

## ORIGINAL ARTICLE

# Assessment of HIV-related risky behaviour: a comparative study of face-to-face interviews and polling booth surveys in the general population of Cotonou, Benin

Luc Béhanzin,<sup>1,2</sup> Souleymane Diabaté,<sup>1,2</sup> Isaac Minani,<sup>3</sup> Catherine M Lowndes,<sup>1,4</sup> Marie-Claude Boily,<sup>1,5</sup> Annie-Claude Labbé,<sup>6</sup> Séverin Anagonou,<sup>7,8</sup> Djimon Marcel Zannou,<sup>7,8</sup> Anne Buvé,<sup>9</sup> Michel Alary<sup>1,2,10</sup>

<sup>1</sup>Centre de recherche FRQS du CHU de Québec, URESP, Québec, Canada

<sup>2</sup>Département de médecine sociale et préventive, Université Laval, Québec, Canada

<sup>3</sup>Dispensaire IST, Centre de santé communal de Cotonou 1, Cotonou, Bénin

<sup>4</sup>Department of HIV and STIs, Health Protection Agency, London, UK

<sup>5</sup>Department of Infectious Disease Epidemiology, Imperial College, London, UK

<sup>6</sup>Département de microbiologie, Hôpital Maisonneuve-Rosemont, Montréal, Québec, Canada

<sup>7</sup>Faculté des sciences de la santé, Université d'Abomey-Calavi, Cotonou, Bénin

<sup>8</sup>Centre national hospitalier universitaire, Cotonou, Bénin

<sup>9</sup>Unit of Epidemiology and Control of HIV/STD, Institute of Tropical Medicine, Antwerp, Belgium

<sup>10</sup>Unité de recherche en santé des populations (URESP), Institut national de santé publique du Québec, Québec, Canada

## Correspondence to

Dr Michel Alary, Centre de recherche du CHU de Québec, Hôpital du Saint-Sacrement, 1050 Chemin Ste-Foy, Québec, QC, Canada G1S 4L8; [malary@uresp.ulaval.ca](mailto:malary@uresp.ulaval.ca)

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## ABSTRACT

**Objectives** During the 2008 HIV prevalence survey carried out in the general population of Cotonou, Benin, face-to-face interviews (FTFI) were used to assess risky behaviours for HIV and other sexually transmitted infections (STI). We compared sexual behaviours reported in FTFI with those reported in polling booth surveys (PBS) carried out in parallel in an independent random sample of the same population.

**Methods** In PBS, respondents grouped by gender and marital status answered simple questions by putting tokens with question numbers in a green box (affirmative answers) or a red box (negative answers). Both boxes were placed inside a private booth. For each group and question, data were gathered together by type of answer. The structured and gender-specific FTFI guided by trained interviewers included all questions asked during PBS. Pearson  $\chi^2$  or Fisher's exact test was used to compare FTFI and PBS according to affirmative answers.

**Results** Overall, respondents reported more stigmatised behaviours in PBS than in FTFI: the proportions of married women and men who reported ever having had commercial sex were 17.4% and 41.6% in PBS versus 1.8% and 19.6% in FTFI, respectively. The corresponding proportions among unmarried women and men were 16.1% and 25.5% in PBS versus 3.9% and 13.0% in FTFI, respectively. The proportion of married women who reported having had extramarital sex since marriage was 23.6% in PBS versus 4.6% in FTFI.

**Conclusions** PBS are suitable to monitor reliable HIV/STI risk behaviours. Their use should be expanded in behavioural surveillance.

## INTRODUCTION

Accurate and reliable data on HIV-related risky behaviour are needed to understand the dynamic of the HIV epidemic, to plan preventive interventions and to evaluate the impact of potentially effective control strategies.<sup>1–4</sup> Face-to-face interviews (FTFI) are often used to collect information on sexual behaviour, especially in populations where literacy rates are low. However, this method is associated with misreports since it is sensitive to stigma and discrimination.<sup>5–8</sup> Persons interviewed through FTFI tend either to conceal their socially proscribed

behaviours from the interviewers leading to under-reporting of such behaviours or to over-report socially approved behaviours.<sup>1 3 4 9</sup> Misreporting of respondents according to their perception of social norms is known as social desirability bias. It is a socio-cultural bias that may vary over time and that is influenced by gender and the respondent perception of the confidentiality surrounding FTFI.<sup>3 10</sup> In order to improve confidentiality and anonymity for reliable data collection, alternative methods such as self-administered questionnaires and computer-assisted self-administered interviews adapted to countries with high literacy rate were developed.<sup>11–13</sup> In settings with low literacy rate, new methods included audio computer-assisted self-administered interviews, informal confidential voting interviews (ICVI) and polling box approaches (PBA).<sup>1 4 5 14–16</sup> Another method called polling booth survey (PBS) was recently developed for assessing sexual behaviour of female sex workers (FSW) in India<sup>17</sup> and its first evaluation was carried out in the general population of two districts of India.<sup>3</sup> In 2008, we carried out a behavioural and HIV/sexually transmitted infections (STI) prevalence survey in the general population of Cotonou, Benin. We took this opportunity to carry out PBS in parallel to FTFI in the same population and we report here the first evaluation of this new method in the African context.

## METHODOLOGY

### Sampling, recruitment and data collection

In 2006, the literacy rate in Cotonou, the largest city and economic capital of Benin, was 56.0% among women and 81.3% among men.<sup>18</sup> In 2008, there were approximately 808 000 inhabitants in Cotonou.<sup>19</sup> A two-stage cluster sampling procedure was used to select the survey participants. A probability proportional to size method was used to select 38 census areas out of 1124.

For FTFI, 1070 households were randomly selected from the 38 census areas. The selected households were systematically visited and all women aged 15–49 years and men aged 15–64 years were asked to participate. Structured and gender-specific questionnaires validated by Joint United Nations Programme on HIV/AIDS (UNAIDS) were used to

collect information on socio-demographic characteristics and sexual behaviour.<sup>20</sup>

For PBS, we aimed to recruit eight persons in each of four demographic groups (32 participants, women aged 15–49 years and men aged 15–64 years), based on gender and marital status (married and unmarried men, married and unmarried women), in each census area. We used a random route sampling procedure to select the households.<sup>21</sup> In parallel to the conduct of FTFI, in each census area and for each group, one household was randomly selected by the interviewers from the household lists of each of the 38 areas. From this index household or starting point, the interviewers walked from household to household in a direction that was indicated by throwing a pencil in the air. In each visited household, all eligible persons were asked to participate. The walk continued in the same direction until the required number of eligible respondents was recruited. The group anonymous PBS sessions were organised in every selected census area at the end of the recruitments. There was a different

questionnaire for each group. Every respondent was provided with a set of standard voting tokens and had a private polling booth containing two boxes where he/she operated his/her choices (figure 1). Each voting token was marked with a different question number and did not contain personal identification information. The boxes for the answers were like ballot boxes with a narrow slot on the top (figure 1). Before the respondents voted for a given question, the interviewer held up the correctly numbered voting token and asked the participants to do so. Then, he/she read the question aloud and gave relevant explanations on the voting process. Respondents answered by putting their numbered voting token in the green box if their answer was 'yes' and in the red one if their answer was 'no' (figure 1). If the question was not applicable, the respondent placed the voting token beside the two coded boxes. For every question, the process was repeated. At the end of the session, a supervisor who did not participate in the interview process gathered the boxes and placed them together by type of answer.



**Figure 1** Tools for polling booth surveys. (A) Voting tokens (with the question number). (B) The two colour-coded boxes for 'Yes' and 'No' answers. (C) Private booth (shown by finger). (D) The voting tokens on the private booth and the two colour-coded boxes placed inside the latter. The respondent has to insert the voting token into the correspondent answer's box (yes or no) or beside them if the question is not applicable to him.

All the personnel of the study, who participated in FTFI and PBS, were trained during the same workshop. Questionnaires were back-translated according to the two main local languages and were pretested in the field. All the questions asked during PBS were included in the questionnaires used for FTFI.

### Statistical analyses

Data for FTFI and PBS were double entered with EPI-INFO (CDC, Atlanta, Georgia, USA) and Excel 2003 (Microsoft Office), respectively. We used SAS 9.2 (SAS Institute, Inc., Cary, North Carolina, USA) for the analyses. Pearson  $\chi^2$  or Fisher's exact test was used to compare both methods according to affirmative answers. We also estimated normal or exact binomial 95% CI for the proportions.

### Ethical considerations

Witnessed verbal informed consent was obtained from each of the participants to FTFI and PBS. The study was approved by an ad hoc ethics committee convened by the Ministry of Health

of Benin and the ethics committees of the Centre hospitalier *affilié* universitaire de Québec and the institutional review board of the Institute of Tropical Medicine (Antwerp, Belgium) as well as the ethics committee of the University Teaching Hospital in Antwerp (Belgium).

### RESULTS

For FTFI, 96.1% (982 married, 363 unmarried) of the 1399 eligible women and 91.4% (606 married, 629 unmarried) of the 1351 eligible men agreed to be interviewed. For PBS, 89.5% (272 married, 272 unmarried) of the 608 eligible women and 90.6% (274 married, 277 unmarried) of the 608 eligible men agreed to participate. Median age (IQR) among married/unmarried men and married/unmarried women who underwent FTFI was 36 (30–43), 22 (19–25), 30 (25–38) and 19 (17–23), respectively. Tables 1A,B and 2A,B show the comparison of proportions of affirmative answers to FTFI and PBS among married/unmarried men and married/unmarried women,

**Table 1** Comparison of reported HIV-related risk behaviour in face-to-face interviews (FTFI) and polling booth surveys (PBS) among men aged 15–64 years, by marital status, Cotonou, Benin

Questions	Affirmative answers					
	FTFI (N=606)		PBS (N=274)		Ratio	p Value
	Proportion (n/N* (%))	95% CI	Proportion (n/N (%))	95% CI		
<b>(A) Married men</b>						
Heard of HIV/AIDS	597/604 (98.8)	(98.0 to 99.7)	259/270 (95.9)	(93.6 to 98.3)	0.97	0.005
Previous HIV testing	135/605 (22.3)	(19.0 to 25.6)	89/270 (33.0)	(27.4 to 38.6)	1.48	<0.001
Ever had sex besides with spouse <sup>1</sup>	516/548 (94.2)	(92.2 to 96.1)	217/273 (79.5)	(74.7 to 84.3)	0.84	<0.001
Had extramarital sex since marriage	320/547 (58.5)	(54.4 to 62.6)	183/273 (67.0)	(61.5 to 72.6)	1.15	0.018
Had extramarital sex last year	106/604 (17.6)	(14.5 to 20.6)	146/273 (53.5)	(47.6 to 59.4)	3.04	<0.001
Ever had sex with FSW	118/603 (19.6)	(16.4 to 22.7)	114/274 (41.6)	(35.8 to 47.4)	2.12	<0.001
Had sex with FSW last year	73/606 (12.1)	(9.5 to 14.6)	64/271 (23.6)	(18.6 to 28.7)	1.95	<0.001
Ever had anal sex with woman	21/605 (3.5)	(2.2 to 5.3)†	48/274 (17.5)	(13.2 to 22.6)†	5.00	<0.001‡
Ever had anal sex with man	0/606 (0.0)	(0.0 to 0.6)†	20/266 (7.5)	(4.7 to 11.4)†	∞	<0.001‡
Condom use at last sex with first spouse	39/549 (7.1)	(5.1 to 9.6)†	69/272 (25.4)	(20.3 to 31.0)†	3.58	<0.001‡
Ever used condom for sex with FSW <sup>2</sup>	76/118 (64.4)	(55.8 to 73.1)	93/114 (81.6)	(74.5 to 88.7)	1.27	0.003
Condom use at last sex with FSW <sup>3</sup>	66/118 (55.9)	(47.0 to 64.9)	83/114 (72.8)	(64.6 to 81.0)	1.30	0.007
Urethral discharge last year	39/604 (6.5)	(4.6 to 8.7)†	58/272 (21.3)	(16.6 to 26.7)†	3.28	<0.001‡
Genital ulcers last year	32/604 (5.3)	(3.7 to 7.4)†	39/274 (14.2)	(10.3 to 18.9)†	2.68	<0.001‡
Ever injected illicit drugs	1/606 (0.2)	(0.0 to 0.9)†	22/250 (8.8)	(5.6 to 13.0)†	44.00	<0.001‡
<b>(B) Unmarried men</b>						
Heard of HIV/AIDS	625/629 (99.4)	(98.7 to 100)	259/277 (93.5)	(90.6 to 96.4)	0.94	<0.001
Previous HIV testing	116/629 (18.4)	(15.4 to 21.5)	74/271 (27.3)	(22.1 to 33.0)	1.48	0.003
Ever had sex with a woman	501/628 (79.8)	(76.6 to 82.9)	222/276 (80.4)	(75.8 to 85.1)	1.01	0.820
Ever had sex with FSW	82/629 (13.0)	(10.4 to 15.7)	70/275 (25.5)	(20.3 to 30.6)	1.96	<0.001
Had sex with FSW last year	79/629 (12.6)	(9.9 to 15.2)	44/262 (16.8)	(12.3 to 21.3)	1.33	0.095
Had sex with a woman not FSW during last year	77/550 (14.0)	(11.1 to 16.9)	167/270 (61.9)	(56.1 to 67.7)	4.42	<0.001
Ever had anal sex with woman	25/629 (4.0)	(2.6 to 5.8)†	35/268 (13.1)	(9.3 to 17.7)†	3.28	<0.001‡
Ever had anal sex with man	0/629 (0.0)	(0.0 to 0.6)†	21/265 (7.9)	(5.0 to 11.9)†	∞	<0.001‡
Ever used condom for sex with FSW <sup>2</sup>	79/82 (96.3)	(92.3 to 100)	60/70 (85.7)	(77.5 to 93.9)	0.89	0.020
Condom use at last sex with FSW <sup>3</sup>	74/82 (90.2)	(83.8 to 96.7)	56/70 (80.0)	(70.6 to 89.4)	0.89	0.074
Ever used condom with woman not FSW	369/629 (58.7)	(54.8 to 62.5)	136/266 (51.1)	(45.1 to 57.1)	0.87	0.038
Urethral discharge last year	49/629 (7.8)	(5.8 to 10.2)†	54/277 (19.5)	(15.0 to 24.7)†	2.5	<0.001‡
Genital ulcers last year	13/629 (2.1)	(1.1 to 3.5)†	31/276 (11.2)	(7.8 to 15.6)†	5.33	<0.001‡
Ever injected illicit drugs	1/628 (0.2)	(0.0 to 0.9)†	8/273 (2.9)	(1.3 to 5.7)†	14.5	<0.001‡

Ratio=% PBS/% FTFI.

\*The differences between the total N and specific denominators are due to missing values.

†Binomial Exact Confidence Interval around Proportion (where expected cell size <5 or at least one of the compared proportions <10%).

‡p Value according to Fisher's exact test. (1) Reporting at least two lifetime sexual partners, including their current spouse; (2) ever used condom in sex with FSW among those who ever had sex with FSW; and (3) condom use at last sex with a FSW among those who ever had sex with FSW.

FSW, female sex worker.

**Table 2** Comparison of reported HIV-related risk behaviour in face-to-face interviews (FTFI) and polling booth surveys (PBS) among women aged 15–49 years, by marital status, Cotonou, Benin

Questions	Affirmative answers					
	FTFI (N=982)		PBS (N=272)		Ratio	p Value
	Proportion (n/N* (%))	95% CI	Proportion (n/N (%))	95% CI		
<b>(A) Married women</b>						
Heard of HIV/AIDS	964/980 (98.4)	(97.6 to 99.2)	263/271 (97.0)	(95.0 to 99.1)	0.99	0.161
Previous HIV testing	403/980 (41.1)	(38.0 to 44.2)	155/267 (58.1)	(52.1 to 64.0)	1.41	<0.001
Ever had sex besides with spouse	552/831 (66.4)	(63.2 to 69.6)	149/266 (56.0)	(50.1 to 62.0)	0.84	0.002
Had extramarital sex since marriage	38/831 (4.6)	(3.3 to 6.2)†	63/267 (23.6)	(18.7 to 29.2)†	5.13	<0.001‡
Had extramarital sex last year	29/982 (3.0)	(2.0 to 4.2)†	56/266 (21.1)	(16.3 to 26.5)†	7.03	<0.001‡
Ever received payment for sex	18/981 (1.8)	(1.1 to 2.9)†	44/253 (17.4)	(12.9 to 22.6)†	9.67	<0.001‡
Received payment for sex <sup>1</sup> in last year	8/981 (0.8)	(0.4 to 1.6)†	31/248 (12.5)	(8.7 to 17.3)†	15.63	<0.001‡
Ever had anal sex with a man	31/982 (3.2)	(2.2 to 4.5)†	49/266 (18.4)	(14 to 0–23.6)†	5.75	<0.001‡
Think spouse ever had sex with another woman not co-wife	246/827 (29.8)	(26.6 to 32.9)	140/228 (61.4)	(55.1 to 67.7)	2.06	<0.001
Think spouse ever had sex with FSW	30/828 (3.6)	(2.5 to 5.1)†	75/204 (36.8) †	(30.1 to 43.8)	10.22	<0.001‡
Condom use at last sex with spouse	42/831 (5.1)	(3.7 to 6.8)†	51/263 (19.4)	(14.8 to 24.7) †	3.80	<0.001‡
Condom use at last paid sex <sup>2</sup>	5/18 (27.8)	(7.1 to 48.5)	26/44 (59.1)	(44.6 to 73.6)	2.13	0.025
Vaginal discharge last year	267/981 (27.2)	(24.4 to 30.0)	111/269 (41.3)	(35.4 to 47.2)	1.52	<0.001
Genital ulcers last year	93/982 (9.5)	(7.7 to 11.5)†	98/269 (36.4)	(30.7 to 42.5)†	3.83	<0.001‡
Ever injected illicit drugs	0/983 (0.0)	(0.0 to 0.3)†	30/257 (11.7)	(8.0 to 16.2) †	∞	<0.001‡
<b>(B) Unmarried women</b>						
Heard of HIV/AIDS	356/362 (98.3)	(97.0 to 99.7)	252/270 (93.3)	(90.4 to 96.3)	0.95	0.001
Previous HIV testing	66/362 (18.2)	(14.3 to 22.2)	73/268 (27.2)	(21.9 to 32.6)	1.49	0.007
Had sex with a man	239/363 (65.8)	(61.0 to 70.7)	190/270 (70.4)	(64.9 to 75.8)	1.07	0.228
Ever received payment for sex	14/362 (3.9)	(2.1 to 6.4)†	42/261 (16.1)	(11.9 to 21.1)†	4.13	<0.001‡
Received payment for sex <sup>1</sup> in last year	10/360 (2.8)	(1.3 to 5.1)†	35/260 (13.5)	(9.6 to 18.2)†	4.82	<0.001‡
Ever had anal sex with a man	9/360 (2.5)	(1.2 to 4.7)†	17/267 (6.4)	(3.8 to 10.0)†	2.56	0.024‡
Ever used condom for sex with a man <sup>3</sup>	131/239 (54.8)	(48.5 to 61.1)	152/190 (80.0)	(74.3 to 85.7)	1.46	<0.001
Condom use at last sex with a man <sup>4</sup>	62/235 (26.4)	(20.8 to 32.0)	93/190 (49.0)	(41.8 to 56.1)	1.86	<0.001
Condom use at last paid sex <sup>2</sup>	9/14 (64.3)	(39.2 to 89.4)	25/42 (59.5)	(44.7 to 74.4)	0.93	0.752
Vaginal discharge last year	143/362 (39.5)	(34.5 to 44.5)	104/269 (38.7)	(32.8 to 44.5)	0.98	0.831
Genital ulcers last year	39/362 (10.8)	(7.6 to 14.0)	70/268 (26.1)	(20.9 to 31.4)	2.42	<0.001
Ever injected illicit drugs	0/364 (0.0)	(0.0 to 1.0)†	5/261 (1.9)	(0.6 to 4.4)†	∞	0.012‡

Ratio=% PBS/% FTFI.

\*Fisher's p value.

†Binomial Exact Confidence Interval around Proportion (where expected cell size &lt;5 or at least one of the compared proportions &lt;10%).

‡The differences between the total N and specific denominators are due to missing values. (1) Received payment as money, gifts or favours; (2) condom use in last paid sex among those who ever received payment for sex; (3) ever used condom in sex with a man among those who ever had sex with a man; and (4) condom use in last sex with a man among who ever had sex with a man.

FSW, female sex worker.

respectively. The results for selected illustrative questions are shown in figure 2.

### Knowledge of HIV/AIDS and HIV testing

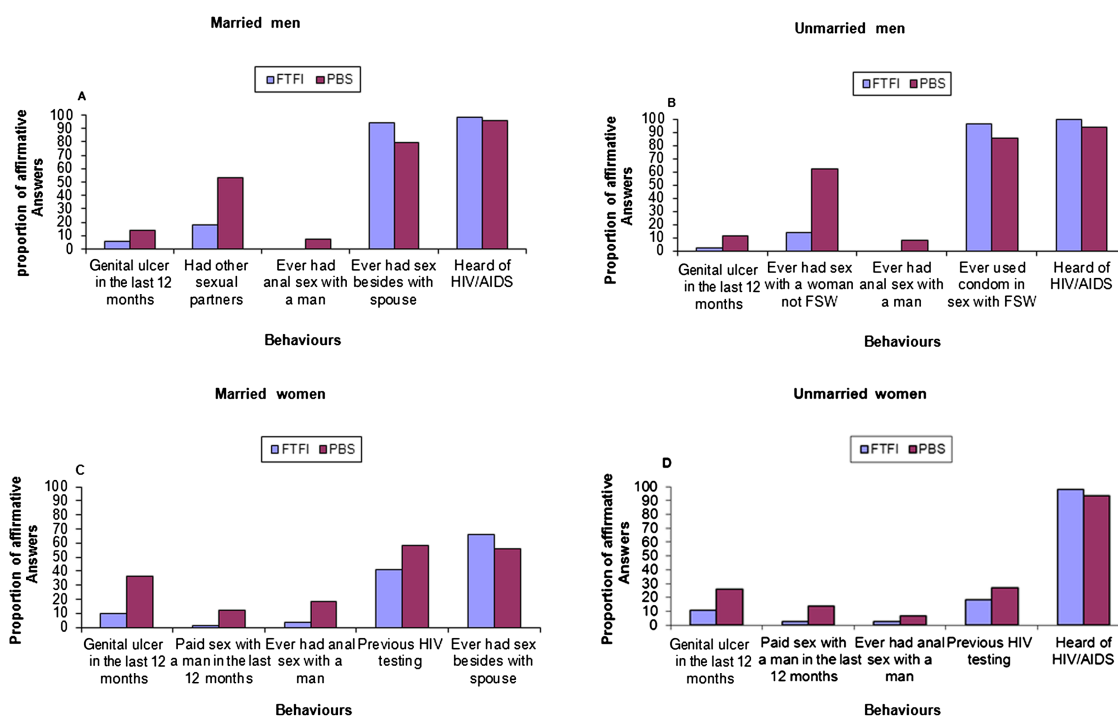
Except in married women where the difference was not significant, knowing about HIV/AIDS was reported significantly more often in FTFI compared with PBS (figure 2 A,B,D). In all four demographic groups, more respondents reported previous HIV testing in PBS than in FTFI. Married respondents, especially women, reported more previous HIV testing than unmarried subjects.

### Sexual activity

Both married men and women reported extramarital sex more frequently in PBS compared with FTFI. The proportion of married respondents who reported ever having had sex besides with their spouse was significantly higher in FTFI than in PBS.

In PBS, 67.0% of the men reported extramarital sex since their marriage. This proportion was similar to that of the women who

thought their husbands ever had sex with a woman other than a co-spouse (61.4%). The corresponding proportions obtained in FTFI were different (58.5% in married men and 29.8% in married women). The proportions of unmarried men and women who reported ever having had sex with a woman or a man were similar in both FTFI and PBS. However, the proportion of unmarried men who reported having had sex with a woman other than a FSW during the last year was higher in PBS than in FTFI (61.9% vs 14.0%,  $p < 0.001$ ). Regarding commercial sex, the proportions of affirmative answers were significantly higher in PBS, in particular among married women. However, the proportions of affirmative answers were higher among married men than among their female counterparts in both FTFI and PBS. Indeed, married men reported at least one episode of commercial sex in 41.6% (17.4% in married women) and 19.6% (1.8% in married women) of the cases in PBS and FTFI, respectively. On the other hand, 36.8% (PBS) and 3.6% (FTFI) of the married women thought their spouse ever had sex with a FSW. Anal sex was reported much more frequently in PBS compared



**Figure 2** Comparison of face-to-face interviews and polling both surveys on the proportion of participants answering yes to selected questions on HIV-related risk behaviour (all differences are statistically significant). (A) Married men; (B) unmarried men; (C) married women; and (D) unmarried women.

with FTFI in all groups (figure 2A–D). No man reported homosexual anal sex in FTFI compared with 7.5% of married men and 7.9% of unmarried men in PBS (figure 2A,B).

### Condom use

Among married men and women, condom use during last sex with the spouse was fourfold higher in PBS than in FTFI. In unmarried men, condom use at least once with a woman other than a FSW was reported slightly more frequently in FTFI compared with PBS. In unmarried women, condom use with a man was higher in PBS. Contrary to unmarried respondents, the proportion of married subjects who reported condom use with FSW was higher in PBS.

### STI symptoms

Except for vaginal discharge in unmarried women ( $p=0.831$ ), the proportion of respondents who reported a history of genital discharge or ulcer was twofold to fivefold higher in PBS than in FTFI ( $p<0.001$ ).

### Illicit drug injection

The proportion of respondents with a history of illicit drug injection was high in PBS and was higher among married respondents than among unmarried ones (8.8% vs 2.9% among married/unmarried men, and 11.7% vs 1.9% among married/unmarried women). No woman reported drug injection in FTFI.

## DISCUSSION

In our study, differences in responses elicited using PBS and FTFI were particularly evident with questions related to sex. Higher proportions of extramarital sex, commercial sex and anal sex were consistently reported by participants in PBS compared with FTFI. Concerning extramarital sex, the difference was larger among women than men, as this behaviour is particularly socially unacceptable among women.<sup>22</sup> In Benin, commercial sex is

stigmatised because it is considered not to comply with social norms.<sup>23</sup> Respondents were loath to report anal sex in general and homosexual anal sex in particular in FTFI, certainly because such a behaviour is strongly stigmatised in the Beninese society.

In PBS, the proportion of married men who reported ever having had sex with a FSW was similar to that of married women who thought their spouse ever had sex with a FSW. On the other hand, there was a wide difference between both proportions in FTFI. The same observation was made for extramarital sex. These results are in favour of the reliability of answers obtained with PBS.

In FTFI, respondents were probably afraid of revealing their HIV status to the interviewers. In general, more previous HIV testing was reported among married women than among the other demographic groups because married women were additionally covered by the national programme for the prevention of mother-to-child transmission (PMTCT). Indeed, in the demographic and health survey (DHS) carried out in Benin in 2006, 63.6% of women who had given birth in the last 2 years were tested for HIV through PMTCT.<sup>18</sup>

Irrespective of gender, the proportion of married respondents reporting at least one sexual partner besides their spouse was higher in FTFI. Indeed, in Benin, the trend towards marrying late as in many countries has also led to increased pre-marital sex.<sup>22</sup> Among women, having a partner other than the spouse is also explained by the fact that virginity until marriage in Benin as elsewhere in West Africa is becoming old-fashioned due to external influences of Western culture.<sup>24</sup> On the other hand, men are proud to admit sexual activity before marriage,<sup>24</sup> because the contrary would sound like a lack of skills for courting a girl.

It is likely that the high proportion of unmarried men reporting ever having been sexually active could be related to undisclosed transactional sex,<sup>22</sup> more in its perception of sex in exchange for gifts or favours within personal relationships than formal trading of sex for money. Unmarried men, who were predominantly

young and educated, did not want to be seen as prematurely engaging in a steady sexual relationship before marriage.<sup>18</sup> As a consequence, in FTFI, most of them did not reveal their relationship with women other than FSW during the last year.

Sex work was under-reported in FTFI by both men and women. However, unmarried men reported condom use with FSW more frequently in FTFI than in PBS. This could be related to increased social desirability. Indeed, unmarried men were relatively young as compared with married men and have been predominantly covered by a preventive intervention targeted at the sex work milieu in Cotonou and promoting correct and consistent condom use.<sup>25</sup> Since they perceived it as socially desirable, unmarried men may tend to exaggerate condom use with FSW in FTFI. On the other hand, married men, who were less exposed to the intervention, may have under-reported condom use with FSW in FTFI. They might also tend to under-report condom use if they want to dissimulate the fact of having sex with FSW. These results are similar to those observed in the districts of Belgaum and Mysore in India.<sup>3</sup> The proportion of unmarried women who ever used condom during sex with a man was higher in PBS indicating under-reporting in FTFI. This could be explained by the fact that some women may have considered condom use with a man in general and with a regular boyfriend in particular as associated with antecedents of risky behaviour and would have tended to under-report it in FTFI. This is in accordance with the fact that condom use appeared sometimes as a risk compensation behaviour consisting in increasing condom use after being infected with HIV.<sup>26</sup>

The proportion of respondents with a history of illicit drug injection was surprisingly high in PBS and was higher among married respondents than among unmarried ones. It is indeed unlikely that 11.5% of married women have actually injected illicit drugs. One can hypothesise that in a context of frequent self-medication as occurs in Benin,<sup>27</sup> many respondents will misinterpret illicit drug injection as referring to illicit injection of vitamins and antibiotics conducted by itinerant and non-trained 'nurses'. This observation illustrates one limitation of PBS method that consists in the absence of interaction between the interviewer and the respondents about the questions and the answers. Such an interaction may have permitted to clarify the questions and to obtain a more valid answer. Also, the absence of interaction (clarification of questions) may have explained the absence of difference between PBS and FTFI according to vaginal discharge among unmarried women: maybe some of these women were unable to distinguish vaginal discharge as a sign of disease from vaginal discharge as a sign of fertility. Another limitation is the inability of data-gatherers to check for internal consistency of answers during interviews leading to possible misreports. It is not possible either to check for internal consistency between answers of individuals to different questions during the analyses because the voting tokens are gathered together without any individual indication.<sup>3</sup> It is also impossible to assess risky behaviour in any depth by using complex questions because the PBS method allows only aggregated data with three possible answers (Yes/No/Not applicable). Differential response rates could have biased our results. Fortunately, we had high and comparable participation rates with both methods (89.5% to 96.1%). Our study did not randomise participants to type of interview in a unique sample of the population. We rather used two independent random samples selected with different methodologies. This was due to the fact that the PBS methodology made randomisation almost impossible, as in practice, we had to organise the group interviews with people from the same neighbourhood, something that would not have been

possible using the sampling methodology employed for FTFI, with selection of subjects over the whole census area, which was sometimes quite large. Although randomisation would have been theoretically preferable, the wide differences observed in reported behaviours between the two methods are very unlikely to have resulted from the differences in the sampling methods.

Self-completion methods like PBA and ICVI were previously evaluated among FSW in Andhra Pradesh (India) and in individuals from the general population of Manicaland (Zimbabwe), respectively.<sup>1 4 5</sup> Findings from these evaluation studies suggest that respondents were more likely to report stigmatised behaviours in PBA and ICVI than in FTFI, but to a lesser extent than in PBS because they require the provision of personal identification information. Whereas ICVI is not suitable for non-literate persons because respondents have to write their answers in the appropriate sections of the voting cards, this method has the advantage of being suitable for questions with numerical responses like number of sexual partners and partnerships within various time frames. PBA can be used for questions with ordinal responses like frequency of condom use.

Overall, PBS seemed to have increased respondents' willingness to report stigmatised behaviours. In order to collect accurate and reliable data when sensitive behaviour variables are concerned, PBS could be integrated into DHS surveys carried out regularly in the general population of developing countries and to integrated biological and behavioural surveys among high-risk groups in sub-Saharan Africa.

## CONCLUSIONS

Our results suggest that PBS are suitable to monitor reliable HIV/STI risk behaviours and they could be used to adjust for answers to sensitive behavioural questions in FTFI. Additional studies in different settings in Africa are still needed to validate this method.

## Key messages

- ▶ Increasing confidentiality and anonymity may favour elicitation of more reliable information on issues prone to social desirability bias.
- ▶ The PBS, compared with FTFI, seemed to have increased respondents' willingness to report stigmatised behaviours like extramarital, commercial and anal sex.
- ▶ In order to collect accurate and reliable data when sensitive behaviour variables are concerned, the use of PBS should be expanded in behavioural surveillance.

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