



Constraints Faced by Sex Workers in Use of Female and Male Condoms for Safer Sex in Urban Zimbabwe

Sunanda Ray, Janneke van de Wijgert, Peter Mason, Francis Ndowa, and Caroline Maposhere

ABSTRACT *We investigated whether female condoms are acceptable to sex workers in Harare and whether improved access to male and female condoms increases the proportion of protected sex episodes with clients and boyfriends. Sex workers were randomly placed in groups to receive either male and female condoms (group A, n = 99) or male condoms only (group B, n = 50) and were followed prospectively for about 3 months each. We found a considerable burden of human immunodeficiency virus (HIV) and sexually transmitted infections (STIs) in our cohort at enrollment (86% tested HIV positive and 34% had at least one STI). Consistent male condom use with clients increased from 0% to 52% in group A and from 0% to 82% in group B between enrollment and first follow-up 2 weeks later and remained high throughout the study. Few women in group A reported using female condoms with clients consistently (3%–9%), and use of either condom was less common with boyfriends than with clients throughout the study (8%–39% for different study groups, visits, and types of condom). Unprotected sex still took place, as evidenced by an STI incidence of 16 episodes per 100 woman-months of follow-up. Our questionnaire data indicated high self-reported acceptability of female condoms, but focus group discussions revealed that a main obstacle to female condom use was client distrust of unfamiliar methods. This study shows that a simple intervention of improving access to condoms can lead to more protected sex episodes between sex workers and clients. However, more work is needed to help sex workers achieve safer sex in noncommercial relationships.*

KEYWORDS *Female condoms, HIV/AIDS, Sex workers, Zimbabwe.*

INTRODUCTION

Prevention of human immunodeficiency virus (HIV) and sexually transmitted infections (STIs) in sex workers is beneficial to the workers' health and also prevents onward transmission to clients and clients' hard-to-reach wives and girlfriends. Zimbabwe has a severe acquired immunodeficiency syndrome (AIDS) epidemic with 25% of adults infected with HIV.¹ HIV transmission is still continuing, with an estimated 2,000 new infections of HIV per week despite widespread health edu-

The authors are from SAfAIDS, Harare, Zimbabwe (Dr. Ray); Population Council, New York City, New York (Dr. van de Wijgert); University of Zimbabwe Medical School, Harare, Zimbabwe (Prof. Mason); World Health Organization, Geneva, Switzerland (Dr. Ndowa); and Women and AIDS Support Network, Harare, Zimbabwe (Ms. Maposhere).

Correspondence: Dr. Sunanda Ray, Southern Africa HIV/AIDS Information Dissemination Service (SAfAIDS), 17 Beveridge Road, P.O. Box A509, Avondale, Harare, Zimbabwe. (E-mail: sunanda@saf aids.org.zw)

cation programs. Inadequate supplies of condoms contribute to this, but a consistent obstacle to safer sex practice in developing countries is that many women are unable to insist on condom use by their male partners. International interest has increased in methods of HIV prevention that women can use without necessarily needing the active participation of their male partners, such as female condoms and vaginal microbicides.^{2,3} A World Health Organization review showed high levels of acceptability of female condoms across diverse international settings.⁴ We enrolled a group of sex workers in Harare to explore whether female condoms are acceptable to them and whether access to female condoms would complement male condom use, resulting in an overall higher proportion of condom-protected sex acts.

METHODS

The study was conducted in Harare, Zimbabwe. The Medical Research Council of Zimbabwe granted ethical clearance. The primary aims of the study were (1) to evaluate the acceptability of the female condom in sex workers in Harare and (2) to determine whether the provision of male and female condoms, compared to male condoms only, leads to a reduction in unprotected sex acts with clients and boyfriends. The study was not powered to determine whether this would subsequently lead to a reduction in HIV or STI incidence. A secondary aim of the study was to document HIV and STI prevalence at enrollment and incidence during the 10-month follow-up period.

Female sex workers were recruited from brothels using a snowballing technique in which women who were recruited initially put us in contact with their friends or brought other sex workers to the study clinic. Women were eligible for enrollment if they were over 18 years old, had at least three different paying clients the previous month, were residents of Harare, and were willing and able to give written informed consent. All women were offered STI screening and treatment, sexual health advice, and condoms free of charge. They were informed that blood specimens taken during the study would be tested for HIV at the end of the study and were offered free separate voluntary counseling and testing if they wanted to know their HIV results earlier. Financial inducements to take part in the study were not offered, but travel costs were reimbursed.

A total of 149 women were enrolled. Two thirds of eligible volunteers were assigned to group A ($n = 99$), receiving both female and male condoms, and one third to group B, receiving male condoms only ($n = 50$). Group B participants who wanted to try female condoms were given supplies after their follow-up was completed. Twice as many women were assigned to group A to allow for a sufficient sample size to assess female condom acceptability and use within group A. Consecutively numbered sealed envelopes containing group assignments (generated by random number tables and balanced in blocks of 10) were used to assign women to groups A or B randomly. Follow-up visits were scheduled every 2 weeks for 10 weeks (a total of one enrollment and five follow-up visits per person). Participants were encouraged to attend the study clinic between scheduled visits if they needed STI treatment or a resupply of condoms. Study procedures and frequency of follow-up were identical for both study groups.

At the enrollment visit, all participants were shown how to use male condoms, and participants in group A were also shown how to use female condoms. In addition, they were given pretested diagrammatic instruction sheets on how to use them and asked to practice insertion in the presence of a research nurse. Each educational

session took about 30 minutes. The women were encouraged to use either male or female condoms every time they had sex, whether with clients or boyfriends.

At all study visits, trained female research nurses conducted structured interviews about demographic and sex work characteristics, sexual behavior (including condom use), reproductive health history, and male and female condom acceptability; counseled participants on safer sex practices; and instructed them on how to record in a study diary sex acts and condom use. They kept a register of the number and type of condoms issued to each woman at each visit, along with numbers of condoms each woman reported having used between visits (determined by study diary review). They performed pelvic examinations and took cervical, vaginal, and blood specimens for HIV and STI testing at enrollment and alternate follow-up visits. Specimens were tested for *Neisseria gonorrhoeae* and *Trichomonas vaginalis* by culture, *Chlamydia trachomatis* by enzyme immunoassay, and *Treponema pallidum* by rapid plasma reagin (RPR) and Treponema Pallidum Hemagglutination (TPHA) test. The algorithm recommended by the World Health Organization for HIV testing in countries with seroprevalence of more than 10% was used.⁵ Treatment of STIs was syndromic and changed as necessary based on culture and sensitivity results, using standard Ministry of Health protocols.

Women in group A were invited to join a focus group discussion at their final clinic visit. Ten hour-long focus group discussions were held with 37 women (3–4 women per focus group). A female research nurse with facilitation experience led the discussions in the local language of the participants (Shona) using a structured guide.

Continuous data (such as age and length of schooling) were summarized by means and ranges, and differences in means were tested by Wilcoxon rank sum test. Categorical data (such as condom use) were summarized in proportions, and differences between study groups were determined by two-sided Fisher exact test. Two different sources of data about condom use over time are presented here: categorical data from structured interviews at all study visits and summaries of study diary data. In structured interviews, participants were asked to report frequency of use of male condoms with clients, female condoms with clients, male condoms with boyfriends, and female condoms with boyfriends; frequency categories were never or rarely, less than half the time, more than half the time (the last two were collapsed for this paper as inconsistent use), and always or almost always (consistent use). We did not specifically ask about use of any condom with any partner and therefore could not determine the overall proportion of condom-protected sex acts from the structured interview data. We could not determine this from the diary data either because the diaries contained insufficient detail due to participants' inability to complete them accurately and consistently. This precluded comparisons of the proportion of protected sex acts across visits, or between study groups, by log-linear models. Diary data could be used, however, to estimate the total number of condoms used during follow-up.

Female condom acceptability was evaluated by questioning women in group A by structured interviews and focus group discussions about likes and dislikes of female and male condoms and problems experienced when introducing and using them in a variety of situations. For each acceptability variable in the structured interviews, we calculated the proportion of certain responses for each follow-up visit and a mean of these proportions across all five follow-up visits (weighted by the number of respondents at each visit). A logistic regression model was used to determine baseline predictors of female condom use (at least five female condoms

used) at first follow-up. Focus group discussions were taped, transcribed verbatim in Shona, and translated into English. Content analysis was based on grouping responses under identified themes.

RESULTS

Cohort Characteristics at Enrollment

Baseline demographic and sex work characteristics of the women in groups A and B are presented in Table 1. There were no statistically significant differences between the two groups. Nearly half of the women had been sex workers for less than a year, with 80% in sex work for less than 5 years. Mean payments were US \$3.40 for a short sex episode and US \$9.50 for a whole night. In comparison, the fixed minimum wage for a domestic worker at the time of the study was US \$30 per month.

The prevalence of HIV at enrollment was 86%; the prevalence of other laboratory-diagnosed STIs (gonorrhea, chlamydia, trichomoniasis, and syphilis) was 34%, with 10 women coinfecting. There were no significant differences in STIs between the two groups based on self-reported symptoms, physical examination, or laboratory tests.

Table 2 shows the reported frequency of male condom use with clients and boyfriends at enrollment. Condom use with boyfriends during the last sex episode was more common in group B than in group A (43% compared to 13%, Fisher exact $P = .01$). There were no other statistically significant differences in condom use at enrollment between the groups. At enrollment, most sex workers used condoms inconsistently with clients and not at all with their boyfriends (Table 3). The majority of condom users (73%) reported at least one case of condom breakage in the 3 months prior to enrollment. Ten women reported that their clients were so concerned about condom breakage that they wore two male condoms at the same time. Around half the women reported having problems getting condoms because of they were out of stock or because they could not afford them. Reasons given for not always using condoms included partner refusal (50%), not wanting to use condoms with a regular boyfriend (14%), condom unavailability (8%), and being too drunk (8%).

Follow-up

Follow-up visits took place over a period of 10 months. Of the women, 86% returned for the first follow-up visit (2 weeks after enrollment), and 48% completed five follow-up visits. Because women often returned to the study clinic late, the median length of time in the study per woman was 13 weeks instead of the scheduled 10 weeks. There were no differences in follow-up rates between group A and group B and no differences in baseline demographic and sexual behavior characteristics of women who were lost to follow-up and those who were not. We attempted to trace all those who did not return for follow-up and found that most of them were temporarily away or had permanently left Harare. A third of the women were involved in cross-border buying and selling of goods, which meant that they were often away from Harare for long periods of time. Some of the women were already suffering from HIV-related illness during the study and were being looked after by their families in the rural areas.

TABLE 1. Demographic and sex work characteristics at enrollment

Demographic and sex work characteristics	Group A (% of 99)	Group B (% of 50)	<i>P</i> *	Total (% of 149)
Age (mean years)	27.1	26.2	.45	26.8
Length of schooling (mean in years)	8.3	7.7	.62	8.1
Marital status				
Single	34	40		36
Married	0	0		0
Divorced	60	56		59
Widowed	6	4	.77	5
Steady partner				
No	59	44		54
Yes, 1 boyfriend	36	44		39
Yes, >1 boyfriend	5	12	.13	7
Cohabiting with boyfriend†	17	11	.68	15
Parous	71	74	.70	72
Number live births in parous women (mean)	2.3	1.9	.10	2.2
Current contraceptive use‡				
Oral contraceptive pills				
Injectables				
Length of sex work (median in months)	24.0	24.0	.78	24.0
Usual number of clients per week				
0–4	25	16		22
5–9	33	36		34
10–14	11	18		13
15–19	12	14		13
20 or more	18	8	.60	17
Where clients were usually found§				
Nightclub	62	72	.28	65
Hotel	40	46	.60	42
Beer hall	27	42	.09	32
In the street	26	36	.26	30
At home/brothel	29	18	.17	26
Other¶	20	26	.53	22
Where sex with client usually took place§				
At home/brothel	85	94	.12	88
At client's home	36	42	.59	38
In hotel	34	34	1.00	34
In car	21	24	.68	22
Other¶	11	24	.06	15
Mean payment short episode in US \$	3.4	3.4	1.00	3.4
Mean payment long episode/night in US \$	9.7	9.1	.98	9.5
Has other income#	37	54	.06	43

*Two-sided Fisher's exact test for categorical data and Wilcoxon rank sum test for means.

†Women who do not have a regular boyfriend were excluded: N = 41 for group A and 28 for group B.

‡Use of other contraceptive methods was negligible.

§Categories are not mutually exclusive.

¶Includes shebeen, restaurant, and cinema.

¶Includes in the street, friend's house, shebeen, and client's office.

#Types of other income mentioned: vending in the streets, import/export of goods, embroidery, sewing, temporary jobs, hairdressing, owns shebeen, alimony, gambling, and from parents.

TABLE 2. Self-reported male condom use with clients and boyfriends at enrollment

Condom use	Group A (% of 99)	Group B (% of 50)	<i>P</i> *	Total (% of 149)
Used during last sex episode with client	81	70	0.15	77
Used during last sex episode with boyfriend†	13	43	0.01	26
Clients pay extra for sex without condom				
Yes	25	19	0.47	23
No	47	58		51
Insists on “No condom, no sex”	28	23		26
Male condom breakage in last 3 months				
Never	30	22	0.19	27
Rarely (once or twice)	34	48		39
Occasional (<50%)	32	30		31
Often (>50%)	5	0		3
Has easy access to male condoms	77	80	1.00	78
Gets male condoms from				
Local clinic	47	60	0.17	51
Red Cross Society	30	18	0.12	26
Pharmacy	14	14	1.00	14
Other‡	36	30	0.56	34
Experienced problems getting condoms	52	56	0.73	53
Kinds of problems experienced				
Provider ran out of supplies	35	52	0.22	41
Condoms too expensive	31	18	0.80	32
Provider only gave limited supply	22	15	0.55	20
Other§	12	0	0.08	8

*Two-sided Fisher’s exact test for categorical data and Wilcoxon rank sum test for means.

†Women who do not have a regular boyfriend were excluded: N = 41 for group A and 28 for group B.

‡Includes friends (11), clients (10), Zimbabwe National Family Planning Council (9), nightclubs (8), hotels (6), vendors (5), and Youth Advisory Service (2).

§Includes difficult to obtain condoms during the day and condom supplier is too far to walk.

Female Condom Acceptability—Structured Interview Data

The women in group A (all of whom had used at least one female condom during follow-up) were asked in structured interviews at each follow-up visit their opinions about the female condom and experiences using it. Table 4 shows that the majority of women said that they liked the female condom (weighted mean of 78% for all visits) and liked it better than the male condom (68%) throughout the study. They also thought that their regular boyfriends and clients liked the female condom and liked it better than the male condom (Table 4). The most frequently reported advantages of the female condom were that they were stronger (reported by 68 women), more comfortable (62), easier to use (29), more fun to use (20), and safer (18) than male condoms; that they could be used when partners refused to use male condoms or could not use them because they were drunk (37); and that they give the woman more control (37). The most frequently mentioned problems with the female condom were that they are too lubricated (mentioned by 17 women), too big (8), and difficult to insert (12); and that the inner ring hurt (11) and outer ring itched (4). Two women at first follow-up indicated that they had reused a female condom despite our instructions not to do so, four women reported female condom

TABLE 3. Self-reported male and female condom use at enrollment and during follow-up

	Enrollment,* % of n†	Visit 2, % of n	Visit 3, % of n	Visit 4, % of n	Visit 5, % of n	Visit 6, % of n
Group A: Female and male condoms						
Male condom use with clients‡	n = 99	n = 82	n = 72	n = 63	n = 56	n = 42
Never or rarely	6	5	1	5	4	5
Inconsistent	94	43	45	36	44	35
Consistent	0	52	54	59	52	60
Male condom use with boyfriends‡	n = 38	n = 52	n = 47	n = 42	n = 38	n = 24
Never or rarely	68	56	51	67	63	42
Inconsistent	24	23	19	19	16	25
Consistent	8	21	30	14	21	33
Female condom use with clients‡		n = 83	n = 72	n = 64	n = 56	n = 42
Never or rarely	NA§	30	18	30	20	36
Inconsistent		63	76	67	71	59
Consistent		7	6	3	9	5
Female condom use with boyfriends‡		n = 52	n = 47	n = 42	n = 38	n = 25
Never or rarely	NA§	69	60	69	58	60
Inconsistent		27	34	19	24	28
Consistent		4	6	12	18	12
Group B: Male condoms only						
Male condom use with clients†	n = 50	n = 40	n = 36	n = 35	n = 30	n = 26
Never or rarely	2	8	0	3	0	0
Inconsistent	98	10	19	14	10	15
Consistent	0	82	81	83	90	85
Male condom use with boyfriends‡	n = 28	n = 26	n = 26	n = 24	n = 22	n = 19
Never or rarely	54	69	54	58	55	63
Inconsistent	14	12	7	9	9	11
Consistent	32	19	39	33	36	26

*In the last 3 months.

†The sample size n gradually reduces over time due to loss to follow-up.

‡Data from structured interviews. *Inconsistent* is defined as the categories “more than half the time” and “less than half the time” combined; *consistent* is defined as “always or almost always.”

§Sex workers did not have access to female condoms prior to enrollment in this study.

breakage throughout the study, and one woman complained about noise during sex.

Condom Use and HIV/STI Incidence During Follow-up

Consistent male condom use with clients increased from 0% to 52% in group A and from 0% to 82% in group B between enrollment and first follow-up and remained high throughout the study (Table 3). The proportion of women in group A who consistently used male condoms with their boyfriends increased from 8% at

TABLE 4. Female condom acceptability—structured interview data

Female condom acceptability	Weighted mean (range) (%) [*]
General reaction: Liked it very much [†]	78.2 (71.4–87.1)
Liked female condom better than male condom [‡]	67.9 (58.9–80.6)
Female condom is very easy to insert [§]	93.6 (89.8–98.0)
Female condom stayed in place during sex	91.4 (87.7–96.8)
Outer ring was pushed up the vagina	3.4 (0.0–4.8)
Penis went between outer ring and vaginal wall	3.0 (0.0–6.3)
Female condom is very easy to remove [§]	98.9 (98.0–100)
Insertion became easier with practice	93.2 (81.7–100)
Use became more comfortable with practice	88.7 (75.3–100)
Female condom interfered with pleasure during sex	7.2 (0.0–10.2)
Female condom caused problems, irritation, or discomfort	14.6 (10.0–23.0)
Boyfriend liked the female condom very much [†]	70.2 (62.5–80.0)
Boyfriend liked female condom better than male condom [‡]	66.0 (54.8–76.5)
Most of my clients liked female condom very much	70.2 (63.4–77.6)
My clients liked female condom better than male condom [‡]	58.2 (54.1–67.7)
Would recommend female condom to friends	98.1 (95.9–100)
Would use female condom in future	94.4 (86.5–100)

^{*}The percentage of women who responded according to the responses in the table was calculated for visits 2–6. Only women who had used female condoms were included in these calculations. These percentages were summarized by the weighted mean and the range across all visits.

[†]The categories were disliked strongly, disliked somewhat, neutral, liked fairly well, and like very much. When asked about the boyfriend's opinion, the following category was added: "I don't know his opinion."

[‡]The categories were liked less, equal, or more. When asked about the boyfriend's or clients' opinion, the following category was added: "I don't know his opinion."

[§]The categories were very difficult, fairly difficult, neutral, fairly easy, and very easy.

^{||}The categories were very few, some, and most of them liked it, and "I don't know."

enrollment to 14%–33% at follow-up. A third of women (33%) in group B were already consistently using male condoms with their boyfriends at enrollment, and this remained stable at 19%–39% during follow-up. Few women in group A reported using female condoms with clients consistently throughout the study (3%–9%), with the majority reporting inconsistent use (59%–71%). Female condom use with boyfriends was much lower than with clients, although consistent use increased steadily from 4% at baseline to 12%–18% during follow-up. Of the eight women in group A who consistently used female condoms more often than male condoms, only one used them for almost all sex episodes with clients.

In group A, the number of condoms used per person during the entire follow-up period ranged from 0 to 317 for male condoms (median number of 5 per week) and 0 to 179 for female condoms (median number of 2 per week). In group B, the number of male condoms used ranged from 0 to 286 (median number of 8 per week).

Women who reported male condom breakage (odds ratio [OR] = 11.6, 95% confidence interval [CI] = 1.9–70.5, $P = .01$) and a higher number of sex partners (OR = 2.83, 95% CI = 1.5–5.3, $P = .001$) at enrollment were more likely to have used female condoms regularly (defined as more than 5 female condoms) between enrollment and first follow-up, whereas women who reported engaging in tradi-

tional vaginal cleansing, drying, and tightening practices were less likely to have used them regularly (OR = 0.1, 95% CI = 0.01–0.6, $P = .02$).

There were 61 new episodes of STI in 43 women (38%) during 392 woman-months of follow-up, and 16 women had multiple infections. The crude incidence rate of STIs for the whole cohort was therefore 16 new episodes per 100 woman-months of follow-up, indicating that unprotected sex still occurred despite improved access to condoms. Three women became HIV positive during the study, all in group B.

Female Condom Acceptability—Focus Group Data

The levels of actual female condom use reported during the study did not match the high acceptability reported in the structured interviews. In the focus groups, we therefore specifically asked which problems participants experienced with introducing female condoms to their sex partners. The most important problem mentioned was fear of losing clients by introducing something unfamiliar. According to the sex workers, many clients either distrusted the female condom because they were not familiar with it or did not want to change methods because they were satisfied using male condoms. Some clients were initially curious about the female condom, but were discouraged by its appearance. Other problems mentioned were with using female condoms in certain sexual positions; no time to insert a female condom because the client was in a hurry; insertion of a female condom with dirty hands (for instance, if sex took place in the street); and getting rid of the lubrication from the hands after application. Seven women mentioned difficulty using female condoms when they were drunk, although one recognized that she was less likely to be “cheated” (clients removing male condoms just before penetration) using a female than a male condom when she was drunk. Many women felt pressured not to use condoms at all with certain regular clients and with their boyfriends to demonstrate that these relationships were special to them; women hoped these relationships would lead to regular income or marriage. Nine women said that they were trying to conceive with a boyfriend, and three became pregnant during the study. The sex workers appeared fatalistic about their own risks and powerless to insist effectively on protection for themselves from partners. All the women stated that if clients refused to use a condom, became violent, or offered more money, they could not insist. Some suspected that their clients were HIV positive and were willing to pay for the opportunity to have unprotected sex. Many women wished that they had access to HIV prevention methods that they could control (such as the female condom), but that could be used without their partners’ knowledge.

DISCUSSION

Before our intervention, this group of sex workers used male condoms inconsistently with clients and rarely with boyfriends. Regular provision of male and female condoms dramatically increased consistent condom use in both study groups, mainly through increased use of male condoms. With the introduction of women-initiated barrier methods, including the female condom, concerns have surfaced about successful male condom users abandoning the male condom for such “unproven” new methods. There was no evidence for this in our study. Our study suggests that many sex workers can successfully use male condoms as a first-line protection, with female condoms providing backup in situations when male condoms cannot be used (with drunk clients, for instance). This finding is consistent

with results from another randomized trial of sex workers in the developing world.⁶

It is possible that condom use and acceptability were overestimated in this study due to differential loss to follow-up and social desirability bias. Many women were lost to follow-up due to high mobility and high burden of HIV morbidity in the cohort. It is likely that the women who were lost to follow-up were less motivated to change their behavior, and less favorable toward the female condom, than women who remained in the study. It is also possible that social desirability bias was present since the research nurses had established rapport with participants.

The high HIV prevalence at enrollment (86%) and STI incidence during follow-up (16 episodes per 100 woman-months of follow-up) are consistent with rates found in sex workers elsewhere in the region.⁷⁻⁹ The high incidence of STIs also demonstrates that unprotected sex with infected partners was still taking place. High rates such as these despite educational campaigns have been attributed to inconsistent condom use.⁹⁻¹² For example, while sex workers in this study started using condoms consistently with clients, very few of them used them consistently with boyfriends. Clients are likely to be perceived as riskier than boyfriends, even though this is not necessarily true. Boyfriends of sex workers often have other sexual relationships, sometimes with other sex workers, and it is likely that they were the source of many of the incident infections in this study. Furthermore, sex workers may feel the need to separate commercial from romantic relationships, and the using of condoms in the former but not in the latter is one way of achieving this. Increasing condom use when sex workers have sex with their boyfriends remains an important challenge for HIV prevention.

Sex workers in this study found female condoms easy to use with practice and preferred them to male condoms in some situations. According to the workers, many of their partners also liked the female condom. However, sex workers are financially dependent on their clients and usually have transient relationships with them, which undermines their ability to introduce female condoms. Studies have shown that negative experiences with male condoms when first starting to use them undermine the success of future attempts.^{13,14} Similarly, the sex workers in this study reported problems with continuing to try to use the female condom if their first attempts had failed. Furthermore, many of the women in the cohort were experienced male condom users before they entered the study and could be reluctant to switch to a method that was less familiar to them and to their partners. Last, the study period (a median of 13 weeks per woman) may have been too short for women to gain adequate confidence in using female condoms. It may be better to promote female condoms initially in steady relationships (commercial or otherwise) until users become more confident in using them.

Even though female condom use is initiated by women, some cooperation from the male partner is needed for its correct use. Sex workers would probably benefit from additional female-controlled methods of HIV/STI prevention, such as vaginal microbicides, that can be used without the male partner's knowledge and cooperation.

Male condom breakage occurred frequently in this study and was worrying enough for some to wear more than one condom at a time. Concern about frequent condom breakage has been expressed before in Zimbabwe, especially in the context of common use of vaginal drying and tightening agents.¹⁵ In our study, during follow-up, women who had experienced male condom breakage were more likely to start using female condoms, and women who used vaginal drying agents were less likely to start using them. A study in Zambia also found that women were more

likely to use female condoms regularly if the women had experienced male condom breakage because the female condoms were perceived as stronger and more reliable than male condoms.¹⁶ Correct use and storage of condoms, plus the importance of adequate lubrication when using them, should always be important components of condom promotion.

Our results show that female condoms may fulfill an important additional source of protection for women at risk for HIV. They may be especially useful for women who often experience male condom breakage or have sex with drunken clients. However, technological developments alone cannot solve the HIV/STI crisis in sex workers. Peer education and negotiation skills training programs for sex workers have been successful in Kenya and Zimbabwe on a small scale¹⁷ and should be scaled up. Sympathetic nonjudgmental HIV/STI prevention and treatment services that target sex workers and can easily be accessed by them are urgently needed.

ACKNOWLEDGEMENT

We would like to thank the sex workers who took part in this research; Professor Ahmed Latif, Lovemore Gwanzura, and all the staff of the Zimbabwe AIDS Prevention Project at the University of Zimbabwe Medical School; Chartex International (UK) for supplying the female condoms and financial resources that enabled this study to get started. Further financial support was given by the Royal Netherlands Embassy, Zambia. Fogarty International AIDS Training Grant (D43-TW00003 to the University of California at Berkeley) enabled Janneke van de Wijgert to participate in this study.

REFERENCES

1. Joint United Nations Programme on HIV/AIDS. *Report on the Global HIV/AIDS Epidemic*. Geneva, Switzerland: Joint United Nations Programme on HIV/AIDS; 2000.
2. Heise LL, Elias C. Transforming AIDS prevention to meet women's needs: a focus on developing countries. *Soc Sci Med*. 1995;40:931-943.
3. Stein Z. HIV prevention: the need for methods women can use. *Am J Public Health*. 1990;80:460-462.
4. World Health Organization. *The Female Condom, A Review*. Geneva, Switzerland: World Health Organization; 1997.
5. Sato PA, Maskill WJ, Tamashiro H, Heymann DL. Strategies for laboratory HIV testing: an examination of alternative approaches not requiring Western Blot. *Bull World Health Organ*. 1994;72:129-134.
6. Fontanet AL, Saba J, Chandelying V, et al. Protection against sexually transmitted diseases by granting sex workers in Thailand the choice of using the male or female condom: results from a randomized controlled trial. *AIDS*. 1998;12:1851-1859.
7. Simonsen JN, Plummer FA, Ngugi E, et al. HIV infection among lower socio-economic strata prostitutes in Nairobi. *AIDS*. 1990;4:139-144.
8. Laga M, Manoka A, Kivuvu M, et al. Non-ulcerative sexually transmitted diseases as risk factors for HIV-1 transmission in women: results from a cohort study. *AIDS*. 1993;7:95-102.
9. Taha TET, Canner JK, Chipangwi JD, et al. Reported condom use is not associated with incidence of sexually transmitted diseases in Malawi. *AIDS*. 1996;10:207-212.
10. Weir SS, Feldblum PJ, Roddy RE, Zekeng L. Gonorrhoea as a risk factor for HIV acquisition. *AIDS*. 1994;8:1605-1608.

11. Allen S, Serafilira A, Bogaerts J, et al. Confidential HIV testing and condom promotion in Africa. *JAMA*. 1992;268:3338–3343.
12. Allen S, Tice J, Van de Perre P, et al. Effect of serotesting with counselling on condom use and seroconversion among HIV discordant couples in Africa. *Br Med J*. 1992;304:1605–1609.
13. Richters J. Researching condoms: the laboratory and the bedroom. *Reprod Health Matters*. 1994;3:55–62.
14. Browne J, Minichiello V. The condom: why more people don't put it on. *Soc Health Illness*. 1994;16:229–251.
15. Civic D, Wilson D. Dry sex in Zimbabwe and implications for condom use. *Soc Sci Med*. 1996;42:91–98.
16. Musaba E, Morrison CS, Sunkutu MR, Wong EL. Long-term use of the female condom among couples at high risk of human immunodeficiency virus infection in Zambia. *Sex Transm Dis*. 1998;25:260–264.
17. Ngugi EN, Wilson D, Sebstad J, Plummer FA, Moses S. Focused peer mediated educational programmes among female sex-workers to reduce sexually transmitted disease and HIV transmission in Kenya and Zimbabwe. *J Infec Dis*. 1996;174(suppl 2):S240–S247.