, 79% reported never using condoms with their private partners, while only 8% said they never did so with clients (*96*). Similarly, in Amsterdam 71% of the sex workers interviewed always used condoms during vaginal intercourse with clients, versus only 7% with their private partners. The CDC multicentre study of sex workers in the USA reported even lower rates of private use: 84% of over 500 women who had vaginal sex with their husbands or boyfriends reported that they never used condoms (*91*).

African sex workers appear to use condoms much less than their counterparts in developed countries. For example, in a large survey of sex workers in Kinshasa in 1988 less than 15% of 1223 women reported regularly using condoms with clients and none reported using condoms with their stable partners (*32*). In a study of 418 lower socioeconomic sex workers in Nairobi in 1985, only two reported using barrier methods of contraception (*36*).

The results of the recent European multicentre study of female sex workers suggest that the use of petroleum-based lubricants, which may lead to condom rupture or increased permeability to HIV, may be associated with HIV infection among women who are not injecting drug users (*27*).

Clients of female sex workers

Few studies have been carried out among the clients of female sex workers, a population that is even more difficult to reach than the women who provide them with sexual services. Those studies that have been performed have found the same risk factors that have been identified for the sex workers, principally STDs.

Risk factors

Various studies suggest that an important cofactor for the clients of sex workers who undergo HIV seroconversion is a history of STDs, especially genital ulcers, in either males or females (*97, 98*). In the USA, one study found that 34% of 178 AIDS patients with no recognized risk factors had a history of STDs, and that 34% of the male patients reported having had sexual relations with sex workers, although it must be acknowledged that the number of men identified was quite small and represented a tiny proportion of the total number of people diagnosed to have AIDS in the USA at that time (*99*). In New York, one survey of men who had no risk factors for HIV infection other than sexual contact with sex workers found that six of the men were seropositive (*100*). Three of these men subsequently admitted to other risk behaviour, while the three who denied any other risk factors had had an average of 575 contacts with sex workers, with no use of condoms, and two episodes of STDs.

In a case–control study to determine risk factors for AIDS among Haitians, it was found that male AIDS patients were more likely than controls to have had sexual relations with sex workers (*101*).

In East Africa high rates of HIV infection have been reported among truck drivers, many of whom have had sexual contact with sex workers (*102, 103*). Also, a study in Rwanda, in Central Africa, indicated that contact with sex workers was one of the strongest risk factors for HIV infection among men (*104*).

Condom use

Several studies have indicated that many clients of sex workers refuse to use condoms during sexual relations. In Amsterdam, a survey of men recruited from an STD clinic and who had had relations with sex workers in the preceding 4 months found that less than half always used condoms during vaginal intercourse with sex workers; only 7% used condoms with their private sexual partners (*88*).

Also, a study of the clients of male and female sex workers in Edinburgh reported greater condom use for commercial than for private sexual relations (*105*). Only one of every eight clients refused to use condoms with sex workers, while almost three-quarters of the sex workers who had private partners reported not using condoms with them. For anal intercourse, clients used condoms more frequently with male than with female sex workers. The results of this study also suggest that clients may constitute a risk factor for the sexual transmission of HIV to sex workers: 7 out of 54 clients who reported having been tested for HIV were seropositive, all of whom were injecting drug users (no serological data were available for the other participants and hence the true number of HIV-positive clients in this study may have been greater). Another study in Edinburgh found that 2 of 72 clients of sex workers were seropositive (*106*).

In Africa, also, client reluctance plays an important role in sex workers' low rates of condom use.

For example, in Ghana 66% of the customers of high-class sex workers, most of whom were businessmen and professionals, refused to use condoms (*29*).

Research needs

A great many cross-sectional studies have been carried out among groups of sex workers in different parts of the world. The results provide useful information on the magnitude of HIV infection among such workers and suggest a number of cofactors that may be involved in HIV transmission. However, studies of this type can only identify associations, which do not necessarily imply causality. Prospective studies could provide useful information on the nature of the relationship between, for example, genital ulcers and HIV infection. Such studies would also permit calculation of incidences of HIV infection and lead to a reliable estimate of the amount of new infection that is being introduced into a population.

The prevalence of HIV infection and associated risk factors among groups of sex workers should continue to be monitored, both to target prevention efforts optimally and to measure their impact. Classification of sex workers into different subgroups, based on criteria relevant to the particular culture, could yield useful information in this regard.

Seropositive sex workers should be studied longitudinally to determine more about the possible interaction between practices associated with sex work and HIV infection. It has been suggested that continued drug injection accelerates the progression to AIDS (*107*); other factors associated with sex work, such as increased frequency of STDs, may play a similar role in this respect.

The high incidence of pelvic inflammatory disease, cervical dysplasia, and cervical cancer among some groups of sex workers also warrants further investigation, as well as how these conditions relate to HIV infection (*108*).

Paradoxically, the emergence of the AIDS pandemic may ultimately have some positive repercussions for female sex workers. Previously, studies of this group tended to focus only on STDs and were often more concerned with the possibile transmission of such diseases to clients rather than with the health of the women themselves. Some more recent studies, however, have examined other issues of importance for sex workers, such as their nutritional status, health habits, experiences with regard to births and abortions, rates of blood transfusion, etc. Further studies should be carried out in these areas so that appropriate strategies can be designed to improve the health status of these women.

Conclusions and recommendations

Sex workers differ in many imporant ways from country to country and within countries, and researchers face many obstacles in attempting to study such a diverse group who frequently live on the margins of society. The studies we have reviewed here vary widely in their sample size, the kinds of sex workers covered, methods of sampling, and the risk factors studied. Nevertheless, certain general tendencies emerge. Sex workers in Western countries are mostly at risk of HIV infection through injecting drug use, but also heterosexual transmission of HIV may be increasing among them. Sex workers in sub-Saharan Africa still have the highest rates of HIV infection, probably because of the high prevalence there of STDs, especially those that cause genital ulcers, combined with low rates of condom use. Infection rates among Asian sex workers, especially in Thailand and India, are rising and are likely to increase greatly in the coming years, largely because of the reluctance of some countries to take steps early enough to reduce transmission.

In general, the living and working conditions of women who practice commercial sex could result in a variety of interrelated risk factors for HIV infection: a large number of different sexual partners, and hence exposure to many other STDs that could increase the probability of acquiring or transmitting HIV; unprotected sexual activity, often because clients or private partners refuse to use condoms; and drug injection by either the woman or her sexual partners. In addition, such women often come from socially and economically deprived backgrounds and may suffer from generally poor health caused by inadequate nutrition, lack of access to health services, frequent abortions (often performed illegally), use of various types of drugs, high stress levels, vulnerability and subjection to violence, etc. Their health may be further compromised by long working hours in unhygienic conditions and continual exposure to a multitude of respiratory, skin, and other types of infections.

The stigmatized nature of sex work and the lack of political power of sex workers as a group have made it easy for politicians, and sometimes even health officials, to use them as convenient scapegoats for the heterosexual transmission of HIV. Much concern has been expressed about the possibility of sex workers transmitting HIV to their clients, while little attention has been paid to how they may have acquired the virus in the first instance. Measures such as the mandatory HIV antibody testing of sex workers and increased prison sentences or quarantine for those found to be seropositive have been proposed or put into practice in some societies (*109*).

Such measures, however, ignore the lessons learned from efforts to control STDs earlier in this century. During the First World War, for example, over 20 000 sex workers were quarantined or incarcerated in an attempt to control spiralling rates of syphilis, to little effect. In contrast, during the Second World War the military mounted a massive education programme and issued condoms to soldiers, resulting in a highly successful control programme (*110*).

Mandatory HIV testing would serve only to drive sex workers underground to an even greater extent, increasing their distrust of health officials, and destroying existing programmes that have succeeded in promoting voluntary testing and providing education about STDs and HIV control. Mandatory testing would also constitute a violation of medical confidentiality. Futhermore, a negative result in an HIV test does not guarantee seronegativity, since a person could become infected after the test or give a false-negative result if their infection is so recent that HIV antibodies are not yet detectable. More importantly, the customers and private partners of sex workers could become complacent, falsely believing that no protective measures were necessary.

Rather than misuse of resources on restrictive and ineffective measures, more positive responses should be made to reduce HIV infection rates among sex workers. More intervention programmes need to be carried out among sex workers. In areas where injecting drug users are the primary group affected, drug-abuse treatment programmes need to be increased and improved; sterile syringes and needles should be made freely available to those who need them as well as instructions on how to clean them; and the use of condoms needs to be promoted.

These efforts should include also peer education, since they are more likely to be successful if the women to whom they are directed are involved in their planning and execution. Sex workers have organized themselves effectively in various parts of the world (e.g., the Red Thread Organization in Amsterdam, the California Prostitutes Education Projects (CAL-PEP), and the Australian Prostitutes Collective), and these groups could play an important role in effective education and in bringing about behavioural changes.

All sex workers should be provided with easier and less costly access to health services. In view of the illegal or quasi-legal status of sex work in most countries, nongovernmental organizations could play an important part in achieving this goal, for example by promoting networks of community health care centres. Sex workers should know where and how to obtain an HIV test and should receive appropriate counselling and follow-up if the test result is positive. Counselling, however, is not enough to enable a woman who is seropositive to give up sex work. Financial assistance, training, and a variety of other social services must also be provided to enable women to find other ways to support themselves and their children.

Preventive slogans must be targeted, not only at sex workers, but also at their clients and private partners. All persons who have sexual relations with sex workers—indeed, all persons who have sexual relations outside a mutually monogamous union in which both partners are seronegative—must be educated to take responsibility for assuring that they use condoms during every sexual act. Creative marketing approaches that attempt to "eroticize" condoms may help to overcome male resistance to using them. Several types of female condoms have been developed but are not yet widely available; these should be marketed as quickly as possible so that women have another option for barrier protection that they can control themselves (*111, 112*).

In many countries, commercial sex has long been openly or tacitly accepted provided it is confined to certain areas—though it is illegal to organize it or derive income from the earnings of sex workers. Recently, some countries, in an attempt to both improve the working conditions of sex workers and reduce the spread of STDs, have proposed that commercial sex should be legalized (*3*). Such a policy may be beneficial, but if legalization involves registration of sex workers, there is also the danger that those who do not wish to register may become further isolated and exploited. This issue merits careful consideration, but sex workers must have the freedom to decide whether they wish to work within the official system.

AIDS continues to present a tremendous challenge. Its history has too often been marked by attempts to blame the victim instead or marshalling efforts to prevent future victims—and sex workers make particularly vulnerable victims. Nevertheless, sex workers have in many instances shown that they are willing to take the necessary steps to protect themselves and their clients if the means are made available to them. Those involved in the fight against AIDS must continue to seek ways to ensure that everyone involved in the sex industry—sex workers, their clients, and the other sexual partners of each—understands the possible risks and takes measures to reduce them to the fullest extent possible.

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Résumé

Le VIH et les prostituées

Il est fréquent de considérer qu'il existe chez les prostituées un risque de contracter et de transmettre l'infection par le virus de l'immunodéficience humaine (VIH), bien que les taux de séroprévalence varient considérablement en fonction de la région géographique, du type de prostitution et de divers facteurs de risque. Le présent article passe en revue les études portant sur la prévalence du VIH et des facteurs de risque associés chez les prostituées de différents pays et récapitule les taux observés. Les taux de prévalence les plus élevés ont été enregistrés en Afrique subsaharienne, où la présence fort répandue des maladies sexuellement transmissibles, et en particulier des ulcérations génitales, joue probablement un rôle important dans le maintien de la transmission du VIH. En Europe et en Amérique du Nord, on trouve fréquemment des taux élevés de séroprévalence chez les toxicomanes par voie intraveineuse, et il existe une petite proportion, quoique peut-être en augmentation, d'infections acquises par voie hétérosexuelle chez les prostituées non toxicomanes. En Amérique latine et dans certaines parties d'Asie, où le VIH a été introduit plus récemment, le tableau de l'infection est davantage mixte, la transmission pouvant aussi bien se faire lors de rapports hétérosexuels que par voie parentérale lors de l'injection de drogues. Les études de séroprévalence en cours dans certains pays d'Asie ne reflètent probablement pas exactement l'amplitude réelle de l'infection par le VIH chez les prostituées.

Les études portant sur les facteurs suivants, associés à l'infection par le VIH chez les prostituées, sont examinées: toxicomanie, comportement sexuel, présence de maladies sexuellement transmissibles, et usage du préservatif. Sont également discutés les résultats de certaines études portant sur les clients des prostituées, chez lesquels les facteurs de risques tels que la présence de maladies sexuellement transmissibles et la non-utilisation du préservatif ont également été identifiés.

Les auteurs soulignent les aspects très divers de la prostitution féminine et la difficulté d'étudier un groupe si hétéroclite et souvent difficile à joindre. Il est recommandé de poursuivre à l'échelle mondiale l'étude de la prévalence du VIH chez des groupes de prostituées, et d'entreprendre des études prospectives afin de mieux cerner l'association entre les pratiques liées à la prostitution et l'infection par le VIH. Les auteurs mettent en garde contre les mesures répressives, comme le dépistage obligatoire ou la mise en quarantaine des prostituées infectées, et recommande de mettre en œuvre des interventions plus efficaces, comme des programmes de traitement des toxicomanies, d'échange de seringues et de promotion du préservatif, de même qu'un meilleur accès aux services de santé en général.

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