REPRODUCIBILITY AND VALIDITY OF SELF-REPORTED CONDOM USE IN JAKARTA

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Abstract. Condom use has been a major focus in STI/AIDS-related behavioral studies. However, since researchers rely mainly on self-reports obtained by self- or interviewer-administered questionnaires, validation studies are necessary to evaluate the quality of the information. A behavioral survey was conducted among female sex workers (FSWs) in an official brothel complex in Jakarta, Indonesia. At baseline, an interviewer-administered questionnaire was completed to identify the personal, professional, and contextual determinants of the women's STI/AIDS-related behaviors, including their condom use, was assessed via interviews two weeks apart among a subset of the samples. Relative validity was estimated by comparing condom use at baseline with a 2-week diary filled out by another subset of the samples. Overall, the FSW's self-reported condom use showed moderate reproducibility and relative validity. The brevity of the recall period, the highly inconsistent condom use practices of the sexworkers, and self-representation bias were among factors that might have attenuated estimated coefficients.

INTRODUCTION

The magnitude of the AIDS epidemic precipitates the need to identify crucial factors that may inhibit or facilitate HIV spread. Although ongoing research on vaccines and drugs shows optimistic results, the day the world can count on biochemical substances to prevent or control the AIDS epidemic is still far away. Therefore, many countries have concentrated AIDS funds and efforts on behavioral change endeavors, leading in some cases (*eg*, among female sex workers in Thailand, among injection drug users in the USA) to declines in HIV-seroprevalence (Sawanpanyalert *et al*, 1994; Wiebel, *et al*, 1996). Elements of these behavioral prevention programs include establishing the prevalence of AIDS-inhibiting/facilitating behaviors, studying the determinants of these behaviors, identifying target populations for intervention, and evaluating prevention programs to reduce HIV transmission (Catania *et al*, 1990a).

Unprotected penetrative sex is one of the behaviors that may transmit HIV; practising it with large numbers of partners will further increase the risk (Fineberg, 1988). Therefore, by the nature of their work, female sex workers (FSWs) are one of the communities at high risk of geting and transmiting HIV infection. Although safer-sex practices (*ie*, a variety of STI/AIDS-risk reduction strategies) that are feasible for the FSWs include non-penetrative and protected penetrative sex, intervention programs targeting FSWs focus mostly on the latter, which generally includes using male condoms. As a consequence, in nearly all STI/AIDS-related research conducted among FSWs, condom use has been the major outcome variable (Sheeran and Abraham, 1994). Since condom use is typically a highly private activity, direct observation is almost impossible. Thus, researchers rely heavily on self-reports of this practice, with recall by a self and an interviewer-administered questionnaire being the two most practised methods (Fox *et al*, 1993; Pickering *et al*, 1993; Borgdorff *et al*, 1994; Sawanpanyalert *et al*, 1994).

Unfortunately, there are a number of reasons

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to suspect inconsistencies between actual and self-reported condom-use practice with evidence for both systematic and random error (Catania *et al*, 1990a). Conclusions and recommendations made on data that are neither valid nor reliable, may result in inappropriate health planning, and inaccurate estimation of the spead of HIV infection (McLaws *et al*, 1990). On the other hand, assessing the reliability and, especially, the validity of self-reported condom use, is not an easy task (Catania *et al*, 1990a; McLaws *et al*, 1990; Cohen and Dent, 1992, Carael *et al*, 1995). Researchers have used several ways to assess the quality of sex behavior information, such as estimating its internal consistency (Catania *et al*, 1986), measuring inter-partner consistency (Coates *et al*, 1988), test-retest reliability (Borgdorff *et al*, 1994; Coates *et al*, 1986), measuring the incidence of STIs and HIV-seroprevalence (De Vincenzi, 1994; Zenilman *et al*, 1995; Taha *et al*, 1996), and comparing recall data with diaries (McLaws *et al*, 1990). However, to our knowledge, the overall number of reports including such information is still very limited.

This paper was based on an STI/AIDS-related behavioral survey among FSWs in an official brothel complex in Jakarta. In this study, the reproducibility and validity of the FSWs' self-reported condom use was estimated by collecting survey data two weeks apart and by using a 2-week daily diary. Although the term "reliability" is often interchangeably used with "reproducibility," the latter term best represents our assessment method, *ie*, "consistency of questionnaire measurements on more than one administration to the same persons at different times" (Willett, 1990). Very few researchers have used diaries to record sexual activities (Reading, 1983; McLaws *et al*, 1990; Fox *et al*, 1993); fewer still have used the method to validate self-reported condom use (McLaws *et al*, 1990). Among the STI/AIDS-related research conducted in Indonesia, a substantial portion was conducted in FSW communities with self-reported condom use being the most important variable of interest. To our knowledge, none of them have sufficiently examined the reproducibility and validity of the measures.

MATERIALS AND METHODS

Our behavioral survey (May-June 1995), which was complemented by an ethnographic study (April-November 1995), aimed to identify the STI/AIDS-related personal, professional, and contextual determinants of the behaviors of the Jakarta brothel FSWs (Sedyaningsih-Mamahit, 1997; Sedyaningsih and Gortmaker, 1999).

Study population

The study population consisted of FSWs working in Kramat Tunggak, a semi-legal brothel-compound in Northern Jakarta. Respondents were 459 FSWs randomly chosen from 1,600 FSW names officially registered in Kramat Tunggak by April 1995. The names were recorded per brothel (total = 228 brothels), but they were not in any kind of systematic order. All respondents were informed about the study personally and were asked to give a written (signature or finger print), or verbal, consent. The initial response rate was 63%, but those who refused to participate or were not found after two visits were replaced by other random names from the list. Full participation meant that they agreed to be interviewed and to be examined for gonorrhea and syphilis. Free-of-charge treatment was given to positive cases.

Data collection techniques

Information from a preliminary qualitative study was used for the construction of a structured, interviewer-administered questionnaire in Bahasa Indonesia (the Indonesian national language). The questionnaire, which was developed through several stages with the use of several other researchers' questionnaires as models or comparisons (Basuki, 1991, unpublished paper; Rahardjo, 1992, unpublished paper; Wingood, 1993, personal communication; Case, 1993, personal communication), covered demographic and socioeconomic characteristics, work-related variables, STI/AIDS-related knowledge, attitudes, beliefs, intentions and practices, including condom use. Through focus group discussion (FGD) and pilot-testing, modifications were made in the order and content of

the questionnaire, and in the terminologies employed. Ten trained women of 20-to-30 years of age interviewed the respondents privately in their brothel for 30 to 60 minutes.

A major variable of interest was self-recalled condom use. The question was placed in the last one-third of the questionnaire, and was formulated as below (translated verbatim into English):

In the previous two weeks, with how many clients did you have the following sex:

Total number of vaginal sex : .....
Number of using condoms : .....
Percentage : ..... (%)

The percentage was calculated by the interviewers (on-the-spot or later in the day) by dividing the number of condoms used by the number of clients recorded. This was based on the FSWs' most common practice of conducting only one intercourse per client (confirmed by the preliminary and the qualitative study). Similar questions were also asked for anal (*pantat/bo'ol*), oral (*karaoke*), and manual sex (*ngocok*); however, since our preliminary research [in concordance with the findings of Basuki (1991) and Rahardjo (1992), personal communication] showed that these sexual activities were not practised very much among the brothel FSWs, we mainly focused on vaginal sex. Prior to the sexual activity questions, the interviewers informed the respondents that by "clients" we meant regular (*langganan/kenalan*) and occasional clients (*tamu*), as well as lovers (*pacar/gendak*).

The methodological design for estimating the reproducibility and relative validity of self-reported condom use was based on two assumptions: a) that the FSWs' condom use was relatively stable over the first and second two-week period of the study; and b) that condom-use reports in diaries were more accurate than self-reported ones, since the former was considered a prospective method (with a very short recall period).

Reproducibility assessment

A retest interview was conducted to estimate the reproducibility of our questionnaire, especially the FSWs' self-reports of their behaviors. Two weeks after the first interview, 50 randomly-chosen respondents were re-interviewed by different interviewers. The 2-week interval was chosen to minimize the respondents' memory of their previous answers. This second intake used the same questionnaire, and all the questions were repeated. For condom use, since the same question was asked, the retest interview retrospectively recorded the FSWs' practices over a 2-week period immediately following the first period asked at baseline (see Fig 1 for time-line).

Validity assessment

A random sample of 50 respondents was asked to complete a daily diary for the two weeks following the first interview (Fig 1). The 1993 census data on the FSWs in Kramat Tunggak showed that nearly 9% of the women were illiterate, and 85% of them had 6 or fewer years of education. Therefore, to avoid the necessity to read and write, and to increase the participants' enthusiasm, this study used a "sticker" method. The diaries were formed as two folded cards; each card was to record all vaginal sex and condom use over a one-week period. A table with 7 rows was printed in the inner side of the card, each row depicted a day in the week. Every day, the participants were asked to record their sexual activities by affixing stickers to their diaries: a green sticker with a man's picture on it was to symbolize each client (regular/*langganan* and occasional/*tamu*) with whom the FSW had vaginal sex, a red sticker with a heart picture on it was to represent the FSW lover with whom the woman had vaginal sex, and finally, a yellow sticker with a condom picture on it was to be affixed beside the stickers of the clients and lovers, whenever they used a condom during intercourse.

The participants were also asked to collect the used condom wrappers in a long brown envelope - which had one transparent side - for "on-the-spot" validation purposes. The main objective of this latter method was to discourage false recording.

During the baseline interview, the interviewers distributed the diaries, the stickers and the envelopes, followed by an explanation and short practice. Seven and 14 days later, a male social worker (who had 20-year experience living and working in Kramat Tunggak) visited the diary participants in their brothels. He collected the diaries, and, in front of the respondents, counted the condom wrappers to see whether the frequency of condom use recorded by the FSWs matched the number of condom wrappers. He was to write the results at the back of each diary and not to give any comment on them. Incidentally, all of the recorded data matched the number of condom wrappers well.

Data analysis

All data were coded and computerized using Epi-Info (CDC, 1990) and most analyses were conducted using the STATA computer package (Stata Corporation, 1993). Quantitative data on condom use *ie*, the percentage of condom use, were treated as continuous data, as well as being collapsed into 3 categories: "never" (0% of the time), "occasional" (more than 0% but less than 100% of the time), and "always" users (100% of the time).

To estimate the reproducibility and relative validity of the incidence of self- reported condom use, simple percent agreement on categorical data between baseline and retest, and between baseline and diaries, were assessed, and Spearman correlation coefficients were computed. The reproducibility and relative validity of the frequency of the self-reported condom use were estimated by simple percent agreement between the quantitative baseline and retest data, and between baseline and diary data. Since both data were not normally distributed, Spearman correlation coefficients were employed. The *t*-test were used to determine the significance of the mean differences between condom use at baseline and at retest, and between baseline and diary data.

The reproducibility of the diaries was estimated by comparing condom use recorded in the week-1, with those in the week-2, diaries, using simple percent agreement for both qualitative and categorical data and Spearman correlation coefficients; a *t*-test to assess the significance of the difference in the means was also employed.

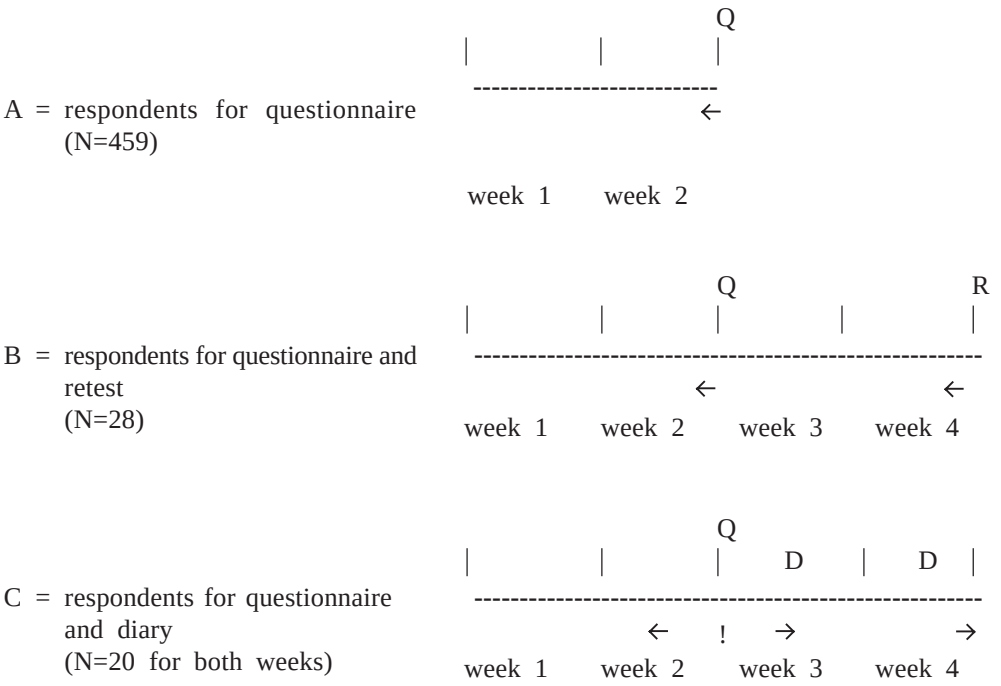
RESULTS

Participation and eligibility

The initial participation rate for the survey was 63%; most (32%) failed to participate because they were no longer there. Those who did were not markedly different from the entire FSW community in Kramat Tunggak by sociodemographic and STI/AIDS-related behavioral characterictics (Sedyaningsih and Gortmaker, 1999). Two weeks after the baseline interview, 50 FSWs were revisited by different interviewers who explained the purpose of this retest. Four FSWs refused to participate (participation rate: 92%). In general, the 46 FSWs who did participate showed lower enthusiasm, since the same questionnaire was administered twice.

From these 46 subjects, 6 were dropped because thay had been trained by Yayasan Kusuma Buana, a NGO that gave 3-day STI/AIDS-related training to 80 FSWs one year before this study started. Since the decision to exclude these trainees came late, we did not have the chance to replace them. Another 6 were dropped due to differences in hometown data (we were not sure whether they were the same women who were interviewed two weeks before), and finally 4 were dropped since they had not received any clients during the previous two weeks. Twenty-eight subjects were eligible for further analysis.

During the baseline interview, 50 pairs of diaries were distributed to a random sample of 50 respondents. A week later, the first-week diaries were collected. Out of 50 diaries, 2 were misplaced and 10 were not filled out due to various reasons, including "forgot," and "did not receive any clients that week." From the 38 diaries collected, 4 were dropped because



Q = baseline interview (questionnaire); R = retest; D = diary
The arrows show the direction of the time-line covered in each method.

Fig 1–Reproducibility and validity assessment of the questionnaire.

the FSWs who filled them out were YKB's trainees, and 34 diaries were analyzed further.

Another week later, the second-week diaries were collected. This time, 5 were claimed to be misplaced and 15 were not filled out (due to the same reasons as the first week). From 30 diaries collected, 4 were dropped due to the same cause of ineligibility, and 26 diaries were analyzed further. For the overall analyzes, 20 diaries were used, *ie*, 20 respondents completed both diaries.

Table 1 shows that the participants in both the retest interview and the diary method did not substantially differ from the survey respondents on selected sociodemographic and STI/AIDS-related behavioral characteristics. Table 2 compares the condom-use practices of the entire survey samples with those of the test-retest and the diary participants. The comparison shows that, with regards to condom use, there is no significant difference between the survey samples and the test-retest participants, while there is one between the survey and the diary participants. However, it was the "never" users that we covered more, and so the chance that the study was overestimated was low.

Estimated reproducibility

At baseline, the condom use of the retest participants (total = 28) showed the following: 46% "always", 22% "occasionally" and 32% "never", as compared to 46% "always", 36% "occasionally", and 18% "never" obtained in the follow-up interview. The overall agreement between the trichotomized test and retest condom use data was 54%, and the correlation was estimated at Spearman rho 0,43 ($p = 0.02$).

Analysis of the quantitative data showed 43% agreement between baseline and retest condom use data (Table 3), with a Spearman correlation coefficient estimated at 0,38 ($p = 0.04$). The means of these data were not

Table 1
Comparison among the survey, test-retest and diary method participants, by selected sociodemographic and STI/AIDS-related behavioral characteristics.

Characteristic	%			
	Survey	Test-retest	Diary	
	N=459	N=28	N=40[a]	N=20[b]
Socio-demographic				
Age (in years)[d]				
<18	0.6	0	0	0
18-20	21	13.3	30	30
21-25	45.4	36.7	40	35
26-30	33	50	30	35
Educational attainment[e,f]				
No school	6.9	6.7	0	0
Elementary	78.8	73.3	85	100
Junior high school	9.6	13.3	15	0
Senior high school	4.7	6.7	0	0
Marital status				
Never married	12.2	10	15	15
Divorced/widowed	82.6	90	85	80
Married	5.2	0	0	5
Length of time working in KT (years)[d]				
0-1	59.7	60	55	55
>1-2	23.5	13.3	25	25
>2-3	7.6	26.7	10	15
>3	9.2	0	10	5
Monthly income as FSW[e] ($1.00 = Rp 5,000-)				
≤$ 20.00	1.8	0	0	0
>$ 20-60.00	28.3	30	32.5	25
>$ 60-100.00	28.3	40	30	35
>$ 100-200.00	31.6	23.3	35	40
>$ 200.00	10	6.7	2.5	0
Knowledge of STIs				
Low	14.6	13.3	10	10
Med	26.6	30	27.5	20
High	58.8	56.7	62.5	70
Perceived susceptibility to, and severity of STIs[e,f]				
Low	27.7	23.3	20	10
High	72.3	76.7	80	90
Condom acceptance				
Low	10.5	16.7	7.5	10
High	89.5	83.3	92.5	90
Self-efficacy in using condoms				
Low	21.3	30	22.5	15
Med	26.4	30	27.5	25
High	52.3	40	50	60
Experience in negotiating condom use				
Low	16.8	20	17.5	15
Med	48.4	50	47.5	45
High	34.8	30	35	40
Number of clients (within previous two weeks)[c,e,f]				
None	5.9	3.3	0	0
<7	57.5	53.3	55	65
7-14	26.1	26.7	32.5	15
>14	10.5	16.7	12.5	20

[a]Includes all FSWs who filled out at least one-week diary.
[b]Includes only FSWs who completed 2-week diary.
[c]N = 432 (excludes FSWs who received no clients over those periods)
[d]Difference between survey and test-retest participants, significant at $p<0.05$.
[e]Difference between survey and complete diary participants (n=20), significant at $p<0.05$.
[f]Difference between incomplete and complete diary participants, significant at $p<0.05$.

Table 2
Comparison among the FSWs who participate in the test-retest and diary studies with the entire survey samples, by their baseline condom-use practice.

Condom-use practice at baseline[a]	Survey samples	Test-retest participants	Diary participants	
	n = 459	n = 28	n=40[b]	n=20[c]
Never	25%	32%	38.5%	45%
Occasional	39.4%	22%	28.2%	20%
Always	35.6%	46%	33.3%	35%

[a]Over the previous two weeks; [b]Includes all FSWs who at least filled out one-week diary.
[c]Includes only FSWs who completed both weeks' diaries.

Never = used condom 0% of the time; Occasional = used condom >0 and <100% of the time. Always= used condom 100% of the time.

Table 3
Comparison of the mean values, percentage of agreements, and coefficient correlation among condom-use continuous data obtained at baseline, retest, and diary.

Mean values		n	Agreement	Spearman coefficient
Questionnaire	Retest			
58%±46%	65%±40%	28	0.43	0.38[a]
Questionnaire	Diary			
45%±46%	39%±41%	20	0.35	0.61[b]
Diary-1	Diary-2			
44%±43%	34%±42%	20	0.55	0.86[c]

[a]p = 0.04; [b]p = 0.004; [c]p = 0.0001

significantly different (Table 3).

Relative validity

Thirty-five percent of the sub-sample who completed the 2-week diary (total = 20) reported at baseline to "always" use condoms, 20% "occasionally," and 45% "never" use. In the diary, however, 10% reported "always", 50% "occasionally", and 40% "never" used condoms. The overall agreement between these trichotomized measures was 45%, and the correlation was estimated as (Spearman rho) 0,49 (p = 0.03). The overall agreement between the quantitative data at baseline and those recorded in the diaries was 35% (Table 3) with the correlation estimated at Spearman coefficient 0.61 (p = 0.004). The mean for condom use practice in the self-reported data did not differ significantly from that for the diaries (Table 3), although the small sample size provides very limited statistical power.

Reproducibility of the diary method

The frequencies of the trichotomized condom use data in the first-week diary were 20% "always", 40% "occasionally", and 40% "never", as compared to 20% "always", 30% "occasionally", and 50% "never", in the second week diary. The overall agreement was 70%, with the correlation estimated as a Spearman rho 0.80 (p = 0.0001). The quantitative first-and second-week diary data had

55% agreement (Table 3), and the correlation was estimated at 0.86 (Spearman) ($p = 0.0001$). The means of condom use in the first- and second-week diaries were also not significantly different (Table 3).

DISCUSSION

The epidemiologic profile of HIV infection in Indonesia resembles those of other Asian countries, where more than 70% of the 839 confirmed HIV-positive cases (by March 1999) can be attributed to heterosexual transmission (MOH Indonesia, 1999), and FSWs are one of the communities at high risk for the spread of HIV infection. Although prostitution is illegal in Indonesia, in many major cities it is permitted under the government's control (Jones *et al*, 1995; Linnan *et al*, 1995). These "official brothels" make FSWs accessible to health services delivery and to studies.

A number of evaluation studies from different countries have demonstrated that promoting condom use among FSWs–and their clients–is one HIV prevention strategy that may work. Although in a population where the HIV sero-prevalence is low, any increase in condom use would somewhat decrease the risk of HIV infection (Fineberg, 1988), and with HIV prevalence steadily increasing, a 100% rate of condom use is the ultimate behavioral goal (Pickering *et al*, 1993; Sawanpanyalert *et al*, 1994). For this reason, and because it is impossible to precisely validate frequency reports of condom use (Catania, 1992), the present study focused on more general categories, such as "always" and "never" condom users. Analyses of condom use frequencies, however, were also conducted as a comparison.

The limitations of this study include deficiencies in the questionnaire, the interviewer, and in respondent variables (Catania *et al*, 1990a). To minimize instrumental errors, we carefully developed and extensively field-tested the questionnaire. An earlier preliminary study and two focus group discussions (FGD) helped us find colloquial, yet culturally acceptable, terms for various sexual activities and types of clients. However, although the FSWs did understand and spoke Bahasa Indonesia, many of them were more familiar with their own dialects, and hence further explanation was often necessary.

No study in Indonesia had examined interviewers' evidence for the effect of gender and age on FSWs' reports on sexual behaviors. Therefore, we used only female interviewers with ages similar to the FSWs', speculating that these would minimize bias. All of the interviewers had previous interviewing experiences (although not necessarily with FSWs), and prior to the survey, they received training to familiarize themselves with the questionnaire, and to conduct the interviews in a standard procedure. However, we realized that there were social class differences between the FSWs and the interviewers, which might result in the FSWs' under-reporting their sex behaviors because of embarrassment (our qualitative study found substantial evidence of stigma). More studies should be conducted to examine whether it is easier for the FSWs to talk about sex behaviors with young male interviewers.

Longer recall periods, as well as higher frequency practices, have been shown to reduce the reliability of the respondents' reports of sexual behaviors (Coates *et al*, 1988; Catania *et al*, 1990b; Sheeran and Abraham, 1994). A short recall period, however, might lack stability, especially if day-to-day variation was substanial (Willett, 1990). Since we were interested in condom use in the FSWs' most common sexual practice, *ie*, vaginal sex, we employed a 2-week recall period. This period included at least two weekend nights (in Indonesia Saturday night is the only weekend night), *ie*, times when the numbers of clients were the highest. However, when the condom-use percentages were counted, we still found small numbers of denominators (since most FSWs had only two clients or fewer per night). Consequently, these percentages varied greatly. Moreover, we did not take into acount the dates of the month, and there was a possibility

that there were more clients at the beginning of the month, or a particular type of client might come more at this time (presumably the occasional type); all of which might affect the FSWs' condom use (Pickering *et al*, 1993; Sawanpanyalert *et al*, 1994; Taha *et al*, 1996).

Another major source of respondent error was self-presentation bias: people tend to present themselves in "a socially acceptable and less confrontational way" (Catania *et al*, 1990a) and "may feel compelled to conform to common expectations" (Zenilman *et al*, 1995). Many of the FSWs had at least heard one government campaign on condom use (Sedyaningsih and Gortmaker, 1997) and since many of them were less educated and came from remote villages, many could not distinguish our team from government officers. Although the interviewers explained the research goals prior to the interviews, we realized that this type of bias was potentially the most important limitation in our study.

Tables 1 and 2 indicate that our test-retest and diary samples were not very different from our entire survey sample in sociodemographic, STI/AIDS-related behavioral characteristics, and condom-use practice at baseline. In turn, the latter well represented the entire FSW population in Kramat Tunggak (Sedyaningsih and Gortmaker, 1997). We also have reason to believe that our samples represent other brothel FSWs in Jakarta (there are about 8 additional brothels) unpublished paper; (Ngatiran, 1995, personal communication). However, since Indonesia consists of different cultures, caution should be used when applying these results to FSWs in other cities.

Our study results indicate a moderate reproducibility of self-reported condom use (54% agreement of the trichotomized condom-use data with estimated Spearman rh at 0,43). As expected, a lower reproducibility is shown for frequency reports of self-recall condom use (43% agreement with a 0.38 Spearman rh). This moderate reproducibility might be due to either unstable FSW condom use over the time period of interest, or the behavior being stable but the FSWs reports were not, *ie*, unreliable. Our analysis, however, demonstrates that the first interpretation was more likely to be true, since the percentage of "always" users remained the same, and the directions of change (from never to occasional to always, and vice versa) were more or less equal.

Inconsistency of condom-use practice among FSWs has been documented by other studies (Pickering *et al*, 1993; Sawanpanyalert *et al*, 1994). Prices, types of clients, types of establishments, and certain circumstances (being drunk or drugged) (Fox *et al*, 1993) were among the causes reported. Although price and type of establishment were practically homogenous in the present study site, the qualitative study (Sedyaningsih-Mamahit, 1999) did confirm the existence of other condom-use inconsistency sources, such as being drunk and in desperate need of money.

The current methods to validate condom use were usually cumbersome, costly, invasive, and yet, imprecise (Catania *et al*, 1990a; Fox *et al*, 1993; De Vincenzi, 1994; Zenilman *et al*, 1995); some examples are: measuring biological markers (sperm in urine, HIV-seroconversion rate, or other STI rates), obtaining partners' reports, and monitoring retail condom sales (Catania *et al*, 1990a). A diary method may be the least invasive validation method, and it has a close temporal proximity to the events being reported (Reading, 1983), hence minimizing recall error (Willett, 1990; Verbrugge, 1980). Nevertheless, it is by no means the "gold standard" for measuring condom use; its disadvantages include a high attrition and a low acceptability (Willett, 1990; Reading, 1983; Verbrugge, 1980). We tried to minimize these problems by using colorful stickers (hence avoiding any literacy skills requirement) and by collecting the results, instead of waiting for the FSWs to submit the diaries at the end of the study. Nevertheless, the fact that only 20 out of 50 FSWs completed the 2-week period highlighted the difficulties in requesting respondents to participate fully in activities that are conceptually new for them.

Another limitation of a diary method was that respondents might change their behaviors

due to their participation in the study (Verbrugge, 1980). In our study, however, this reaction did not seem to occur: diary week-1 showed similar results to diary week-2 (40% "never", 40% "occasionally", and 20% "always", compared to 50% "never", 30% "occasionally", and 20% "always" condom users). If there were to be any changes, we suspected them to be towards more use, *ie*, an increase in the percentage of "always" and/or a decrease in the percentage of "never" users. In addition, our analysis incidates that the "incidence" of "never" users was more robust than the "always" users. This might indicate that for FSWs, starting to use condoms was as difficult as maintaining use at the highest level.

This study's results demonstrate that our self-reported condom use data had a moderate relative validity: 45% agreement with Spearman rho estimated at 0.49 for the categorical data, and 35% agreement with an estimate of 0.61 Spearman rho for continuous data. These correlation coefficients might be attenuated by limited reliability of the recall method (McDowell and Newell, 1996: "when comparing two methods, the maximum correlation between them is the square root of the product of their reliabilities").

Our study indicates the complexities of assessing condom use practice and estimating reproducibility and validity in a brothel setting. A limited number of studies that included condom-use reliability and validity have been reported; most of them, however, were conducted among the homosexual community (McLaws *et al*, 1990; Coates *et al*, 1986; 1988). The brothel FSWs in our study had some specific characterictics that were different from those of most homosexuals studied. They were mostly poorly educated (more than 75% had 6 years or less schooling) (Table 1) mostly came from poor villages, and they all worked under the authority of brothel managers, and, as such, had relatively little power in negotiating condom use with their clients. On the other hand, drug users were few (no injecting drug users) and drinking problems were not extensive (Sedyaningsih-Manahit, 1999).

In conslusion, our study indicates a moderate reproducibility and relative validity of the incidence and frequency of self-reported condom use. The brevity of the recall period, the relatively unstable condom-use practice of the FSWs, and unreliability were among factors that might have attenuated the estimated correlation coefficients. These results suggest that self-reporting, a method widely used due to its practicality and inexpensiveness is a reasonably good method for measuring condom use. However, studies using a self-reporting method should always include ways to assure the quality of the data, and strive to find better validating measures.

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