



## The Acceptability of Reuse of the Female Condom Among Urban South African Women

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**ABSTRACT** *This study assessed whether reuse of the female condom was acceptable among two groups of women in central Johannesburg, South Africa, who were taking part in two separate studies of female condom reuse. The first group consisted of women (aged 17 to 43 years) attending a family planning/sexually transmitted infections (STIs) clinic who were participating in a cross-sectional survey of the acceptability of female condoms reuse (n = 100). The second group included women (aged 18–40 years) at high risk for STI (80% self-declared sex workers) who were taking part in an ongoing cohort study to investigate the safety of reuse of the female condom through a structural integrity and microbial retention study (n = 50). Among women participating in the acceptability study, 83% said that they would be willing to reuse the female condom, and 91% thought the idea of reuse of the female condom was acceptable. All women taking part in the safety of reuse study and who reused the female condom up to seven times (n = 49) reported that the steps involved in reusing the device were easy to perform and acceptable. All 49 women said they would reuse the female condom at least once, while 45% said they would use it a maximum of seven or eight times. From the results of the interviews with both study groups, it can be concluded that, among women in a South African urban environment who have used a male and/or female condom, the concept of reuse of the female condom is acceptable and thought to be a good idea.*

**KEYWORDS** *Acceptability, Female condom, Reuse, South Africa.*

### INTRODUCTION

The female condom is currently one of the few methods available to prevent sexually transmitted infections (STIs), including human immunodeficiency virus (HIV). Although not a completely female-controlled method, it offers women more opportunity to initiate use than does the male condom. Unfortunately, due to the high cost of the female condom, it is not widely available in many resource-poor countries where HIV and STIs are most prevalent. Because of its limited availability, reuse of the female condom has been reported in many developing countries since the introduction of the method.<sup>1–5</sup> These reports, however, do not document the

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acceptability or experience of the women reusing the condoms. The investigation into the safety of female condom reuse continues; therefore, it is important to collect information on the acceptability and capacity of women to conduct the procedures potentially required for reuse. If reuse procedures are demonstrated to be safe, the female condom could become a more cost-effective method of pregnancy and HIV/STI prevention and hence be more accessible to women, especially women in resource-poor countries.

A number of studies have examined whether repeated washing and drying cycles using a number of different washing combinations affects the structural integrity of the female condom.<sup>6-8</sup> These studies found that, for two of the main tests for examining structural integrity and safety standards (the seam strength and air-burst pressure tests), results remained well above manufacturing specifications after eight washes. In another test of structural integrity, the water leakage test, a breakage rate of between 1.7% and 1.9% was reported in the two *in vivo* studies investigating reuse. The holes detected during the test were not associated with an increased number of uses.<sup>7,8</sup> In addition to structural integrity, several other areas have been explored that relate to the safety of reuse of the female condom, including microbial retention and HIV permeability studies. Initial results from microbial retention work suggest that microbes, including those classified as STIs, can be removed by washing the female condom.<sup>9</sup> These studies have developed protocols for adequate cleaning, drying, storage, and relubrication of the device using locally available products and taking into consideration domestic circumstances of the sample population.

This article presents data on the acceptability of female condom reuse from women participating in two separate studies conducted in central Johannesburg, South Africa. The first study recruited women with a history of male and/or female condom use to participate in a cross-sectional study of the acceptability of female condom reuse. The second study recruited women at high risk for STI acquisition into a cohort study designed to assess the safety of the female condom after use and washing.<sup>8</sup> The study also collected information on the acceptability of reuse as part of its data collection; this information is presented in this article. Data from both studies are presented here to increase sample size and to compare the experiences of women who had actually reused the female condom to women who had used the male and/or female condom, but not reused the female device.

## **METHODS**

Two studies were conducted to assess the acceptability of female condom reuse among women in inner-city Johannesburg. While similar concepts related to reuse were assessed in both studies, the same questionnaire was not used with both populations.

### **Cross-sectional Study: Family Planning and Sexually Transmitted Infection Clinic Attendees**

The first study was a cross-sectional survey administered among women attending a family planning and STI clinic in inner-city Johannesburg. This study was conducted while *in vitro* studies of the safety of female condom reuse were being undertaken. The aim of the study was to determine if the concept of female condom reuse was acceptable among a population of women who had experience using the male and/or female condom. Other aims of the study were to assess the feasibility

of female condom reuse (i.e., access to running water, washing facilities, storage, etc.), to determine the types of products available to women if they were to reuse the female condom (i.e., washing soaps used, lubricants, water temperatures available, etc.), to identify the main reasons why women would and would not reuse the female condom, and to examine variables that might modify a woman's willingness to reuse the device (such as partner number and type of barrier method ever used). The main outcome of this study was acceptability of female condom reuse measured by asking women if they would be willing to reuse the female condom one or two times and more than two times (conditional on the procedure being found to be safe) and asking if they thought the concept of female condom reuse was a good idea (even if they personally would not want to reuse).

Women were eligible to participate if they had ever used a male and/or female condom and were age 17 years or older. Every fifth woman who registered at the clinic in April 1997 was screened for eligibility when registering at the clinic; if eligible, she was asked to participate in the study. This continued until a sample of 100 was attained. As female condoms were not widely available in Johannesburg at the time of the study, female condom users were actively recruited at the clinic by posting flyers at the clinic and making announcements about the study in the clinic waiting rooms. An interviewer-administered questionnaire was conducted around issues of potential female condom reuse acceptability. Both open- and closed-ended questions were asked of all women using a structured questionnaire. In addition, this group was asked to give information on their access to the products and facilities needed to carry out the recommended washing, drying, storage, and relubrication procedures. The questionnaire collected information on demographics, number of sexual partners, male and female condom use, knowledge of the female condom, experience of reuse of the female condom, willingness to reuse the female condom, and general questions on female condom reuse acceptability.

#### **Cohort Study: Female Condom Reusers**

The second study was a cohort study conducted to evaluate the safety of female condom reuse (assessed through microbial retention and structural integrity studies) among self-declared sex workers and other women at risk for STI acquisition in inner-city Johannesburg. This study was conducted after *in vitro* work on female condom reuse had found the procedure to be safe and after the cross-sectional acceptability study had been completed.

The primary aim of the study was to assess the structural integrity of the female condom after each incremental use and to assess the acceptability of the reuse procedure. A secondary objective of the study, reported here, was to evaluate the acceptability and feasibility of reuse (compliance with reuse procedures). Acceptability of female condom reuse was measured by asking women if, based on their experience, they would be willing to reuse the female condom and how many times they would be willing to reuse it. Feasibility was measured by asking the women how they had washed, dried, and relubricated the device. We also asked the participants to describe any changes in the properties of the device as they reused it. The acceptability data reported here were collected after women had reused the device seven times, thus at the end of the cohort study (before condoms were issued to be used the eighth and last time). We report these data as it gives a picture of the women's total reuse experience at varying levels of reuse over time (i.e., from using just once to use up to seven times).

We recruited 50 women to take part in a cohort study to investigate the safety

of female condom reuse.<sup>8</sup> Women were eligible to participate in the study if they were 17 years old or older, were sexually active, and were willing to comply with the study procedures. This study population was comprised almost entirely of commercial sex workers (80%) and women at high risk for STI acquisition. The women were recruited from local hotels/brothels in inner-city Johannesburg and from a family planning/STI clinic in the area (the same clinic where the cross-sectional study took place). This population was chosen because the aim of the second part of the reuse safety study, which is not reported in this paper, was to demonstrate a woman's ability to remove harmful pathogens from the used condom; thus, a population at risk of exposure to these pathogens was necessary. The study population also had experience using the male condom, and some had experience using the female condom due to their prior participation in a study of female-controlled prevention methods.

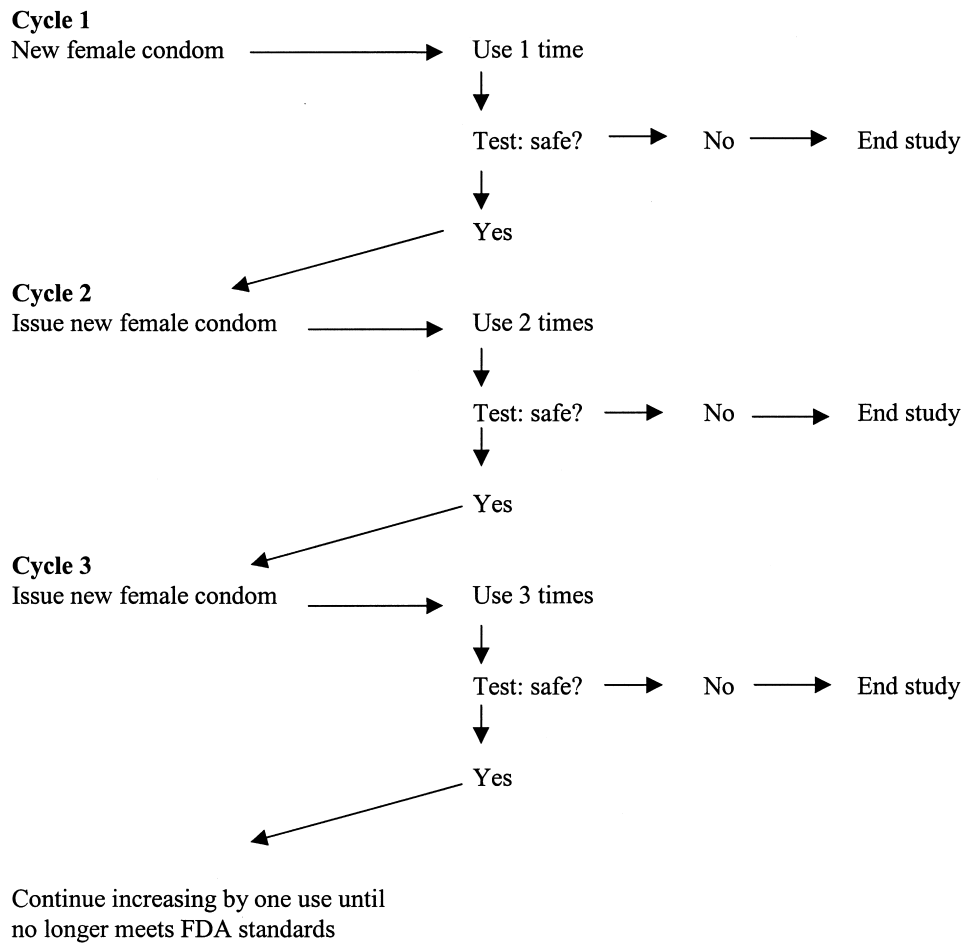
Women were given detailed instructions on washing, drying, storing, and relubricating procedures for the female condom as recommended by the study. The standard washing procedure included the following steps: (1) rinsing the female condom; (2) washing the condom for 60 seconds using a liquid detergent; (3) rinsing the condom with water; (4) patting the condom dry with clean tissues or towels or air drying it; (5) storing the condom in a clean container between use; (6) relubricating the condom with vegetable oil or other lubricant immediately before use. Women were counseled on safer sexual practices at study onset and at each return visit. Women were also shown how to inspect the female condom and to check for damage before use. At the beginning of each "cycle," each woman started with one new female condom and was instructed to use, wash, and relubricate the female condom. After cycle 1, during which the female condom was used once, the number of times a condom was reused increased by one in each subsequent cycle. After each reuse cycle, the woman was asked to return the device to the clinic within 12 hours of last use (Figure).

The condoms were then transported to the laboratory, where safety testing took place. The structural integrity of the used condom was assessed between each reuse cycle, and a new condom was issued for the next reuse cycle if Food and Drug Administration (FDA) standards were satisfied. Women were given a follow-up appointment to return to the clinic after the safety results of the previous cycle were known (approximately 3 weeks later). If the results met FDA standards, then women were issued a new female condom and asked to reuse it one more time than they had in the previous cycle. Although women in this study were at risk for STI acquisition, due to the safety testing between each increase in reuse, given that *in vitro* work had shown the procedure to be safe and given that women were advised only to use the female condom for study purposes when male condom use could not be negotiated with the partner, the study team believed that they were not placing the study participants at an increased risk of infection.

Questionnaires in both studies were administered in the study subject's language of choice by a qualified counselor, and both study protocols were approved by the University of the Witwatersrand Committee on Human Subjects and the Ethics Committee of the World Health Organization (WHO), Special Programme of Research, Development, and Research Training in Human Reproduction.

### **Data Analysis**

The statistical package Epi-info 6.1 (Centers for Disease Control and Prevention, Atlanta, GA) was used to analyze the data. Proportions were used to describe the



**FIGURE** Diagram of reuse cycle.

main outcome variable in both studies (acceptability of female condom reuse) and secondary outcome variables (number of times willing to reuse, reasons willing to reuse, access to washing facilities). Chi-square tests were used to determine if there were any statistically significant differences (at  $P = .05$ ) in acceptability across the two study groups, prior female condom use (never vs. ever), and number of partners in the last 6 months (1 vs.  $\geq 1$ ). We had 80% power to detect such differences at  $\alpha = .05$ .

## RESULTS

### **Cross-sectional Study: Family Planning and Sexually Transmitted Infection Clinic Attendees**

There were 100 women who completed the interview and answered all questions. The mean age of the group was 26 years (range 17–43 years). The mean number of years of education was 11 (range 4–12) and the mean monthly income of the

group was 745 rand (US \$95) per month (range R 90 to R 3,500). All of the women were black African. Sixteen women were self-declared sex workers.

All had used the male condom before, but only 19 had ever used the female condom. All of these women reported liking the method, but the majority (89%) were no longer using the device because it was no longer available to them (all of the women who had used the female condom received it through an acceptability study that took place at the same clinic in 1996).<sup>10</sup> Reuse of the female condom was reported by 1 woman of the 19 who reported ever using the female condom.

Table 1 shows the percentage of women who would be willing to reuse the female condom one or two times and more than two times. The majority of women (83%) reported being willing to reuse the female condom one or two times, while 67% of women reported being willing to reuse the device more than two times. Overall, general acceptability of female condom reuse was high. The majority (91%) of the 100 women interviewed said that the idea of female condom reuse was acceptable to them.

Reasons given for reuse being an advantage included affordability (81%), availability (57%), and convenience (10%). The women who reported that they would not be willing to reuse the female condom ( $n = 17$ ) identified fear of breakage (82%), fear of disease transmission (49%), and lack of cleanliness (46%) as the reasons why they would not be willing to reuse the female condom.

There was no difference in willingness to reuse the female condom by prior male or female condom use or by number of partners in the last 6 months (Table 2). The majority (80%) of women with more than one sexual partner in the last 6 months were self-declared sex workers, and 94% of all sex workers interviewed were willing to reuse one or two times. Almost all (99%) of the women reported adequate access to washing, drying, and storage facilities. Washing materials reported to be commonly available were bar soap, liquid detergent, and washing powder.

#### Cohort Study: Female Condom Reusers

Of the 50 women recruited for the seventh reuse cycle, 49 completed the cycle (1 woman was lost to follow-up). The mean age of these women was 28 years (range 17–44 years). All women were black African. The majority (80%) were sex work-

**TABLE 1. Willingness to reuse the female condom one or two times versus multiple times among women in the cross-sectional acceptability study compared to women in the reuse safety cohort study**

Number of times a woman was prepared to reuse	Cross-sectional study: women who never reused the female condom (N = 99)* n (%)	Cohort study: women who reused the female condom 7 times (N = 49) n (%)
1–2	83 (83)†	49 (100)
>2	67 (67)	40 (82)

\*Of the 100 women in the cross-sectional study, one woman reported having reused the female condom and was excluded from this analysis.

†Percentages were not statistically significantly different using the chi-square test.

**TABLE 2. Cross-sectional study: willingness to reuse the female condom one or two times and multiple times among women attending the family planning/sexually transmitted infection clinic stratified by type of barrier method ever used**

Willing to reuse?	Would reuse one or two times		Would reuse more than two times	
	Ever used female condom (N = 19) n (%)	Only ever used male condom (N = 81) n (%)	Ever used female condom (N = 19) n (%)	Only ever used male condom (N = 81) n (%)
Yes	16 (84)	67 (83)	12 (63)	55 (68)
No	02 (11)	14 (17)	6 (32)	25 (31)
Not sure	01 (05)	0 (0)	01 (05)	01 (01)
Total	19 (100)	81 (100)	19 (100)	81 (100)

None of the above percentages were statistically different from each other using the chi-square test.

ers. More specific information on the sociodemographics of this population was not available.

All 49 women reported that the process of reuse was easy, and that they would recommend reuse to a friend. All women reported that they would be willing to reuse the female condom one or two times, while 82% said that they would be willing to reuse more than two times (Table 1). There were 45% of the women who said they would be prepared to use it a maximum of seven or eight times (Table 3). The main reasons given for willingness to reuse the female condom included that it felt safe to reuse it (98%) and that they would not have to go to the clinic so often (46%).

All of the women in the study had more than one sexual partner in the last 6 months, and all of the women were willing to reuse the female condom at least one time. Although the majority of women (88%) reused their condom with the same partner, six women used the same condom with both a regular boyfriend and a client.

**TABLE 3. Female condom reuse cohort study: maximum number of times female condom reusers would be willing to reuse, outside of a study setting, if the procedure were found to be safe**

Maximum number of times willing to reuse (N = 49)	n	(%)
1	3	(6)
2	6	(12)
3	5	(10)
4	5	(10)
5	4	(8)
6	4	(8)
7	20	(41)
8	2	(4)

At each wash cycle, between 15% and 30% of women reported that the condoms looked and felt different. Of the 27% of women who reported that the condom felt different at the seventh cycle, all said it felt thinner, and two women said it felt drier. Some women ( $n = 7$ ) mentioned that the condom had changed color.

In most cases, women adhered to the specific instructions given for washing. Over three quarters (76%) of women used liquid detergent as a washing agent. The remainder used bar soap, and one woman used washing powder dissolved in water. Condoms were mainly air dried (62%), and almost all (99%) women relubricated the device between uses. Baby oil, sunflower oil, and petroleum jelly were the main products used for relubrication. More detailed information on the recommended compliance to the washing regimen, storage, and detailed practical logistics of reuse is reported elsewhere.<sup>6</sup>

## DISCUSSION

Although reuse of the female condom has been reported since acceptability studies started in the early 1990s,<sup>1-5</sup> there have been no formal studies conducted to find out how women would feel about reusing the device. While this study was conducted at only one urban site in South Africa, this is the first study of its kind, and the results suggest that many women find the concept of reuse acceptable. All women involved in the cohort study on reuse safety found the practice acceptable. This may be because they had volunteered to participate in the study and therefore already felt the practice was acceptable. In addition, these women were also mainly self-declared sex workers who may have been more motivated to reuse the female condom due to the high frequency of sexual activity, the difficulty getting clients to use male condoms, and the need to protect themselves from HIV/STIs. Nevertheless, the majority of women in both studies did not find the concept of touching or washing a condom that had been used during intercourse problematic.

Due to the limited availability of the female condom in South Africa at the time of both studies, only a small number of women in these two studies had used the female condom before ( $n = 19$ ), and most prior female condom use had been in the context of a research study.<sup>10</sup> Therefore, this acceptability data is for a group of women who would not be considered regular or consistent female condom users, a group difficult to find in South Africa given the limited availability of the device at the time.

Women in both studies did not report problems in accessing washing facilities or products, but this issue needs to be evaluated further in periurban and rural areas, where access to washing facilities may be more limited. Indeed, reuse of the female condom may be more important in rural and periurban communities, where family planning services are often limited to mobile clinics<sup>11</sup> or to overcrowded clinics. In these areas, women may not be able to visit the clinic frequently to replenish their female condom supply. Currently, when a woman in a rural area runs out of condoms (male or female), her options are to use no protection at all or to abstain from sex, the latter of which is not necessarily under the woman's control. If reuse is found to be safe, it would offer women in both rural and urban areas another option when they do not have a new male or female condom available. In fact, a major benefit of reuse of the female condom reported by women in both study populations was the convenience of not having to go to the clinic as often to get new female condoms.

The risk of disease transmission is an important issue being considered in the



reuse studies on the female condom. The issue of disease transmission and reusable contraceptive devices has been overlooked to date and has not been addressed in the literature on the diaphragm. Washing instructions for the diaphragm are very basic and include washing with a mild soap and warm water.<sup>12</sup>

A particular concern expressed about reuse of the female condom is that it would not be appropriate for women with multiple partners because it would not be hygienic.<sup>13</sup> In a qualitative acceptability study conducted in Zimbabwe, a main objection to reuse was concern about the potential unhygienic nature of reuse, which was emphasized particularly by the sex workers interviewed.<sup>14</sup> This is in contrast to our findings, for which acceptance of reuse was just as high among women with multiple partners as it was among those with only one partner. In the reuse safety cohort study, a small number of women reused the same condom with different partners. This does raise concerns for hygiene and disease transmission. It may be that the population sampled in this study had a limited understanding of hygiene and disease transmission, which may have contributed to their lack of concern in reusing the female condom. Women did express a concern about the female condom breaking if it was reused too often. This may indicate concern about disease transmission as a broken condom would no longer offer protection. While women in the reuse safety study used the device up to eight times, only about one fifth stated that they would only be willing to reuse a female condom once or twice, which may have meant that some women were concerned about condom effectiveness after a certain number of uses.

Women in the reuse safety cohort study also noted that, after reusing the female condom, it looked and felt different when compared to a new condom. The silicone lubricant on new female condoms is very viscous and difficult to wash off. Once removed, the condom does appear much drier, and there is some visible color change from the original product. This change in appearance was a concern for women as it was a visible sign that the condom was no longer the same as a new device and therefore perhaps not as effective.

Currently, the diaphragm is the only reusable barrier method on the market. It has been reported to be used most successfully by women who are well educated and who have a background of an above-average socioeconomic status.<sup>15</sup> This may be due to the fact that a diaphragm must be fitted by a health care provider, that its initial cost is high, or that provider bias may prevent diaphragms from being provided to lower socioeconomic groups. In addition, there is low availability of the diaphragm in developing countries.<sup>15</sup> Due to the limited availability of the diaphragm in developing countries, acceptability data are limited. A study conducted in a rural area in Madras, India, showed that women living in one-room houses with no access to private bathrooms or washing facilities had no problems with insertion, removal, washing, or storage of the diaphragm.<sup>16</sup> In addition, overall acceptance and efficacy of the diaphragm in this study was high. The results of this study add compelling evidence to the argument that, in areas where women do not have access to a choice of contraceptive methods, they are capable and willing to undertake seemingly complicated procedures to use those methods that meet their reproductive health needs. Other studies on use and acceptability of the diaphragm are currently under way in Kenya and Zimbabwe and should add more information to the acceptability of reusable barrier methods in developing countries (N. Padian, oral communication, May 2001). If reuse of the female condom is found to be a safe procedure, then it may make it more cost-effective and thus increase the availability of the device. In South Africa, male condom use in stable relationships is

low.<sup>17-19</sup> An important finding of the current study was that women participating in the cross-sectional study with only one sexual partner conveyed a strong interest in using the female condom. A concern expressed by many of these women was that their partners had other sexual relationships that might put them at risk of being infected with HIV or STIs. This concern again highlights the need for prevention methods that are not totally dependent on the compliance of a male partner.

South Africa is one of the few developing countries with female condoms available through the public health sector free of charge. The female condom is also sold on a limited basis in pharmacies and through social marketing outlets. This is not the case in many other developing countries, with many unable to afford to purchase female condoms. If reuse is found to be safe, some of these countries could potentially reconsider the purchase of female condoms.

In developing countries, such as South Africa, where HIV and STI rates are high and condom use is low,<sup>19-21</sup> reuse of the female condom could lower the cost closer to that of the male condom, making it a more affordable, and thus accessible, method of contraception and protection. Although the sample size in this study was small and the study was conducted using a convenience sample, it is the first indication that female condom reuse is a practice that South African women are willing to undertake if it means that the female condom will become more available to them.

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