Condom use by female sex workers and their clients in Mexico: who decides and does it matter?

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ABSTRACT

Objectives To explore the effect of different patterns of condom use by clients and female sex workers (FSW) on HIV transmission in Mexico.

Methods Data from 2401 face-to-face interviews among FSW from Morelos and Michoacán in Mexico were used to build and parameterise a deterministic model of HIV transmission between FSW, their stable partners and clients.

Results For the observed patterns of condom use among FSW, a range of patterns of use among clients would be consistent. Two extreme patterns were explored: either clients conformed to FSW decision, or they had a strict preference for bought sex with or without condoms. HIV prevalence in the model is greater in the first of these scenarios.

Conclusions Patterns of condom use between sex workers and clients is an important, but hidden, determinant of epidemic spread. More detailed information on condom use negotiation and behavioural patterns of clients is needed to understand the potential for transmission in these populations and in order to direct intervention efforts more effectively.

In Mexico and other countries with concentrated HIV epidemics, targeting high-risk groups has been a focus of sexually transmitted infection control efforts.1 2 An important determinant of the extent of HIV spread will be the heterogeneity in risk behaviour within these groups. Mathematical models using data on behaviour allow us to predict the risks of HIV spread and the impact of interventions. While information on individuals’ own behaviour can be recorded, information on partners’ risks is less readily captured. In fact, in many cases, several different patterns of behaviour can be consistent with the same individual-level behavioural reports. In this paper, we test the hypothesis that patterns of mixing and condom use among sex workers and their clients are a determinant of the potential extent of epidemic spread.

RESULTS

HIV epidemics were simulated under the two scenarios. In the homogenous client scenario (figure 1A) ‘homogeneous client population’, it was assumed that condom use was determined by FSW only (ie, clients always used condoms in the same transaction and did not switch clients). In the alternative scenario (figure 1B) ‘heterogeneous client population’, it was assumed that condom use also depended on clients’ preferences (ie, some clients always used condoms and some never did, and each type of client sought FSW who matched their behaviour). The contribution of each subpopulation to the HIV epidemic was also evaluated through sensitivity analyses by measuring changes in incidence according to the frequency of condom use with both clients and partners, and the number of clients.

METHODS

A deterministic mathematical model was developed that represents heterosexual transmission of HIV between FSW, their clients and non-commercial partners (see supplementary figure S-1, available online only). We focused on the heterogeneity in behaviour between FSW categorising them into eight mutually exclusive sexual activity classes defined by: (1) condom use at last sex; (2) number of clients per week; and (3) having a non-commercial partner (see supplementary table S-1, available online only). We parameterised the model using data from a behavioural survey undertaken in Morelos and Michoacán, Mexico, where 2401 FSW participated in a validation study, part of the second generation surveillance implemented by the Instituto Nacional de Salud Pública (INSP) and Centro Nacional para la Prevención y el Control del VIH/SIDA (CENSIDA) in 2001 (see supplementary table S-2, available online only). The model is described in detail in the supplementary material (model equations S-1 available online only).

Based on those data, it was assumed that some FSW always use condoms (84%) and some never do (16%). Then, the effect of the mixing pattern between clients and FSW was explored by simulating an HIV epidemic under two scenarios. In one scenario (figure 1A) ‘homogeneous client population’, it was assumed that condom use was determined by FSW only (ie, clients chose FSW randomly, such that clients used condoms in some transactions and not others). In the alternative scenario (figure 1B) ‘heterogeneous client population’, it was assumed that condom use also depended on clients’ preferences (ie, some clients always used condoms and some never did, and each type of client sought FSW who matched their behaviour). The contribution of each subpopulation to the HIV epidemic was also evaluated through sensitivity analyses by measuring changes in incidence according to the frequency of condom use with both clients and partners, and the number of clients.
Figura 1  HIV prevalence y incidencia entre todos los grupos y sobre la incidencia a equilibrio por subgrupo del modelo: (A) Homogéneo cliente población (Hom-CP) escenario, donde todos los clientes (carréte) mezclan al azar con FSW (círculos) que o siempre o nunca usan condones; (B) Cliente de población homogénea (Het-CP) escenario, donde los clientes se dividen en usuarios de condones (flecha oscura) y no usuarios (flecha clara) y mezclan asortativamente con FSW según el uso de condones. (C) y (D) muestran la prevalencia previa de HIV en luz oscura y la incidencia en negro en todos los grupos para el Hom-CP y Het-CP escenarios, respectivamente. (E) y (F) muestran la incidencia a equilibrio por subpoblación para elHom-CP y Het-CP escenarios, respectivamente. FSW-C: FSW que siempre usan condones; FSW-NC: FSW que no usan condones; Clients: clientes de FSW que usan condones sólo con FSW que usan condones (Hom-CP); Clients-C: clientes que siempre usan condones y sólo tienen sexo con FSW que usan condones (Het-CP); Clients-NC: clientes que nunca usan condones y sólo tienen sexo con FSW que no usan condones (Het-CP); Partners-C: socios de pago de FSW que siempre usan condones; Partners-NC: socios de pago de FSW que nunca usan condones. (Todos los modelos y parámetros del modelo se proporcionan en el apéndice suplementario, disponible en línea).

Key messages
- Niveles reportados de uso de condones de FSW se podrían traducir en diferentes epidemias de VIH dependiendo de los patrones de uso y mezcla de los clientes.
- El uso de condones por parte de los clientes puede generar una prevalencia de VIH más baja si el uso del condón no se iguala entre todos los clientes.
- La información sobre la negociación de uso de condones entre FSW y clientes de FSW sería valiosa para el modelado, la vigilancia y el uso programático.

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Contributors AB and GPG designed the study. AB, TBH and GBG performed the analyses. All authors contributed to the interpretation of results and write up.

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REFERENCES

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