HIV prevalence and risk behaviour among prostitutes and clients in Amsterdam: migrants at increased risk for HIV infection

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Abstract

Objectives—To study groups of prostitutes and clients of prostitutes in order (i) to determine HIV prevalence and sexual risk behaviour, (ii) to determine differences between samples recruited within and outside a clinic for sexually transmitted diseases (STD) and (iii) to determine correlates of inconsistent condom use (ICU) among both groups.

Design—Participants were interviewed and anonymously tested for HIV-antibody; approximately half were recruited at a clinic for sexually transmitted diseases (STD) and half at prostitute working places.

Setting—An STD clinic and prostitute working places in Amsterdam in 1991.

Subjects—201 female prostitutes without a history of injecting drugs and 213 male clients of female prostitutes.

Main outcome measures—antibodies to HIV, consistency of condom use in commercial vaginal contacts in the preceding 6 months.

Results—HIV prevalence was low: three prostitutes (1.5%; 95% CI 0.5–4.6%) and one client (0.5%; 95% CI 0.1–3.3%) were infected. All three HIV positive prostitutes originated from AIDS-endemic countries, came to the Netherlands only recently and were recruited outside the STD clinic. Large differences between subgroups resulted from the two recruitment methods: while clients of prostitutes with relatively high risk behaviour were strongly represented among the STD clinic sample, high risk prostitutes were underrepresented in this sample. Consistent condom use (with 100% of contacts) was reported by 66% of prostitutes and 56% of clients of prostitutes. Inconsistent condom use was found to be high among prostitutes who had migrated from Latin America and among migrant clients of prostitutes.

Conclusions—When monitoring HIV infection one must take into account imported cases. HIV prevention efforts should be particularly focused at prostitutes from Latin America and at clients of prostitutes who migrated to the Netherlands.

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Introduction

Female prostitutes and their clients are often

considered a group of heterosexuals particularly at risk of becoming infected with the human immunodeficiency virus (HIV).¹ Especially in developing countries, increasingly high rates of HIV infection have been documented among prostitutes.^{2–6} In the developed countries on the other hand, HIV infection among prostitutes seems to be mainly related to injecting drug use (IDU) and HIV prevalence generally is quite low in non-IDU prostitutes.^{7–11}

In Amsterdam (700,000 inhabitants), where the HIV infection epidemic in the Netherlands centres, a roughly estimated 10,000 women work as prostitutes. Several hundred of these prostitutes are injecting drug users. Prostitutes with a history of drug injection in Amsterdam are relatively well studied.^{12,13} Sexually transmitted disease (STD) incidence among this group is very high and HIV prevalence was found to be 30%.¹² Much less is known about prostitutes without an IDU history and about their clients. A previous study among heterosexual, non-IDU visitors of an STD clinic, with at least five sexual partners in the preceding 6 months, has shown HIV prevalence to be very low (0.3% and 0.4% among females and males respectively).¹⁴ The majority of the participants in that study were prostitutes and clients of prostitutes. However, that was a non-anonymous cross-sectional study among participants who were committed to return for follow-up examinations, with a participation rate of only about 50%. Furthermore, recruitment was limited to STD clinic visitors. Because of this restricted participation the results may give only a very limited insight in the HIV prevalence among prostitutes and clients of prostitutes. Consequently, the first aim of this study was, following less restricted recruitment procedures, to determine HIV prevalence in these groups and the extent at which riskful sexual behaviour occurs.

A second aim of this study was to examine the extent of selection bias evoked by the recruitment of prostitutes and clients of prostitutes solely through an STD clinic. This question was addressed by comparing characteristics of study participants recruited at an STD clinic with those of participants recruited outside such a clinic.

Identifying correlates of (non-) condom use was the third aim of this study. Ascertaining these correlates may lead to a better understanding of the occurrence of risky sexual behaviour and may help in the

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design of policies aimed at reducing sexual risk behaviour.

Methods

Subjects

Between February and December 1991 201 female prostitutes without a history of injecting drugs and 213 male clients were recruited into two separate voluntary and anonymous cross-sectional studies. A prostitute/client is defined here as a woman/man who has received/given money or goods in exchange for heterosexual services at least once in the past 6 months. One hundred and twenty eight of the prostitutes were interviewed as part of a European multi-site study, to assess prevalence and risk factors for HIV infection among female sex workers on a European scale.¹⁵

Recruitment took place at an STD clinic run by the Municipal Health Service, and in the red light district at prostitute working places such as a sex hotel, brothels and "window" locations (where prostitutes sit behind a window, facing the street, to attract clients.) The STD clinic is situated next to the red light district and is open during office hours on weekdays; attendance is free of charge and, if preferred by the visitor, anonymous. Many prostitutes and clients of prostitutes are of foreign origin and do not speak Dutch. To deal with this problem, interviewers were selected who could also speak English, Spanish and Turkish. Still, some potential participants could not be included because of a language barrier. Those who appeared capable to understand the meaning of the study were invited to participate if at that moment an interviewer was available. At the STD clinic an invitation to participate was preceded by the usual examination. Participation rates for those invited were 96% and 77% at the STD clinic and 45% and 79% outside the STD clinic, for clients and prostitutes respectively. No further information is available on the refusers. After informed consent had been obtained, participants were interviewed using standard questionnaires and a blood sample was taken by trained nurses.

Laboratory methods

Either a serum sample by venipuncture or capillary blood by finger prick on filter paper was taken and tested for HIV antibody. Sera were tested at the Laboratory of the Municipal Health Service in Amsterdam by a standard recombinant HIV-1/HIV-2 enzyme-linked immunosorbent assay (Abbott, Wiesbaden-Delkenheim, Germany), confirmation was by western blot. Capillary blood was tested at the Central Laboratory of the Netherlands Red Cross Blood Transfusion Service in Amsterdam. Dried blood spots were treated with 500 μ l of PBS containing 0.1% v/v Tween-20 and 0.01% sodium azide. The extracts were applied in a radio-immunoprecipitation-assay as described elsewhere.¹⁶

Data analysis

Although described and presented here together, the questionnaires for prostitutes and for clients were conceived separately. This resulted in a number of questions which were not completely comparable or with non-equivalent answering categories. Questions asked concerned socio-demography, number, type and frequency of prostitution contacts and of private sexual contacts, other risk factors for HIV infection and a short medical history. Type of sexual contact and degree of condom use were expressed as relative frequencies on 5 or 11 point scales (ranging from "never" or 0% to "always" or 100%), which are reported on in a condensed form here, for the sake of simplicity of presentation. For both prostitutes and clients, the median interview duration was 25 minutes.

Main outcome measures were HIV infection status and consistency of condom use in commercial vaginal contacts in the preceding 6 months. Condom use with clients/prostitutes was dichotomized as 100% (consistent condom users: CCU) versus less than 100% (inconsistent condom users: ICU). Sexual risk behaviour was assessed and factors related to condom use were determined for those having vaginal intercourse.

Statistical methods

Associations between variables were examined by χ^2 for categorical variables and by Mann-Whitney test for ordinal or continuous variables.¹⁷ Odds ratios (ORs) and corresponding exact 95% confidence intervals (CIs) were calculated.¹⁸ A *p* value ≤ 0.05 was considered significant.

Logistic regression analysis¹⁹ was used to construct multivariate models predicting inconsistent condom use for prostitutes and clients of prostitutes separately. Included in each model were predictors that made a significant contribution to the fit of the model according to the likelihood ratio statistic. Adjusted ORs and 95% CIs were calculated for the variables included in the models.

Results

Characteristics of prostitutes

Characteristics of the 201 prostitutes, both for the total group and by location of recruitment (STD clinic versus elsewhere) are listed in table 1. Median age of the prostitutes was 29 years, country of birth was mainly in Latin America (39%) and the Netherlands (36%). Median number of clients in the past week was 15. A large part of the prostitutes in Amsterdam appears to be highly mobile: 62 prostitutes (31%) reported to be living in the Netherlands for less than 3 years.

HIV antibody status could be determined in 199 prostitutes (two women refused), of whom three appeared to be infected (1.5%; 95% CI 0.5–4.6%). All three infected women were recruited outside of the STD clinic, were residing in the Netherlands for less than 3 years and had been born either in sub-Saharan Africa (prevalence 2/26; 7.7%, 95%

Table 1 Characteristics of 201 female prostitutes in Amsterdam, 1991

Characteristic	Total (n=201) median (SD)	Location of recruitment		p Value
		STD-clinic (n=82) median (SD)	Elsewhere (n=119) median (SD)	
Age (years)	29 (7)	29 (8)	29 (6)	0.88
Number of clients in past week	15 (28)	10 (24)	20 (31)	< 0.0001
	number (%) *	number (%) *	number (%) *	
Country of birth [†] :				< 0.0001
the Netherlands	72 (36)	46 (56)	26 (22)	
in Latin America	79 (39)	22 (27)	57 (48)	
in sub-Saharan Africa	26 (13)	3 (4)	23 (19)	
other	24 (12)	11 (13)	13 (11)	
Living in the Netherlands < 3 years	62 (31)	11 (13)	51 (43)	< 0.0001
Sexual contact with clients in past 6 months:				
—vaginal (with >50% of contacts)	158 (80)	62 (76)	96 (83)	0.05‡
—oral (anytime)	128 (65)	57 (70)	71 (62)	0.75‡
—manual (anytime)	144 (73)	69 (84)	75 (66)	0.01‡
—anal (anytime)	8 (4)	3 (4)	5 (4)	0.76‡
Condom use in vaginal contact with clients:				0.0003‡
0–40%	10 (5)	1 (1)	9 (8)	
50–90%	56 (29)	16 (20)	40 (35)	
100%	130 (66)	64 (79)	66 (57)	
Previously tested for HIV antibody	107 (53)	38 (46)	69 (58)	0.09
HIV antibody positive	3 (1.5)	0 (0)	3 (2.6)	0.21

*Because of missing data some percentages are not based upon the full number of participants.

†Latin America: from Colombia (n = 27), the Dominican Republic (n = 28), Surinam (n = 16) and 6 other countries (n = 8); sub-Saharan Africa: from Ghana (n = 16) and 4 other countries (n = 10); other: from 12 countries (n = 24).

‡Tested with Mann-Whitney test, on the complete 11-point scale data.

CI 1.9–26.1%) or in the Caribbean (prevalence for Latin Americans 1/79; 1.3%, 95% CI 0.2–8.4%).

Some clear differences between the sub-groups according to location of recruitment are apparent: STD clinic visitors were living in the Netherlands longer, were more often of Dutch origin, had fewer clients in the past week (and also in an “average” working week, data not shown), practised relatively more often manual sex (masturbation) and less often vaginal sex with clients, and used more often condoms while having vaginal sex with clients, than prostitutes recruited elsewhere.

Characteristics of clients of prostitutes

Characteristics of the 213 clients of prostitutes, both for the total group and by location of recruitment (STD clinic versus elsewhere)

are listed in table 2. Median age of the clients was 36, country of birth was mainly the Netherlands (56%) and Turkey (22%). The median number of contacts with prostitutes in the past 6 months was 10 and about one third of the clients were not Amsterdam residents. HIV infected was 1/213 clients (0.5%; 95%CI 0.1–3.3%). The one infected man had a history of homosexual contact (since 1980). Clients of prostitutes recruited at the STD clinic were younger, were born less often in the Netherlands, resided more often in Amsterdam, earned less, paid a lower maximum price per contact and used condoms less often with their prostitute contacts.

Correlates of condom use among prostitutes

Among the prostitutes were 66 ICU (inconsistent condom users) and 130 CCU

Table 2 Characteristics of 213 male clients of prostitutes in Amsterdam, 1991

Characteristic	Total (n=213) median (SD)	Location of recruitment		p Value
		STD-clinic (n=125) median (SD)	Elsewhere (n=88) median (SD)	
Age (year)	36 (13)	31 (12)	42 (13)	< 0.0001
Number of contacts with prostitutes in past 6 months	10 (31)	8.5 (28)	10 (35)	0.83
Maximum price paid per contact (DF)	75 (113)	50 (109)	110 (113)	0.0002
	number (%) *	number (%) *	number (%) *	
Country of birth:				< 0.0001
the Netherlands	121 (57)	50 (40)	71 (82)	
Turkey	45 (21)	43 (34)	2 (2)	
other‡	46 (22)	32 (26)	14 (16)	
Enjoyed higher education	57 (28)	28 (23)	29 (34)	0.12
Gross annual income > DF 30,000	95 (49)	44 (39)	51 (62)	< 0.0001
Residing in Amsterdam	136 (64)	96 (77)	40 (46)	< 0.0001
Sexual contact with prostitutes in past 6 months:				
—vaginal (with > 2/3 of contacts)	184 (87)	115 (92)	69 (80)	0.02‡
—oral (anytime)	143 (68)	88 (70)	55 (64)	0.03‡
—manual (anytime)	53 (25)	30 (25)	23 (27)	0.55‡
—anal (anytime)	10 (5)	9 (7)	1 (1)	0.04‡
Condom use in vaginal contact with prostitutes:				0.0005‡
0–33%	46 (22)	35 (28)	11 (13)	
34–99%	46 (22)	33 (26)	13 (16)	
100%	116 (56)	57 (46)	59 (71)	
Ever had an STD	114 (55)	73 (60)	41 (47)	0.07
Previously tested for HIV antibody	48 (23)	29 (24)	19 (22)	0.80
HIV antibody positive	1 (0.5)	1 (0.8)	0 (0)	0.30

*Because of missing data some percentages are not based upon the full number of participants.

†Tested with Mann-Whitney test, on the complete 5-point scale data.

‡From 20 other countries.

Table 3 Comparison of selected characteristics of 196 prostitutes using condoms with vaginal contact either consistently (CCU) or inconsistently (ICU)

Characteristic	CCU (n=130)		ICU (n=66)		p Value
	median	(SD)	median	(SD)	
Age (years)	29	(7)	30.5	(7)	0.06
Number of clients in past week	12	(22)	21.5	(37)	0.005
	number (%) *		number (%) *		OR (95% CI)
Recruited at STD clinic	64 (49)		17 (26)		0.36 (0.17-0.71)
Living in the Netherlands < 3 years	25 (20)		36 (59)		5.76 (2.79-11.93)
Latin American origin†	21 (16)		41 (62)		8.51 (4.08-17.85)
Enjoyed higher education	29 (23)		12 (19)		0.76 (0.32-1.69)
Migrant clients with foreign nationality in past month	74 (57)		50 (77)		2.48 (1.21-5.24)
Steady clients in past month	87 (67)		39 (59)		0.70 (0.36-1.35)
Working "at the window" in past week	46 (35)		41 (62)		2.99 (1.55-5.81)
Working 7 days a week	16 (12)		31 (47)		6.31 (2.93-13.78)
No other legal income	86 (67)		58 (88)		3.54 (1.49-9.33)
Condoms supplied by boss/manager	84 (65)		24 (37)		0.31 (0.16-0.61)
In previous year:					
—any male private partner	112 (86)		45 (68)		0.34 (0.16-0.75)
—maintained others	64 (49)		55 (83)		5.16 (2.38-11.84)
—had gonorrhoea, syphilis or CT‡	22 (17)		16 (24)		1.56 (0.70-3.40)

*Because of missing data some percentages are not based upon the full number of participants.

†Excluding Surinam.

‡Chlamydia trachomatis.

(consistent condom users, table 3). Compared with CCU, ICU reported more clients in the previous week, working more often all days of the week and always in weekends, more often living in the Netherlands for less than 3 years, originating from Latin America (excluding Surinam) more often, maintaining others financially more often, other sources of legal income less often and less often having condoms supplied by their "employer".

In multiple logistic regression analysis three variables from those listed in table 3 (excluding the variable "STD in past 6 months", since this would result from inconsistent condom use) contributed significantly to a model predicting inconsistent condom use. According to this model, the probability of using condoms inconsistently was higher for prostitutes originating from Latin America (OR = 5.91; 95% CI 2.56-13.63), living in the Netherlands for less than 3 years (OR = 2.75; 95% CI 1.18-6.39) and being

older (OR = 1.06 per year; 95% CI 1.00-1.12). Location of recruitment did not appear to be a confounder, since inclusion of this variable in the model did not have an effect on the presented ORs. Many of the characteristics which are associated with inconsistent condom use are highly correlated: prostitutes originating from Latin America tend to have more clients per week, work 7 days a week more often and more often work at the window; they are less often supplied with condoms by a boss or manager, are maintaining others more often, have less often other (legal) income and often live in the Netherlands since fairly recently (Spearman's correlation coefficient $r \geq 0.40$, $p < 0.001$ for all comparisons; data not shown).

Correlates of condom use among clients of prostitutes

Among the clients of prostitutes were 92 ICU and 116 CCU (table 4). Compared with

Table 4 Comparison of selected characteristics of 208 clients of prostitutes using condoms with vaginal contact either consistently (CCU) or inconsistently (ICU).

Characteristic	CCU (n=116)		ICU (n=92)		p Value
	median	(SD)	median	(SD)	
Age (years)	41	(13)	32.5	(12)	0.003
Number of contacts with prostitutes in past 6 months	6	(19)	20	(39)	< 0.0001
	number	(%) *	number	(%) *	OR (95% CI)
Recruited at STD-clinic	57 (49)		68 (74)		2.93 (1.56-5.56)
Living in the Netherlands $\leq$ 15 years	19 (16)		53 (58)		7.12 (3.58-14.36)
Resident of Amsterdam	59 (51)		74 (80)		3.90 (2.00-7.80)
Ever had STD	49 (43)		61 (68)		2.83 (1.53-5.26)
Preference for Latin American prostitutes	9 (8)		14 (15)		2.16 (0.82-5.95)
Ever been tested for HIV	26 (23)		22 (24)		1.08 (0.53-2.17)
Combining alcohol use and sex with prostitutes	32 (28)		39 (43)		1.96 (1.05-3.66)
Country of birth:					
—Netherlands	86 (74)		31 (34)		1 (3.30-18.15)
—Turkey	12 (10)		33 (36)		7.63 (1.98-9.47)
—other	18 (16)		28 (30)		4.32 (0.16-0.71)
Enjoyed higher education	42 (37)		15 (17)		0.35 (0.07-0.47)
Owens the house he lives in	34 (30)		7 (8)		0.19 (0.18-0.65)
Gross annual income > DF 30,000	65 (60)		28 (34)		0.34 (2.87-18.63)
Prepared to pay more for sex without a condom	8 (7)		30 (34)		6.98 (0.36-1.19)
In previous six months:					
—any female private partner	63 (54)		39 (44)		1.18 (0.64-2.17)
—did not visit same prostitute twice	50 (48)		45 (52)		2.88 (1.09-8.15)
—has been refused by prostitute	8 (7)		16 (18)		1.49 (0.72-3.19)
—never brings own condoms	88 (76)		75 (82)		24.7 (3.6-1049)
—had gonorrhoea, syphilis or CT	1 (1)		15 (18)		

*Because of missing data some percentages are not based upon the full number of participants.

†Chlamydia trachomatis.

CCU, the ICU report more contacts with prostitutes per 6 months, more often contracting gonorrhoea in the preceding 6 months, a preference for Latin American prostitutes slightly more often, being born in the Netherlands less often, being prepared to pay more for sex without a condom, less often having had a higher education and earning less.

As the main reason for not using condoms consistently, 51/91 ICU (56%) mentioned finding sex without a condom more pleasant. From table 4 it can also be seen that even among CCU there are some men (7%) prepared to pay more for unprotected sex, making clear that their consistent condom use is merely circumstantial. Out of 37 men stating that they were prepared to pay more for sex without a condom, only 15 (41%) indicated that they actually did in the preceding 6 months.

An indication of the validity of the reported level of condom use can be seen in the numbers reporting to have had gonorrhoea, syphilis and/or *Chlamydia trachomatis* infections in the preceding 6 months: 15 ICU (18%) and 1 CCU (1%) ($p = 0.001$). The one CCU who recently had a sexually transmitted disease reported two private partners with whom he did not use condoms at all. There was no significant crude association between having had private sexual partners in the past 6 months and having had a sexually transmitted disease in the same period for the total group (OR = 1.33; 95% CI 0.42–4.37).

In multiple logistic regression analysis, 5 variables from the list in table 4 (excluding the variable "STD in past 6 months") contributed independently and significantly to a model predicting inconsistent condom use. According to this model, the probability of using condoms inconsistently was higher for clients residing within the Netherlands ≤ 15 years (OR = 5.85; 95% CI 2.66–12.84), being a resident of Amsterdam (OR = 2.52; 95% CI 1.12–5.68), having more commercial sexual contacts in the preceding 6 months (OR = 1.03 per contact; 95% CI 1.01–1.05), ever having had a sexually transmitted disease (OR = 2.66; 95% CI 1.22–5.82) and being prepared to pay more for sex without a condom (OR = 4.87; 95% CI 1.87–13.44). There were no significant interactions between these variables. As with prostitutes, location of recruitment did not appear to be a confounder, since inclusion of this variable in the model had only a very minor influence on the presented ORs.

Discussion

The present anonymous study shows HIV prevalences among prostitutes without a history of injecting drug use and among clients of prostitutes in Amsterdam to be quite low (1.5% and 0.5% respectively). This is in accordance with the results of a non-anonymous study in the same city,¹⁴ which also found a very low HIV prevalence among a

group of promiscuous, non-IDU STD clinic attenders, consisting mainly of prostitutes and clients of prostitutes. Thus, lowering the participation threshold by conducting a study which was anonymous and without follow-up commitment, did not result in a noteworthy higher HIV prevalence estimate. The low prevalence we found is also in accordance with the results of studies performed in other western European cities.^{8 9 11 15 20} Whether or not the three prostitutes and single client, who were identified in the present study as being HIV infected, actually became infected through their prostitution contacts in this country is uncertain: all had other risk factors. The three women came from an AIDS endemic region and the HIV-positive man had a history of homosexual contact. Prostitutes in Amsterdam appear to be highly mobile: 62 prostitutes (31%) reported to be living in the Netherlands for less than 3 years. It is within this group that the three HIV-infected prostitutes were identified (prevalence 3/62; 4.8%, 95% CI 1.6–14.0%). In the light of this mobility a rapid increase in HIV prevalence among prostitutes cannot be excluded. Therefore, the HIV prevalence among this group should be closely monitored, to be able to adjust and intensify HIV infection prevention efforts in a well timed manner.

Sampling participants for studies among prostitutes and clients of prostitutes exclusively through STD clinics is generally a very convenient method of recruitment. However, as our data show, an STD clinic sample may be too selective to gain sufficient insight in the level of HIV infection and risk behaviour among different subgroups of prostitutes and their clients. The two sampling methods applied here, one limited to an STD clinic and the other focused at a variety of prostitute working places, resulted in quite different subgroups. Among prostitutes, those recruited at the STD clinic were born far more often in the Netherlands and used condoms more frequently than those recruited elsewhere, while all three identified HIV-infected prostitutes were contacted outside the STD clinic. Among clients on the other hand, those recruited at the STD clinic were more often born abroad and used condoms less frequently than those recruited elsewhere. The one infected man we found was recruited at the STD clinic. Not surprisingly there is a far higher percentage of Amsterdam residents among the STD clinic recruited than among those recruited elsewhere. Clients who live outside Amsterdam may use STD control facilities in their home town, instead of attending the municipal STD clinic and therefore cannot be contacted at the latter location. Of course, the size and type of the differences we found cannot simply be generalised to other cities in other countries, where the culture of prostitution may be quite different and where the role that STD clinics play within that cultural setting may also be different. However, the present study shows that even in a situation where a low threshold

for visiting an STD clinic exists, large differences may exist between prostitutes and clients who tend to visit an STD clinic and those who do not. Our results also suggest that many of the prostitutes who appear to be at highest risk for HIV infection cannot be contacted through the STD clinic.

The reported level of condom use in commercial sexual contact is high: the majority of both prostitutes (66%) and clients of prostitutes (56%) report always to have used condoms with vaginal contact in the preceding 6 months, while a substantial part of the others report to have used condoms most of the time. The finding that consistent use of condoms occurs in particular when an "employer" provides for them, possibly reflects the effectiveness of the "safe sex" policy practised in some brothels: those clients that report that if they go to a sex club they always go to one with a safe sex house rule are far less often ICU than those stating not always to go to one with such a house rule (18% versus 52% respectively; OR = 4.95, 95% CI 1.36–18.25). Among prostitutes, many of the characteristics which are associated with inconsistent condom use are highly correlated; particularly women originating from Latin America tend to be among the ICU and they are inclined to work hard, presumably partly as a result of economic pressure (having to maintain others more often and having less often other (legal) income), while the shortness of their (frequently illegal) residency in the Netherlands may make them more isolated and therefore more susceptible for clients who persist on sexual contact without a condom. The initiative to use condoms relies heavily on the prostitutes, since few clients bring their own condoms, many clients find sex without a condom more pleasant and some admit to be willing to pay more for sex without a condom.

The risk of becoming HIV-infected through commercial sexual contacts for an average individual in the groups here described appears to be very small because of the low HIV prevalence, the generally high level of condom use and the rather small chance of transmitting the virus per unprotected vaginal contact.^{21 22} However, some subgroups seem to be particularly at risk. Creative prevention efforts should be focused at these subgroups. Because of the transient composition of the group of women who are most vulnerable (mainly from Latin America), these efforts should have to bear a rather permanent character. Since ultimately changes in individual social and economical circumstances of these women may be needed to improve their bargaining position and thereby to become able to insist on safe sex with clients, this will be a difficult task. More promising may be to address the demand side of unsafe sex: the clients of

prostitutes and particularly those that migrated to the Netherlands. Preventive measures aimed at attitude change may lead to behavioural change in this group, provided that the applied measures fit in the cultural background.

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- 1 Anonymous. AIDS: prevention, policies, and prostitutes. *Lancet* 1989;i:1111–3.
- 2 Van de Perre P, Clumeck N, Carael M, et al. Female prostitutes: a risk group for infection with human T-cell lymphotropic virus type III. *Lancet* 1985;2:524–7.
- 3 Kreiss JK, Koech D, Plummer FA, et al. AIDS virus infection in Nairobi prostitutes—spread of the epidemic to East Africa. *N Engl J Med* 1986;314:414–8.
- 4 Mann JM, Nzilambi N, Piot P, et al. HIV infection and associated risk factors in female prostitutes in Kinshasa, Zaire. *AIDS* 1988;2:249–54.
- 5 Siraprasit T, Thanprasertsuk S, Rodklay A, Srivanichakorn S, Sawanpanyalert P, Temtanarak J. Risk factors for HIV among prostitutes in Chiangmai, Thailand. *AIDS* 1991;5:579–82.
- 6 Nzila N, Laga M, Abib Thiam M, et al. HIV and other sexually transmitted diseases among female prostitutes in Kinshasa. *AIDS* 1991;5:715–21.
- 7 Seidlin M, Krasinski K, Bebenroth D, Itri V, Paolino AM, Valentine F. Prevalence of HIV infection in New York call girls. *J Acquir Immune Defic Syndr* 1988;1:150–4.
- 8 Tirelli U, Rezza G, Giuliani M, et al. HIV seroprevalance among 304 female prostitutes from four Italian towns. *AIDS* 1989;3:547–8.
- 9 Aim G, de Vincenzi I, Ancelle-Park R, Brunet JB, Catalan F. HIV infection in French prostitutes. *AIDS* 1989;3:767–8.
- 10 Padian NS. Prostitute women and AIDS: epidemiology. *AIDS* 1988;2:413–9.
- 11 McKeganey N, Barnard M, Leyland A, Coote I, Follet E. Female streetworking prostitution and HIV infection in Glasgow. *BMJ* 1992;305:801–4.
- 12 van den Hoek JAR, van Haastrecht HJA, Scheeringa-Troost B, Goudsmit J, Coutinho RA. HIV infection and STD in drug addicted prostitutes in Amsterdam: potential for heterosexual HIV transmission. *Genitourin Med* 1989;65:146–50.
- 13 van den Hoek JAR, Coutinho RA, van Haastrecht HJA, van Zadelhoff AW, Goudsmit J. Prevalence and risk factors of HIV infections among drug users and drug-using prostitutes in Amsterdam. *AIDS* 1988;2:55–60.
- 14 Hooykaas C, van der Velde FW, van der Linden MMD, van Doornum GJJ, Coutinho RA. The importance of ethnicity as a risk factor for STDs and sexual behaviour among heterosexuals. *Genitourin Med* 1991;67:378–83.
- 15 Alary M, for the European working group on HIV infection in female prostitutes. HIV infection in European female sex workers: epidemiological link with the use of petroleum based lubricants (abstract). VIII international conference on AIDS/III STD world congress. Amsterdam: Congrex Holland, 1992.
- 16 Langedijk JPM, Vos WFHM, van Doornum GJJ, Rotman HAJ, Meloen RH, Huisman JG. Identification of cross-reactive epitopes recognized by HIV-1 false-positive sera. *AIDS* 1992;6:1547–8.
- 17 Norusis MJ. *SPSS/PC + 4.0 Base Manual*. Chicago: SPSS Inc., 1990.
- 18 Dean AG, Dean JA, Burton AH, Dicker RC. *Epi Info, Version 5: a word processing, database and statistics program for epidemiology on microcomputers*. Atlanta, Georgia, Centers for Disease Control, U.S.A., 1990.
- 19 Dixon WJ (ed.). *BMDP Statistical Software Manual*. Berkeley: University of California Press, 1988.
- 20 European project on monitoring HIV seroprevalance in a sentinel population of STD patients. *Newsletter nr 5*. Brussels: IHE epidemiology unit, 1992.
- 21 Padian NS, Shiboski SC, Jewell NP. The effect of number of exposures on the risk of heterosexual HIV transmission. *J Inf Diseases* 1990;161:883–7.
- 22 European Study Group on Heterosexual Transmission of HIV. Comparison of female to male and male to female transmission of HIV in 563 stable couples. *BMJ* 1992;304:809–13.