# How to reach clients of female sex workers: a survey "by surprise" in brothels in Dakar, Senegal

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**Objective** To describe the sampling techniques and survey procedures used in identifying male clients who frequent brothels to buy sexual services from female sex workers in Dakar, Senegal, with the aim of measuring the prevalence of human immunodeficiency virus (HIV) infection and investigating related risk behaviours.

**Methods** Surveys were conducted in seven brothels in Dakar, Senegal. Clients were identified "by surprise" and interviewed and requested to donate saliva for HIV testing.

**Results** Of the 1450 clients of prostitutes who were solicited to enter the study, 1140 (79.8%) agreed to be interviewed; 1083 (95%) of these clients provided saliva samples for testing. Of the samples tested, 47 were positive for HIV-1 or HIV-2, giving an HIV prevalence of 4.4%.

**Conclusion** The procedures adopted were successful in reaching the target population. Men present in the brothels could not deny being there, and it proved possible to explain the purpose of the study and to gain their confidence. Collection of saliva samples was shown to be an excellent method for performing HIV testing in difficult field conditions where it is hard to gain access to the population under study. The surveying of prostitution sites is recommended as a means of identifying core groups for HIV infection with a view to targeting education programmes more effectively. In countries such as Senegal, where the prevalence of HIV infection is still low, interventions among commercial sex workers and their clients may substantially delay the onset of a larger epidemic in the general population.

**Keywords** Prostitution; Sex behavior; HIV seroprevalence; Men; Women; Risk factors; Cross-sectional studies; Data collection/methods; Senegal (*source: MeSH, NLM*).

**Mots clés** Prostitution; Comportement sexuel; HIV séroprévalence; Hommes; Femmes; Facteur risque; Etude section efficace; Collecte données/méthodes; Sénégal (*source: MeSH, INSERM*).

**Palabras clave** Prostitución; Conducta sexual; Seroprevalencia de VIH; Hombres; Mujeres; Factores de riesgo; Estudios transversales; Recolección de datos/métodos; Senegal (*fuente: DeCS, BIREME*).

## Introduction

The emergence of the global pandemic of acquired immunodeficiency syndrome (AIDS) has necessitated an increased understanding of the sexual behaviour of human populations (*1–7*) in order to make informed predictions about human immunodeficiency virus (HIV) epidemics in specific populations and to help policy-makers design effective education and control programmes. Although antiretroviral therapy has become accessible in most industrialized countries, HIV/AIDS control efforts in developing countries must continue to rely on information and education programmes to increase condom use and decrease high-risk behaviour.

Programmes aimed at controlling sexual transmission of HIV in Africa have mostly targeted the general public. The impact of this approach is difficult to evaluate since the risk of HIV infection is not randomly distributed, but is mainly related to specific sexual networks. Interventions that focus on specific core groups may be more efficient in this respect.

The earliest data reported on HIV epidemics in Africa identified commercial sex workers as a group whose sexual behaviour (multiple partners, unprotected sex) made them at risk of infection (*8–10*). Recent studies show evidence of a continuing increase in HIV infection in this population (*11, 12*). The male clients of female sex workers constitute another core group for HIV transmission, but the characteristics of this subset of the population are almost unknown. They are an important group, however, since they play a role as vectors for HIV transmission, linking female sex workers (with a high HIV seroprevalence) to the general population of women (wives, girlfriends), assumed to have a lower prevalence. Efforts to reduce transmission of HIV infection within the male client group might therefore have a considerable impact in slowing the spread of HIV.

We carried out a study in brothels in Dakar, Senegal, to estimate the prevalence of HIV infection and the related risk behaviours among males who frequent them to buy services from female sex workers. In this article we report the sampling techniques and survey procedures used to identify this hard-to-reach population.

## Methods

### Study design

A cross-sectional HIV seroprevalence and sexual behaviour study was undertaken in seven brothels in Dakar, Senegal. Information from individual open-ended interviews with sex workers was integrated with data obtained by questionnaire. The survey combined standard sampling survey methods with outreach techniques.

### Study setting

The seven brothels (*maisons closes*), located in four neighbourhoods of Dakar, each comprise an aggregate of rudimentary constructions within a compound, to which men come to buy sexual services from female sex workers. The majority of such houses are located in working-class neighbourhoods with extremely poor living conditions, and the women who work in them are mostly from the lower classes of the population. These places are well known to people living in the neighbourhood from whom most of the clients are drawn.

### Study population

The subjects of the study were the clients of the female sex workers working in the selected brothels. A client was defined as a male who was present in the brothel during the fieldwork and who had had a sexual encounter at the site with a female living and/or working there for which he had paid in money or goods of monetary value. All subjects fulfilling this definition were asked to participate in the study.

Traditional sampling methods were not suitable for determining the levels of HIV infection in this group. Many studies have reported high rates of HIV infection and risk behaviours in males who frequent sex workers from nonprobability samples identified in clinics and similar settings. However, the findings cannot be generalized for a broader population of clients. The Centers for Diseases Control and Prevention (CDC) have developed a venue-based probability survey method to sample and estimate HIV prevalence among men who have sex with other men that combines outreach techniques with standard methods (*13*). At sampled venues (dance clubs, bars and street location) where young gay men congregate, they are enumerated, approached consecutively, and offered enrolment if they are considered eligible. The same principle was used to approach the male clients in this study. In each brothel, time slots were randomly selected during opening hours (after 19:00 for all sites). All males entering the brothels to buy sexual services during these periods were considered eligible and solicited to participate to the study. Clients were recruited outside the sex workers' rooms after the encounter.

### Selecting study sites

Commercial sex work is legal in Senegal. In 1970, the government institutionalized the medical follow-up of self-indicated female sex workers older than 21 years, who must enrol with a health service. The women are issued with a health record and their sociodemographic details are registered with the police. Approximately 1500 women are currently registered by the Institut d'Hygiène Social (IHS) in this way and a little less than 1000 regularly attend medical consultations, i.e. are seen at least twice a year. Brothels are not legal but are tolerated. Because their illegal status precluded random sampling to establish the sampling frame, an inventory of brothels was

taken using information provided by IHS and two female sex workers who joined the team and were given an incentive payment. The team, which also included a surveyor and a driver, located the sites at which commercial sexual activity had been observed and decided whether they should be maintained in the listing, if necessary making repeat visits.

This process located 13 brothels situated in five residential working-class neighbourhoods. Brothels were not found in middle-class residential areas. The main criterion for the inclusion of a brothel in the study was acceptance by the sex workers at the site. It was decided to include at least one site from each area, and to include two from two neighbourhoods, Fass Delorme and Grand Yoff, where the population density was greater.

An IHS social worker introduced the main researcher (*G.E.S.*) to the sex workers but did not participate in any other way in the study. The researcher explained that she was planning to carry out a privately funded study about their male clients and asked for their cooperation. Of the 13 sites identified, 11 were contacted to enter the study and at seven the sex workers agreed to participate. Two sites were omitted because two other brothels in the same neighbourhood had already agreed to participate. One site was closed during the survey period for building work. There was a refusal rate of approximately 30%, and at three sites women categorically refused to participate, two of them after the survey had already started.

### Sample size

The total number of clients per site was not known until the end of the survey. Theoretically, all male clients were eligible for inclusion. Although an estimate of HIV seroprevalence among the male clients of female sex workers is not available for Dakar, HIV seroprevalence among males who have reported regular sexual contact with sex workers has been associated with levels of HIV infection in males attending sexually transmissible disease (STD) clinics in many African countries. Therefore, the HIV seroprevalence among males STD patients in Dakar (5%) was used as the estimate for HIV prevalence in clients (*p*). For a precision (*d*) of 1.5% and a confidence level of 5% ($z = 1.96$), we calculated the sample size (*n*) as follows:

$$n = z^2 (pq)/d^2 = 1.96^2 (0.05 \times 0.95)/0.015^2 = 811$$

In the only large study on clients of sex workers in Africa, Pickering et al. (*14*) reported a refusal level of nearly 30% in the Gambia. Assuming the same proportion of refusals in our study sample, we calculated the required sample size to be 1054.

The procedure for sample size calculation assumed a random selection of the study sites. It became evident, however, that selection of brothels would not be 100% random but rather by convenience and opportunity. Nevertheless, because a high proportion of the brothels inventoried entered the study, the selection of the time slots was random, and all men entering the brothels at the selected time were invited to participate; non-random selection of sites is likely to have had only a minor impact on the study results.

### Data collection

Data were collected over a 3.5-month period from April to June 1999, with information on the estimated necessary sample

size being completed after 38 nights of work. Four surveyors, three males and one female, were recruited and trained to complete the questionnaire and perform saliva collection: two professional surveyors; a teacher of the Wolof language, who had taken part in the inventory of brothels and had proven to be very skilful in contacts with clients and sex workers; and a final-year medical student. The main researcher supervised the surveyors and was present throughout the fieldwork.

## Questionnaire design

The data collection instrument, a questionnaire, was predominantly quantitative and was divided into the following sections: sociodemographic characteristics; sexual behaviour with steady and occasional partners; sexual behaviour and sexual acts with prostitutes; and prevalence of STDs during the previous 6 months. Steady partners were initially defined as women with whom clients had affective steady sexual relations. During testing of the questionnaire it was noted that a number of males had affective relations with women with whom they did not have sexual relations. Therefore during the survey the notion of steady partner was enlarged to include affective relations with or without sexual relations. Data on condom use and sexual practices were collected for each category of woman. Respondents were asked about the last time they had any type of STD, if they had sought treatment and, if so, where. A number of structured, open-ended questions were also asked, and further qualitative answers were noted when additional information was spontaneously given in response to quantitative questions. The interviews lasted on average 5 minutes.

Response categories were coded for computer entry: the surveyors circled the number corresponding to the answer given by the respondent, and wrote the code in the specified place on the questionnaire. The open-ended questions were standardized and coded after the fieldwork.

## Collection procedures

Primary data were collected using the questionnaire. Saliva samples were collected using the Saliva Strip HIV 1/2 kit (Saliva Diagnostics Systems, Medford, NY, USA), which included a sterile saliva collector and a transport tube containing 1.1 ml buffer fluid (0.2% sodium azide). The collector was placed under the tongue and the subject was asked to keep his mouth closed. Collection time varied, with a range of 1–6 minutes. When the indicator line turned blue, the collector was removed from the mouth and inserted into the tube provided, which was recapped firmly for transport. Respondent consent to donate saliva was obtained at the time of interview.

Interviews took place from 19:00 hours until the end of the sex workers' commercial activities. Men were approached as they left the sex worker's room and informed of the purpose of the study and the dispositions for strict confidentiality. Some men, who noticed the presence of the survey team in the yard, left before being solicited. These were considered as refusals. Vendors who entered the rooms of the women to sell their merchandise and men who entered the compound to inquire about prices and left without going to a woman's room were not approached. All other men entering the house and leaving women's rooms were considered as clients and were asked to participate. Men leaving rooms who were reported by the women as not having had sexual relations for any reason

(refusal to use a condom or conflict about prices) were included. One surveyor remained permanently at the brothel entrance to ensure that all clients were approached.

Following verbal consent, the questionnaire was administered. Each questionnaire received an identifying code.

Free condoms were distributed to all clients and sex workers in the brothels. In addition, clients received a "voucher" valid for up to 1 month after the termination of the survey for a free medical consultation and HIV testing in the IHS clinic.

## Laboratory procedures

All saliva samples were tested the day after collection. The cotton pad was detached from the stem of the collector by twisting or rocking it against the inside edge of the tube. A filter was then pressed into the tube as far as it would go to ensure complete mixing of saliva with the buffer and to extract maximum sample volume. The processed specimen was transferred by pipette into a test tube and a test strip was added. The results could be read after 20 minutes when one or two lines became visible: the control line, which appeared closer to the top of the test strip and indicated the presence of specimen and proper hydration and migration of reagents; and the test line which appeared closer to the bottom of the test strip and indicated the presence of antibodies specific for HIV-1 or HIV-2. If the control line was nonreactive the test was interpreted as invalid, regardless of any other reactivity shown. Only one invalid test was observed during the study. This invalid test was repeated with a new test strip.

The indicator dye can interfere with the test reaction if it is allowed to colour the specimen. To prevent this, the tubes should be kept upright after the collector has been inserted in the tube containing the buffer, and during transport from the field. Among the 1083 samples collected, 12 were discarded after collection because they became coloured.

## Ethical considerations

The Institutional Review Board (IRB) of Tulane University, New Orleans, LA, USA, and the AIDS Ethical Committee of Senegal approved the study, and the ethical principles adopted were in conformity with those proposed by WHO guidelines. The interviews were anonymous and confidential. Answers were entered on the printed questionnaire and each questionnaire was coded with a unique identifier. Individuals were asked for verbal consent to the interview and donation of saliva samples for HIV testing. HIV testing was unlinked and anonymous but correlated to the questionnaire. All participants received a card to attend a free medical consultation in the IHS. Participants were encouraged to seek HIV testing for screening purposes.

# Results

Of the 1450 clients of sex workers who were solicited to enter the study, 1140 (79.8%) agreed to be interviewed; 1083 (95%) of these provided saliva samples for testing, of which 12 were discarded because they had become coloured. Reasons for refusal to donate saliva included a fear that there might be a drug in the saliva collector cotton pad, or fear of identification through the test.

Of the samples tested, 47 were positive for HIV-1 or HIV-2, giving an HIV prevalence of 4.4%. In Senegal, HIV

seroprevalence in the range 1–20% has been found in sentinel groups (STD patients, prostitutes, pregnant women, blood donors, hospitalized patients, and tuberculosis patients) included in the HIV serological surveillance conducted by the national AIDS programme. An increase in HIV-1 infection among male STD patients has been observed at Dakar surveillance sites: global prevalence was 3.7% in 1997 and 4.1% in 1998.

The survey data were broken down into two age classes; HIV prevalence among clients aged $\geqslant 26$ years was 7.1%, compared with 2.5% for clients aged < 26 years. The mean age for HIV-seropositive clients was 28.8 years (95% confidence interval (CI) = 26.7–31.0) compared with 25.5 years (95% CI = 25.1–25.9) for seronegative clients. Clients who refused to donate saliva were younger than seronegative ones; their mean age was 24.5 years (95% CI = 23.1–25.9). This suggests that considering their age, clients who refused to donate saliva were more likely to be negative than positive.

Significant differences in HIV prevalence were found among the brothels ($\chi^2$ test = 21.8; $P = 0.001$): 23 of the tested samples from one site and nine from another in the same neighbourhood were positive for HIV-1 or HIV-2, giving a prevalence of 8.1 % and 6.2%, respectively. The clients who frequented the first brothel were 2.8 times (95% CI = 1.5–5.0) more likely to be infected than clients at the other sites surveyed. When the two sites are taken together, the association becomes more significant than when taken separately ($\chi^2$ test = 15.518, $P < 0.001$). The risk of infection with HIV was 3.304 times higher (95% CI = 1.767–6.18) for clients frequenting the two brothels than for those of the other sites together.

## Discussion

Research on clients of female sex workers is rare because this group of males is difficult to reach. Moreover, few researchers have investigated the prevalence of HIV among clients of either female or male sex workers. The fact that 1080 clients were successfully approached and agreed to be interviewed and tested for HIV indicates that such studies can be conducted. In addition, it confirms that people are willing to speak about some aspects of their sex lives, even if the clandestine nature of the sexual exchange between sex worker and client might lead them to distort reports of their sexual behaviour patterns.

The duration of the data collection period, around 4 months, allowed the researchers to become accustomed to the environment of the brothels and to improve tactics for approaching clients and convincing them to participate. Much of the behaviour reported by participants was confirmed by observation and by interviews with sex workers, which gives considerable confidence in the reliability of the data.

This sample of males may be considered representative of the clients of brothel sex workers in Dakar. The inventory of brothels was exhaustive and validated by IHS social workers. During the time spent by the survey team in the brothels, most men entering to buy sexual services were invited and agreed to participate. The small proportion of refusals to answer the questions provides a degree of certainty that the results would not have changed if there had been no refusals.

This study indicates that testing of saliva for HIV antibodies, in addition to its already demonstrated high sensitivity and specificity in a variety of clinical settings, offers several advantages over serum tests in outreach conditions. It offers greater safety and ease of collection, and is well accepted by study participants. HIV antibody testing in settings such as brothels may be useful in reaching people at risk of infection who are not reached at traditional testing sites.

The study provided the opportunity to obtain information about HIV/AIDS and sexually transmissible diseases in a population engaging in high-risk behaviours. Similar studies targeting hard-to-reach populations in settings including street prostitution, bars, and night-clubs should be considered. ■

**Conflicts of interest:** none declared.

### Résumé

### Comment atteindre les clients des prostituées : une enquête « par surprise » dans les maisons closes de Dakar (Sénégal)

**Objectif** Décrire les techniques d'échantillonnage et les méthodes d'enquête utilisées pour identifier les hommes qui fréquentent les maisons closes pour s'acheter les services sexuels de prostituées à Dakar (Sénégal), l'objectif de l'étude étant de mesurer la prévalence de l'infection par le virus de l'immunodéficience humaine (VIH) et d'étudier les comportements à risque liés à cette infection.

**Méthodes** Les enquêtes ont été réalisées dans sept maisons closes de Dakar. Les clients ont été identifiés « par surprise », interrogés et invités à donner un échantillon de salive pour le dépistage du VIH.

**Résultats** Sur les 1450 clients de prostituées invités à participer à l'étude, 1140 (79,8 %) ont accepté d'être interrogés ; 1083 (95 %) d'entre eux ont fourni des échantillons de salive pour le dépistage du VIH. Parmi les échantillons testés, 47 étaient positifs pour le VIH-1 ou le VIH-2, soit une prévalence du VIH de 4,4 %.

**Conclusion** Les méthodes adoptées ont permis d'atteindre avec succès la population cible. Les hommes se trouvant dans les maisons closes ne pouvaient nier leur présence dans ces lieux, et il a été possible de leur expliquer le but de l'étude et de gagner leur confiance. Le recueil d'échantillons de salive s'est avéré une excellente méthode de dépistage du VIH dans des conditions de terrain difficiles où il est malaisé d'accéder à la population d'étude. Il est recommandé de procéder à des enquêtes dans les lieux de prostitution pour identifier les groupes constituant des noyaux d'infection par le VIH, afin de cibler plus efficacement les programmes d'éducation. Dans des pays comme le Sénégal, où la prévalence de l'infection à VIH est encore faible, les interventions axées sur les travailleurs sexuels et leurs clients peuvent retarder sensiblement l'apparition d'une épidémie de plus grande ampleur dans la population générale.

## Resumen

### Cómo llegar hasta los clientes de las profesionales del sexo: encuesta ''por sorpresa'' en burdeles de Dakar (Senegal)

**Objetivo** Describir las técnicas de muestreo y los métodos de encuesta utilizados para identificar a los hombres que frecuentan los burdeles para comprar los servicios de las profesionales del sexo en Dakar, Senegal, con la finalidad de medir la prevalencia de la infección por el virus de la inmunodeficiencia humana (VIH) y de investigar los comportamientos de riesgo relacionados.

**Métodos** Se realizaron encuestas en siete burdeles de Dakar. Tras abordar a los clientes ''por sorpresa'', se les entrevistaba y se les pedía una muestra de saliva para las pruebas del VIH.

**Resultados** De los 1450 clientes de prostitutas a los que se pidió que participaran en el estudio, 1140 (79,8%) accedieron a ser entrevistados; de ellos, 1083 (95%) proporcionaron muestras de saliva para la prueba. De las muestras analizadas, 47 fueron positivas para el VIH-1 o el VIH-2, lo que arroja una prevalencia de infección por el VIH del 4,4%.

**Conclusión** Los métodos empleados resultaron eficaces para llegar a la población destinataria. Los hombres no podían negar el hecho de que visitaban los burdeles, y fue posible explicarles la finalidad del estudio y granjearse su confianza. Se comprobó que la obtención de muestras de saliva era un método excelente para realizar las pruebas del VIH en condiciones de campo difíciles que entorpecen el acceso a la población objeto de estudio. Se recomienda realizar encuestas en los lugares de prostitución como medio para identificar los grupos centrales de la infección vírica, con miras a focalizar más eficazmente los programas de educación. En países como el Senegal, donde la prevalencia de la infección por el VIH es todavía baja, las intervenciones llevadas a cabo entre los trabajadores sexuales y sus clientes podrían retrasar marcadamente la aparición de una epidemia más amplia en la población general.

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