

Knowledge, attitudes, practices and behaviors associated with female condoms in developing countries: a scoping review

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Abstract: Women in developing countries are at high risk of HIV, sexually transmitted infections, and unplanned pregnancy. The female condom (FC) is an effective dual protective method regarded as a tool for woman's empowerment, yet supply and uptake are limited. Numerous individual, socioeconomic, and cultural factors influence uptake of new contraceptive methods. We reviewed studies of FC knowledge, attitudes, practices, and behaviors across developing countries, as well as available country-level survey data, in order to identify overarching trends and themes. High acceptability was documented in studies conducted in diverse settings among male and female FC users, with FCs frequently compared favorably to male condoms. Furthermore, FC introduction has been shown to increase the proportion of "protected" sex acts in study populations, by offering couples additional choice. However, available national survey data showed low uptake with no strong association with method awareness, as well as inconsistent patterns of use between countries. We identified a large number of method attributes and contextual factors influencing FC use/nonuse, most of which were perceived both positively and negatively by different groups and between settings. Male partner objection was the most pervasive factor preventing initial and continued use. Importantly, most problems could be overcome with practice and adequate support. These findings demonstrate the importance of accounting for contextual factors impacting demand in FC programming at a local level. Ongoing access to counseling for initial FC users and adopters is likely to play a critical role in successful introduction.

Keywords: condoms, HIV prevention, contraception, female condom, developing countries, behavior

Introduction

Women carry a disproportionate burden of HIV¹ resulting from numerous physiological, socioeconomic, cultural, and political factors, including unbalanced gender norms impacting sexual negotiation.²⁻⁷ Furthermore, over one-third of pregnancies in developing countries is unplanned,⁸ making unmet need for contraception a priority policy area.⁹

The female condom (FC) is the only available woman-initiated method for preventing HIV/sexually transmitted infections (STIs) and unintended pregnancy.¹⁰ It has comparable dual protective efficacy to male condoms (MCs)¹¹ and is frequently cited as a tool for women's empowerment.¹²⁻¹⁴ There are several FC models including FC2, The Woman's Condom, The Phoenurser, Cupid, Panty (Condom Femenino), Velvet, and VA w.o.w (Condom Feminine); all have common components with unique design features.¹⁵ Although the Female Health Company's FC2 (Chicago, IL, USA)

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is the only current model approved by the United States Food and Drug Administration (USFDA), Cupid has been prequalified for distribution by United Nations (UN) agencies¹⁶ and others have commenced or are planning UN and USFDA applications.¹⁵

Over 20 years since its first USFDA approval, FC supply and uptake remains inadequate.¹⁷ Few established national programs exist,^{18–20} with low distribution²¹ often attributed to a lack of policy and donor support^{11,17,22} and relatively high procurement costs compared to MCs,^{11,23} despite long-term cost effectiveness.^{14,24,25} As FC options increase, the method may become more affordable, encouraging greater distribution and use.¹⁵

Increasing availability of new contraceptive methods does not automatically broaden choice. Uptake depends on the perceptions and experiences of potential users and the socioeconomic context,^{23,26} with culture and gender relations often having greater impact on acceptability than actual attributes of the method.^{13,27} Health system capacity and acceptance of new methods by service providers additionally influence uptake and sustained use.^{26,28} Any FC program evaluation must therefore consider acceptability in context, by exploring knowledge, attitudes, practices, and behaviors (KAPB) in a wide range of stakeholders. We conducted a scoping review²⁹ of FC KAPB across developing countries to identify overarching themes linking contextual variables with these outcomes.

Methods

The format of our review was a scoping study. The purpose of a scoping review is to map a wide range of literature and to identify the nature, range, and extent of the evidence.^{29,30} Scoping reviews differ from systematic reviews in their broad approach to a topic, purposive sampling frame, and identification of gaps in the literature. We searched MEDLINE without date restrictions for material available through January 2015, using the terms “female condom” or “female-initiated”, to identify KAPB studies for male and female users and nonusers. We also searched for studies exploring perspectives of other stakeholders such as health care providers, although this information falls beyond the scope of this article. Countries in which research was identified are listed in Table 1. Titles or abstracts (where a decision could not be made on title alone) were screened for studies that discussed FC KAPB in developing nations. We included English-, French-, and Spanish-language articles. We also searched the Websites of major international organizations involved in FC programming and the survey database of the

Reproductive Health Supplies Coalition³¹ using the same inclusion criteria. We reviewed a compiled list of research studies at the Female Health Company Website (<http://www.femalecondom.org/>).³² All reference lists were reviewed; where potentially relevant additional material was unavailable online, we contacted authors or publishers to obtain a copy where possible. All sources were organized by country, and data were extracted onto standardized data abstraction forms that stratified KAPB variables by distinct user subpopulations. Data were then examined across countries to identify emerging themes and trends. The purpose of a scoping review is to map a wide range of literature and to identify the nature and extent of the evidence;²⁹ thus, for each country, research articles for which there were available data on potential or actual users or providers were then selected for inclusion in this review.

Results

We identified 56 countries with national survey data (usually as Demographic and Health Surveys [DHS])^{33–41} and 34 countries with other types of material (peer-reviewed articles, governmental or nongovernmental organizational reports, or other gray literature). The frequency of articles and the depth of information varied considerably across countries. Table 1 shows the type of participants included in the FC studies, by country. Most research focused on women, particularly female sex workers (FSWs). Notably, only three studies^{42–44} included men who have sex with men (MSM) (none addressed FC use by women for anal sex); we therefore include these data alongside those for female users, while perspectives of heterosexual male partners are considered separately. Sample sizes for quantitative reports ranged to 2,700, although most contained a few hundred participants. Qualitative reports tended to be smaller, though most sample sizes exceeded 100. Table 2 “maps” the number and variety of peer-reviewed research compared with coverage by national survey data, organized by country and continent. Most countries listed provided DHS or other country-level survey data, but peer-reviewed data were considerably less frequent. The majority of peer-reviewed research emanated from Africa, where both qualitative and quantitative studies were available for several countries. By contrast, countries in the Americas were less well represented by quantitative studies. Single countries having the greatest number of peer-reviewed articles were South Africa (18 articles), the People’s Republic of China (nine articles), and Zimbabwe (eight articles) (data not shown). Although most studies were conducted with the discontinued FC1, several demonstrated comparable

Table 1 Availability of female condom research by participant type and country

Country	Women/ couples	Men	FSWs	Providers	Other
Bangladesh	■		■		
Botswana				■	
Brazil	■	■	■		○
Burundi	■				
Cambodia			■		
Cameroon			■		
Central African Republic	■	■			
People's Republic of China	■	■	■	■	❖
Dominican Republic		■	■		
El Salvador			■		
Ghana	■		■	■	★
India	■	■	■	■	❖
Indonesia					
Ivory Coast	■		■		
Kenya	■		■	■	★
Madagascar			■		
Malawi	■	■	■		
Mexico	■	■	■		
Mozambique			■		○
Namibia	■	■			○
Nicaragua			■		
Nigeria	■	■	■	■	
Papua New Guinea			■		
Rwanda	■	■			
South Africa	■	■		■	★
Swaziland			■		
Tanzania	■		■		
Thailand	■	■	■		
Tunisia			■		
Turkey	■				○
Uganda	■	■	■	■	
Vietnam	■		■		
Zambia	■	■			○,○
Zimbabwe	■	■	■	■	
Total	22	15	25	9	10

Notes: ■, Indicates that at least one piece of evidence identified for the specified country; ○, High-risk women; ◎, high-risk men; ❖, MSM; ★, government/NGO stakeholders.

Abbreviations: FSWs, female sex workers; n, number; MSM, men who have sex with men; NGO, nongovernmental organization.

acceptability between various brands.^{45–50} Reports on provider attitudes were limited; our search turned up only six peer-reviewed articles. We made reference to these findings where relevant and integrated with data from users.

Knowledge and awareness

National data on FC knowledge, primarily from DHS, were available for 56 countries. These demonstrated widely varying between-country awareness (Table 3). The prevalence of FC awareness within countries was consistently lower than that of MCs; for example in the Democratic Republic of the Congo, 43% and 82% of women had knowledge of FCs and MCs, respectively.⁵¹ The proportion of women across all countries having heard of FC (FC knowledge) was also

generally lower (47%) than for the oral contraceptive (OC) (85%), injectables (80%), and the intrauterine device (IUD) (55%) (data not shown).³³ In general, men demonstrated slightly higher FC awareness (54%) than women (47%), but they exhibited lower levels of knowledge on other methods, as compared with that of women: OC (76%); injectables (67%); or the IUD (38%) (data not shown).³³ FC knowledge also varied within countries (where available);⁵² for example, in India, 13% of urban women reported awareness compared to 6% of rural women.⁴¹ Some studies supported the contention that greater awareness of and counseling on FC would increase interest and possible use;^{53,54} nevertheless, it is clear that FC awareness alone appears to be insufficient to stimulate uptake.⁵⁵ For example 91.4% of women interviewed in the

Table 2 Comparison of national survey data and peer-reviewed research by type, country, and continent

Continent	Country	Quantitative ^a	Qualitative ^a	Mixed ^a	Any peer review	National survey
Africa	Benin					■
	Botswana		■		■	
	Burkina Faso					■
	Burundi					■
	Cameroon	■			■	■
	CAR	■			■	
	Chad					■
	Comoros					■
	Congo					■
	DRC					■
	Eritrea					■
	Ethiopia					■
	Gabon					■
	Ghana					■
	Guinea					■
	Ivory Coast		■		■	■
	Kenya	■	■		■	■
	Lesotho					■
	Liberia					■
	Madagascar	■			■	■
	Malawi	■			■	■
	Mali					■
	Mauritania					■
	Mozambique					■
	Namibia		■		■	■
	Niger					■
	Nigeria	■	■	■	■	■
	Rwanda	■			■	■
	Senegal					■
	Sierra Leone					■
	South Africa	■	■	■	■	■
	STP					■
	Swaziland		■		■	■
	Tanzania	■			■	■
	Tunisia	■			■	
	Uganda	■	■		■	■
	Zambia	■	■		■	■
	Zimbabwe	■	■	■	■	■
Americas	Brazil	■		■	■	
	Dominican Republic		■		■	■
	El Salvador		■		■	■
	Guatemala					■
	Guyana					■
	Haiti					■
	Honduras					■
	Mexico	■	■	■	■	
	Nicaragua		■		■	■
	Paraguay					■
Asia	Peru					■
	Bangladesh	■			■	
	Cambodia			■	■	■
	China	■		■	■	
	India	■			■	■
	Jordan					■
	Kazakhstan					■
	Kyrgyz Republic					■
	Philippines					■

(Continued)

Table 2 (Continued)

Continent	Country	Quantitative ^a	Qualitative ^a	Mixed ^a	Any peer review	National survey
	Tajikistan					■
	Thailand	■		■	■	
	Timor-Leste					■
	Turkmenistan					■
Australia	PNG					■
Europe	Albania					■
	Turkey	■			■	■

Note: ^aIncludes only peer-reviewed research. ■ Indicates that at least one piece of evidence of this type identified for the specified country.

Abbreviations: CAR, Central African Republic; DRC, Democratic Republic of the Congo; STP, Sao Tome and Principe; PNG, Papua New Guinea.

most recent Swaziland DHS had heard of FCs, yet only 46% knew where to source one.⁵⁶

General perceptions and attitudes

High acceptability was documented across numerous and varied settings where studies were undertaken among women, men, and couples who tried the device.^{45,57–59} For example, studies introducing FCs in South Africa and Kenya reported that over 85% of male and female participants expressed an intention to use FCs in the future, and even more would recommend them to friends.^{60,61} A large number of studies among FSWs suggest that FCs are consistently acceptable to this population;^{62,63} for example, in Papua New Guinea, 90% of female participants engaging in transactional sex reported “liking” the FC.⁶⁴ In India, 83% of MSM FC users said they would continue to use the device.⁴²

Numerous studies reported that FCs compared favorably with MCs. For example, 80% of women in a South African short-term crossover trial favored the FC1 and FC2 over MCs;⁵⁰ in a Nigerian study, many more participants accepted and paid for FCs than MCs (8% versus 1%, respectively) following a provider training intervention.⁶⁵ Women and MSM also gauged FC acceptability against the MC, based on previous negative experiences or perceived superior safety, strength, or effectiveness.^{42,43,66} Advantages over the MC were frequently highlighted, such as comfort, lack of male responsibility, enhanced sexual pleasure, and potential use during menstruation.^{67–71} Contraceptive properties were highlighted in El Salvador, Swaziland, and Zimbabwe.^{68–70}

Several studies did not distinguish between factors influencing initial uptake or continued use, but they reported overall responses. The same method attributes of FCs were perceived both positively and negatively by different groups and between settings (Table 4). Similarly, environmental/contextual factors both positively and negatively influenced uptake in different settings (Table 5). Although few studies commented on patterns of acceptability, several contradictory

trends existed between countries based on marital status, education, and occupation,^{55,58,72–76} thus supporting the conclusion of a 2006 systematic review that predictors of acceptability are not generalizable across cultural contexts.⁷⁷

Some studies reported that stigmatized notions of the FC impeded initial use and were widely expressed by men, women, and health care providers,^{52,54,73,78,79} linking the device with infidelity and commercial sex work, even when marketed as a contraceptive for stable couples.^{54,61,66,68,78–81} For example, a quarter of female participants in a Kenyan study felt that using or carrying an FC was synonymous with unfaithfulness.⁶¹ Researchers in Zimbabwe commented that “just like the male condom, the [FC] was seen as a threat to intimacy and commitment, in that requesting them would introduce an element of distrust and suspicion of infidelity and promiscuity”.⁸²

Cost was a frequently cited acceptability barrier. Although both clients and providers often indicated that the FC should be freely available,^{83–86} most conceded that they would be willing to pay a highly subsidized price,^{67,87–90} usually equal to that of MCs.^{66,91,92} FSWs in Malawi noted that free FCs were only available in hospitals.⁸⁴ By contrast, in Cameroon, where intensive FC availability campaigns and a massive decrease in price has recently occurred, a relatively high ever-use rate among female high school students (8%) suggests that price significantly influences acceptability.⁹³

Lack of availability and access were the most frequently cited contributing factors to FC non-use, discontinuation and reuse, across diverse subpopulations, including students, FSWs and women in the general population. For example, 43% of Rwandan undergraduates agreed that they would use FC if available;⁵⁴ and only one-quarter of Chinese family planning clients thought that FC was easy to obtain.⁹⁵ Furthermore, lack of access or availability were frequently cited by healthcare providers as a reason not to counsel clients on FC use. 22% of Zimbabwean health care workers indicated they would offer FCs more frequently if availability was improved (note that the terms availability and access were used variously by different

Table 3 Prevalence of female condom awareness and use^a by country (listed by prevalence of awareness) from national survey data

Country	Survey ^b date	Awareness ^c		Ever use	Current use
		Women	Men		
Namibia	2013	94.2%	92.5%		0.5%
	2006	83.0%	82.3%	6.4%	0.3%
Swaziland	2006	91.3%	84.1%	3.3%	0.1%
	2010				0.4%
	MICS				
Lesotho	2009	86.6%	77.9%		0.2%
Malawi	2010	86.0%	84.9%	1.2%	0.1%
Zimbabwe	2010	83.9%	87.4%		0.3%
Rwanda	2010	82.4%	79.9%		
Gabon	2012	81.7%	78.2%		0.1%
Haiti	2012	81.5%			<0.1%
Ghana	2008	81.3%	86.3%	0.7%	<0.1%
Guyana	2009	78.4%	69.9%	1.5%	<0.1%
South Africa	2008	77.8% ^d	72.1%	7.2% ^d	
	NHPIBCS				
	2003	53.2%	56.4%	2.6%	0.2%
Dominican Republic	2013	74.8%			
	2007	52.2%		0.6%	
Tanzania	2010	72.5%	73.4%		<0.1%
Uganda	2011	70.5%	81.4%		
Cameroon	2011	70.4%	77.0%		0.1%
Sierra Leone	2013	69.5%	64.7%		<0.1%
Liberia	2013	69.3%	56.1%		
Burundi	2010	69.1%	66.4%		<0.1%
Congo	2011	68.3%	85.0%		<0.1%
Zambia	2007	65.8%	65.5%	1.2%	<0.1%
Sao Tome and Principe	2008	58.6%	61.1%	0.5%	
Kenya	2008	57.6%	61.5%	0.6%	<0.1%
Comoros	2012	54.8%	60.8%		<0.1%
Ivory Coast	2012	54.4%	63.0%		<0.1%
Paraguay	2004	54.0%			
Burkina Faso	2010	47.8%	52.5%		<0.1%
Mozambique	2011	45.3%	77.1%		0.1%
Peru	2011	44.7%		0.2%	
Honduras	2011	44.6%	48.8%	0.4%	<0.1%
Democratic Republic of the Congo	2013	43.2%	52.8%		0.1%
Papua New Guinea	2006	40.1%	46.1%	0.6%	
Senegal	2010	37.2%	44.0%		<0.1%
El Salvador	2008	36.8%		0.3%	
Mali	2012	35.7%	38.7%		<0.1%
Benin	2012	34.9%	47.8%		<0.1%
Nicaragua	2001	32.9%		0.3%	
Ethiopia	2011	31.9%	39.1%		<0.1%
Nigeria	2013	28.6%	32.8%		<0.1%
	2008	14.7%	25.9%	0.2%	<0.1%
Guinea	2012	27.5%			<0.1%
Guatemala	2002	25.0%			
Cambodia	2010	23.5%			<0.1%
Eritrea	2002	23.0%		0.1%	<0.1%
Philippines	2013	20.0%			

(Continued)

Table 3 (Continued)

Country	Survey ^b date	Awareness ^c		Ever use	Current use
		Women	Men		
Kyrgyz Republic	2012	19.5%	21.5%		
Jordan	2012	18.7%			
Madagascar	2008	18.5%	21.2%	0.1%	<0.1%
Kazakhstan	1999	17.9%	4.9%	0.1%	
Albania	2008	15.2%	8.9%	0.3%	<0.1%
Niger	2012	15.2%	17.8%		<0.1%
Turkey	2003	13.5% ^e			
		13.4% ^f			
Timor-Leste	2009	10.4%	10.4%	<0.1%	
India	2006	8.3%	16.8%	<0.1%	<0.1%
	NFHS				
Tajikistan	2012	7.2%			
Chad	2004	7.1%	27.3%	<0.1%	<0.1%
Turkmenistan	2000	6.3%		<0.1%	
Mauritania	2000	5.3%	7.5%	<0.1%	

Notes: ^aRefers to all women 15–49 years of age, unless otherwise indicated; ^brefers to Demographic and Health Survey, unless otherwise indicated; ^cawareness of female condoms as a contraceptive method (percentage of all respondents, currently married respondents, and sexually active unmarried respondents ages 15–49 years who know of any contraceptive method, by specific method); ^dsexually active women over 15 years of age; ^eever-married women; ^fcurrently married women.

Abbreviations: MICS, Multiple Indicator Cluster Survey; NHPIBCS, National HIV Prevalence, Incidence, Behavior and Communication Survey; NFHS, National Family Health Survey.

authors with a great degree of overlap in meaning; we have adhered to the original study terms where possible).⁹⁴

Initial use

FC acceptance in a trial setting varied. In a large Brazilian study, 90% of participants initially introduced to the device had used the FC at least once at the 90-day follow-up visit (hereafter, referred to as follow-up);⁵⁸ whereas in a Kenyan study, less than half of the participants recruited through HIV counseling and testing centers were willing to use the FC.⁶¹ The most common reason for never-use was the fear of partner reaction or partner refusal.^{60,61,78,96} Appearance^{59,61,81,92} and lack of perceived need⁶¹ were also cited as initial barriers.

Triggers for initial FC use included novelty,^{43,61,67,71,96} dual protective properties, partners' or clients' unwillingness to use MCs,^{42,67,92} and the feeling that it was woman-initiated.^{43,61,67,97} Promotion and support were frequently-reported facilitators of initial use.^{22,53,71,81,88,98–100} For example, counselor training and peer support groups in Kenya helped women introduce the FC into sexual relationships.^{98,101} In Zimbabwe, having observed an FC demonstration in a hair salon more than doubled a woman's likelihood of having tried the device.²² In Tanzania, a mass media campaign, which triggered communication about the FC between partners, increased women's intention to use the device.⁹⁹

Table 4 Method attributes (actual and perceived) of FCs influencing acceptability, uptake and/or continued use

Attribute	Positive perceptions/facilitators of use (countries where relevant evidence was identified)	Negative perceptions/barriers to use (countries where relevant evidence was identified)
Appearance	<ul style="list-style-type: none"> General appearance (People's Republic of China) Large size (South Africa, Uganda, El Salvador, Nicaragua) Smell (preferred to MC) (Burundi, El Salvador, Nicaragua) Natural feel (El Salvador, Nicaragua, Nigeria) 	<ul style="list-style-type: none"> Generally unattractive size and shape (Brazil, Ghana, India, Kenya, South Africa, Uganda, Zimbabwe, El Salvador, Cambodia, People's Republic of China, Dominican Republic, Thailand, Vietnam, Nigeria, Nicaragua) Too thick (Ghana) Too big/loose/long (India, Kenya, South Africa, Uganda, Bangladesh, Thailand, Nigeria) Rings are confusing (South Africa) Smell (South Africa)
Different than other methods	<ul style="list-style-type: none"> Novelty factor (India, Kenya, People's Republic of China, CAR, Nigeria) 	<ul style="list-style-type: none"> More complicated than other contraceptives (Vietnam, Zimbabwe, South Africa)
Lubrication	<ul style="list-style-type: none"> Well lubricated (better than MC) (Brazil, Ghana, India, Uganda, Burundi, El Salvador, Swaziland, Nicaragua) 	<ul style="list-style-type: none"> Overlubricated (Namibia, South Africa, Tanzania, Zimbabwe, People's Republic of China, Dominican Republic, Thailand) Fear of adverse effects of lubricant (Burundi)
Insertion/use	<ul style="list-style-type: none"> Easy/comfortable to insert and use during sex/"natural feel" (compared to MC) (India, Kenya, Namibia, South Africa, Zimbabwe, Burundi, El Salvador, Mexico, Cameroon, Cambodia, Dominican Republic, Thailand, Vietnam, Nigeria) Allows sex in any position without technical difficulties (Brazil) Permitting use when penis is not erect (El Salvador, Nicaragua) 	<ul style="list-style-type: none"> Difficult to insert/remove (Brazil, Namibia, Nigeria, PNG, Zimbabwe, Burundi, El Salvador, Bangladesh, People's Republic of China, Swaziland, Thailand, Nicaragua, CAR, Tunisia) Takes too long to insert (Vietnam) Need privacy to insert (India, Swaziland) Noise (FCI only) (Brazil, Ghana, Namibia, PNG, South Africa, Burundi, Cambodia, Dominican Republic, CAR, Malawi) Messy (Kenya) Technical difficulties during sex/method failure (Brazil, Ghana, Nigeria, Zimbabwe, Burundi, Cambodia) Fear of potential technical difficulties (Burundi, People's Republic of China, Nigeria, South Africa) Female or male partner discomfort (Brazil, India, Nigeria, Zimbabwe, Burundi, El Salvador, Bangladesh, People's Republic of China, Dominican Republic, Swaziland, Thailand, South Africa) Concerns about potential discomfort (South Africa, Tanzania, Burundi, El Salvador, Nicaragua) Problems/discomfort related to inner/outer ring (Ghana, India, South Africa, Zimbabwe, Burundi, Cameroon, Vietnam, El Salvador, Nicaragua, CAR) Itching sensations (CAR) Bleeding/burning/allergy (El Salvador, Nicaragua)
Timing of use	<ul style="list-style-type: none"> Ability to insert before sex (prior to drinking alcohol, prior to man getting an erection) (Brazil, Ghana, South Africa, Zimbabwe, El Salvador, Cambodia, Swaziland, Nicaragua) 	<ul style="list-style-type: none"> Perception that FC must be inserted several hours before sex (South Africa) Insertion interrupts the sex act (Zimbabwe)

(Continued)

Table 4 (Continued)

Attribute	Positive perceptions/facilitators of use (countries where relevant evidence was identified)	Negative perceptions/barriers to use (countries where relevant evidence was identified)
Practice improves confidence	<ul style="list-style-type: none"> Comfort and ease of use improves with practice (Brazil, Ghana, Namibia, South Africa, Zimbabwe, Cameroon, Cambodia, El Salvador, Swaziland, Thailand, Vietnam) 	<ul style="list-style-type: none"> Requires practice to use with confidence (Cambodia) Discomfort persisted with repeated use (South Africa)
Safety and effectiveness	<ul style="list-style-type: none"> Perceived strength (compared to MC) (Brazil, India, South Africa, Zimbabwe, El Salvador, Cambodia, People's Republic of China, Dominican Republic, Swaziland, Nicaragua) Perceived flexibility (compared to MC) (South Africa) Perceived safety (compared to MC) (Brazil, Zimbabwe, Thailand, CAR, South Africa) FC cannot get lost inside the body (Cambodia) Perceived effectiveness in pregnancy/STI prevention (compared to MC) (India, South Africa, Uganda, Burundi, El Salvador, People's Republic of China, Dominican Republic, Vietnam, Nicaragua) Perceived effectiveness in pregnancy/STI prevention (Rwanda, South Africa, Nigeria) Reduced slippage (El Salvador, Nicaragua) Better protection from STIs (covers the outer part of the vagina and labia) (El Salvador, Nicaragua) 	<ul style="list-style-type: none"> Doubts about effectiveness (compared to MC) (Kenya, Zimbabwe) Fear of losing FC in reproductive tract/abdomen (Ghana, Zimbabwe, People's Republic of China, South Africa) Lack of trust in effectiveness against HIV/STI risk among males (Nigeria) Method failure resulting in pregnancy (Nigeria)
Dual protective properties	<ul style="list-style-type: none"> Provides dual protection (Kenya, South Africa, Uganda, Zimbabwe, Burundi, People's Republic of China, Dominican Republic, Swaziland, Nigeria) 	
Pleasure	<ul style="list-style-type: none"> Enhanced sexual pleasure for woman or man (including by clitoral stimulation from the external ring), preferred over MC for sexual pleasure (Brazil, Ghana, India, Kenya, Zimbabwe, Burundi, Swaziland, CAR) Does not affect sexual pleasure (Kenya, South Africa, Vietnam, CAR) Couples can stay together for longer after ejaculation (Kenya, South Africa) 	<ul style="list-style-type: none"> Reduced sexual sensation/pleasure for woman or man (Ghana, India, Kenya, Nigeria, South Africa, Burundi, People's Republic of China, Dominican Republic) Perception that it would interfere with sexual pleasure (Uganda) Outer ring makes genitalia inaccessible (Uganda, Zimbabwe)
Woman initiated	<ul style="list-style-type: none"> Increases woman's control and sexual agency (Brazil, Ghana, India, Kenya) (Namibia, South Africa, Uganda, Zimbabwe, Burundi, Mexico, Bangladesh, People's Republic of China, Dominican Republic, Swaziland, Thailand, Vietnam, Nigeria) 	
Covert use	<ul style="list-style-type: none"> Ability to use covertly (Brazil, Uganda, Cambodia, Dominican Republic, Swaziland, El Salvador, Nicaragua) 	<ul style="list-style-type: none"> Inability to use covertly (Uganda, Zimbabwe)
Other	<ul style="list-style-type: none"> Ability to use during menstruation (Brazil, El Salvador, Nicaragua) Offers an alternative to MC (for those who cannot/prefer not to use MCs or when MC is not available at the time of sex) (Brazil, Ghana, Nigeria, Swaziland, El Salvador, Nicaragua, Nigeria, South Africa) Offers alternative protection when nothing else is available (Zimbabwe) Offer alternative to hormonal contraception (Swaziland, El Salvador) Reuse possible (Burundi, India) 	<ul style="list-style-type: none"> Inconvenient/long-term use not feasible (Burundi, People's Republic of China, Thailand) Not suitable for some traditional sexual practices (Burundi)

Abbreviations: MC, male condom; CAR, Central African Republic; PNG, Papua New Guinea; FC, female condom; STI, sexually transmitted infection.

Table 5 Contextual/environmental factors influencing FC acceptability, uptake, and/or continued use (excluding availability)

Factor	Facilitators (countries where relevant evidence was identified)	Barriers (countries where relevant evidence was identified)
Experience with condoms	<ul style="list-style-type: none"> • Familiarity with MC use (Zambia, Bangladesh) 	<ul style="list-style-type: none"> • Lack of knowledge/experience with condoms (Kenya) • Unfamiliarity with FC/lack of exposure (South Africa, El Salvador, Swaziland) • Preference for MC (Nigeria, Zambia, Thailand, South Africa) • Dislike of condoms in general (Nigeria, Uganda)
Perceived personal risk Relationship or gender dynamics	<ul style="list-style-type: none"> • Perceived risk of STI/HIV infection (Bangladesh, People's Republic of China, Nigeria, Zimbabwe, CAR, Tunisia, South Africa) • Ability to discuss FC with a partner (Tanzania, Zambia) • More comfortable using FC with (regular) paying client than nonpaying partner (Brazil, Ghana, El Salvador, Nicaragua) • Perception that clients would prefer FC (Thailand) • Bargaining tool for protected sex (Bangladesh, Cambodia, Swaziland, Thailand) • Share responsibility for condom use (South Africa) • Partner acceptance of first use predicted easier negotiation for further uses (Cote d'Ivoire) • Men would use if their partners initiate (South Africa) • Potential for use during menstruation or breastfeeding protects marriages (Nigeria) • Can be used if client/partner does not like/refuses/cannot use MC (Brazil, India, South Africa, Bangladesh, Dominican Republic, Thailand, El Salvador, Nicaragua, Nigeria) • Better protection for women at risk of coerced sex (Ghana) • Better protection for women whose husband is unfaithful (Vietnam) 	<ul style="list-style-type: none"> • Lack of perceived need (for barrier contraceptive) (Kenya, Nigeria, Burundi, Bangladesh) • Limited ability to discuss FC with partner (Ghana) • Desire for unprotected sex with a loving partner (Nigeria, Uganda) • Male partner resistance/refusal (Ghana, Namibia, Nigeria, PNG, South Africa, Zimbabwe, Burundi, El Salvador, Bangladesh, Cambodia, Swaziland, Thailand, CAR) • Fear of partner reaction/requirement for negotiation/partner cooperation (Kenya, Uganda, Burundi, El Salvador) • Male preference for being in control (Zambia, Uganda) • Men's fear that women reuse FC (Uganda) • Difficulty identifying strategies to negotiate FC use with nonpaying partners (El Salvador, Swaziland, Nicaragua) • Clients accept MC (Thailand)
Cultural and religious norms		<ul style="list-style-type: none"> • Women unaccustomed, uncomfortable or embarrassed to touch genitals/insert FC in front of a partner (Brazil, South Africa, Cambodia, Dominican Republic) • Embarrassment/anxiety over FC appearance and use (Vietnam) • Stigma/association with untrustworthiness/disease (Ghana, Kenya, Nigeria, South Africa, Zimbabwe, Burundi, El Salvador, Rwanda, Swaziland, Vietnam) • Condom use conflicts with moral or religious beliefs (Nigeria, Burundi, Bangladesh)
Promotion, education, and support	<ul style="list-style-type: none"> • Provider or peer promotion/education/support/counseling (Brazil, Kenya, Tanzania, People's Republic of China, South Africa) • FC promoted as contraceptive rather than HIV prevention device (Zimbabwe) 	<ul style="list-style-type: none"> • Lack of awareness of female anatomy causing fear of losing FC in reproductive tract/abdomen (Ghana, Zimbabwe, People's Republic of China, South Africa) • Lack of information about the device (El Salvador, Nicaragua, Turkey, Tunisia) • Not fully aware on how to use (Malawi, South Africa)

(Continued)

Table 5 (Continued)

Factor	Facilitators (countries where relevant evidence was identified)	Barriers (countries where relevant evidence was identified)
Infrastructure	<ul style="list-style-type: none"> No need to attend clinic to access FCs (Swaziland) 	<ul style="list-style-type: none"> Difficulty disposing of FC (India) Free FCs only at hospital (Malawi) Difficulty of concealing the large package (El Salvador, Nicaragua)
Poverty/financial resources	<ul style="list-style-type: none"> For FSWs, allows higher earnings when used covertly with clients requesting no condom use (El Salvador, Nicaragua) For FSWs, allows higher earnings due to possibility of use during menstruation (El Salvador, Nicaragua) 	<ul style="list-style-type: none"> Cost (if not free or heavily subsidized) (Brazil, Ghana, India, Namibia, South Africa, Tanzania, Zimbabwe, El Salvador, Mexico, Bangladesh, Nigeria, Nicaragua, Malawi) Loss of potential earnings from clients requesting sex without a condom (El Salvador, Nicaragua)

Abbreviations: MC, male condom; FC, female condom; STI, sexually transmitted infection; PNG, Papua New Guinea; CAR, Central African Republic; FSW, female sex worker.

Continued use

A large number of studies reported that continued use was strongly influenced by experiences during the adoption phase. These included reservations regarding appearance, insertion or removal difficulties, discomfort caused by the inner or outer ring, noise, technical difficulties during sex, and partner resistance.^{60,66,71,92,96,102–106} However, study data indicated that most users overcome initial difficulties with practice, resulting in high acceptability^{62,70,81,102,107,108} and few clinical failures.^{63,90,95,107,109} For example, FSWs in El Salvador reported using FCs independently in up to ten sexual acts before they formed an opinion of the device and felt skilled enough to use it with a partner. Consequently, these women recommended that providers offer in-depth training to potential users who are new to the FCs.⁹²

Continued use was commonly associated with adequate support during the adoption phase, through counseling or peer education, in studies following women and couples for 2–20 months.^{62,88,102,107,110} For example, in the People's Republic of China, education and demonstration sessions significantly increased FSWs' knowledge and acceptance of FCs, and confidence that clients would accept its use.^{62,75} Brazilian women reported benefiting from FC demonstration, negotiation tips, hearing testimonials from others, and discussing initial difficulties:

The meetings were good because she explained many things, I could rehearse again how to insert it correctly in a model resembling the vagina, I also talked about how to introduce it to the partner.¹⁰²

In the same Brazilian study, other important factors influencing continued use were perceived safety (compared

with MCs), pleasure (stimulation from external ring), and increased sense of power for safer sex negotiation.¹⁰²

Conversely, some studies found that women were more likely to report inconsistent use or discontinuation when their initial difficulties were not overcome. Inconsistent use was most commonly attributed to partner objection – as cited by 30% of Kenyan women at 12-month follow-up¹¹¹ and by FSWs in Zimbabwe, who reported that their clients distrusted unfamiliar methods.⁶³ Other common reasons for discontinuation were lack of perceived need for a barrier method, often due to belief in a mutually faithful partnership,¹¹¹ or desire for unprotected sex with a loved one.⁴⁸

Several studies found that discontinuation was frequently attributed to partner resistance, objection, or dislike of the device.^{60,66,112,113} Method attributes influencing discontinuation included unattractive appearance, noise, reduced sensation, size, overlubrication, difficulty inserting, and discomfort from the internal ring.^{58,60,66,84,105,113,114}

Patterns of use

National survey data (Table 3) supported a handful of cross-sectional studies^{52,54,66,115} that demonstrated low ever or current use in the general population. FC use among FSWs was more common,^{64,67,85,116,117} with ever-use prevalence ranging from 5% in Malawi¹⁰⁴ to 33% in Swaziland.¹¹⁷

Notably, trends in uptake based on demographic variables were inconsistent between countries, and no strong association was apparent between awareness and ever use for 22 countries where both national datasets were available (Figure 1), although no formal statistical tests of associations were undertaken. An analysis of South African national survey data identified significant associations only with older

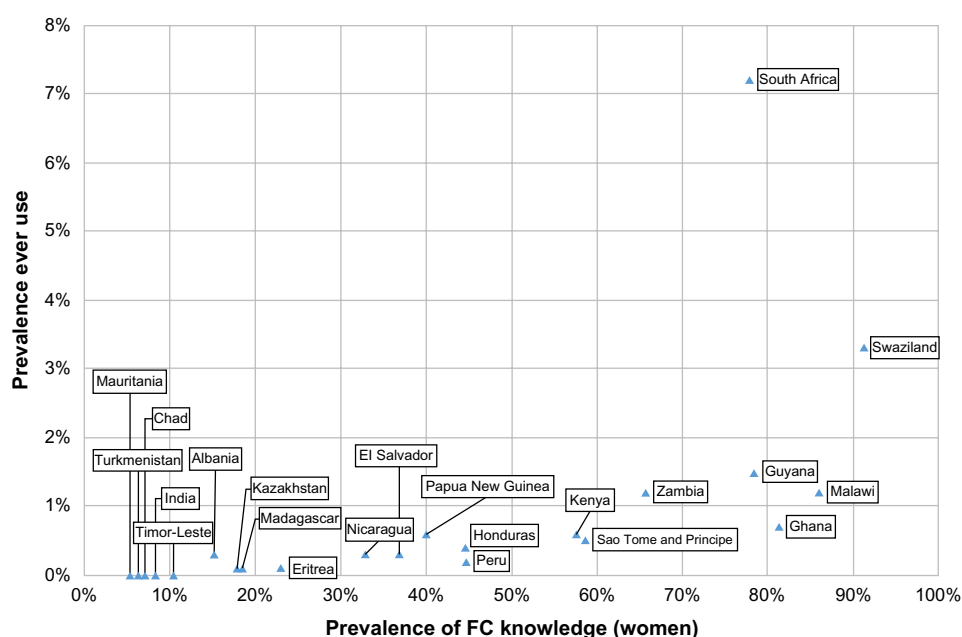


Figure 1 Scatterplot showing the prevalence of FC knowledge in women and ever use for countries where national survey data were available.
Abbreviation: FC, female condom.

age and living in a particular province. Interestingly, many variables were associated with high knowledge prevalence but low use, or vice versa.⁵⁵

Dual protection was a commonly cited advantage in a number of settings. For example, general population women in South Africa and Ghana usually cited STI/HIV prevention;^{66,88} Ugandan HIV-positive women cited prevention of partner transmission;¹¹⁸ and Swazi FSWs cited prevention of STIs, unintended pregnancy, and HIV reinfection.⁷⁰ However, the most common partner type with whom FC use was reported varied between settings. For example, in Kenya, South Africa, and Zimbabwe, use was more common with a spouse/regular partner than a casual/commercial partner,^{61,69,88} whereas in Uganda, use was more common in high-risk sexual relationships.⁴⁸ FSWs in Brazil and El Salvador reported using FCs more often with regular clients than with new/occasional clients or boyfriends.^{67,68} Conversely, despite both sexes generally perceiving dual protection as an advantage, women in Swaziland, Zimbabwe, Cote d'Ivoire, and India reported discomfort discussing disease prevention with long-term partners.^{69,70,119,120}

Consistency of use and impact on protected sex

The prevalence of consistent FC use varied between studies, but it was often low. For instance, in Kenya, 11% of women enrolled in an FC acceptability trial reported consistent use at 6-month follow-up.¹¹¹ Conversely, consistent use in a

general population sample ranged as high as 25%, as shown in a recent cross-sectional study in a Zimbabwean hospital.¹²¹ Most evidence, however, suggested that couples interchange MC and FC use to maintain or increase the proportion of protected sex acts.^{69,70,88,122} In Zimbabwe, factors influencing method choice included availability, partner preference, and the woman's menstrual cycle. Women were more likely to use FCs consistently if they did not experience technical difficulties or partner opposition, did not rely on other contraceptive methods, and used FCs for contraception.⁶⁹ Another Zimbabwean study showed that factors influencing consistent use depended on partner type: consistent use between spouses was negatively associated with multiple partner behaviors, but for regular nonmarital partners, it was positively associated with perceived ease of use and effectiveness for STI prevention.¹²³

A 2006 systematic review⁷⁷ and three further studies in Mexico, Kenya, and Madagascar^{85,122,124} concluded that FC provision can increase consistent condom use in a population, supporting other evidence that expanded choice improves contraceptive uptake and health outcomes.^{18,19} The addition of free FC provision into an existing peer education program among FSWs in Kenya increased consistent MC or FC use from 60% to 67%.¹²⁴

Covert use

Despite being a commonly perceived advantage, studies that investigated actual covert FC use suggest that this practice is not widespread. Evidence from Brazil, South Africa,

India, and Uganda suggested that only a minority of women practice covert use,^{43,60,67,125} although this may be higher for FSWs.^{126,127} In South Africa, reduced partner awareness, often when partners were drunk or high, was more important to women than absolute covert use.⁸⁰ Covert use may facilitate higher sex work earnings from clients willing to pay more for sex without a condom,⁶⁸ whilst increasing a woman's chance of protection:

[I]f you have the female condom, you can go to the bathroom and put it in and the client thinks they are not using a condom. But because you are wearing it, there is no risk that he can give you an infection (FSW, El Salvador).⁶⁸

Reuse

Research in Zimbabwe, Uganda, Zambia, Mexico, Bangladesh, and Swaziland suggested that a minority of women reuse FCs.^{48,70,85,86,89,128} In India, 11% of MSM users reported reuse of a single FC with multiple clients.⁴² In South Africa, among 150 family planning clients and women at high risk for STIs, 83% reported willingness to reuse the FC, and those who trialed reuse up to seven times reported that the recommended steps involved were easy to perform and acceptable.⁹¹ In Swaziland, FSWs reported reuse without removal or washing, citing reasons of limited availability and lack of privacy needed for disposal and reinsertion.⁷⁰

Heterosexual male partners

Studies involving heterosexual men were identified in 15 countries (Table 1); participants included single men, FSW clients, regular or cohabiting partners, and husbands. Men in several countries in Africa, Asia, and South America welcomed the device.^{45,59,87,102,115,129} For example, over 80% of men participating in an acceptability trial in India reported willingness to buy both the FC2 and Reddy FC in the future.⁴⁵ Men frequently perceived superior effectiveness of the FC over the MC for HIV/STIs/pregnancy prevention and valued its dual protective properties.^{45,89,115,118,130} High levels of comfort and sensation were also reported, especially with practice, resulting from loose fit and lubrication.^{48,89,131} Men in Nigeria and Uganda liked the potential to insert before sex, and not having to remove the FC immediately after sex.^{48,89} Men in Brazil, South Africa, and China recognized the advantages of a female-initiated method,^{59,87,102,115} namely because it reduced male responsibility and increased female sexual agency: "Women can decide independently whether they would choose contraception or not. This is its greatest strength" (College educated young man, Shanghai).⁸⁷

Conversely, several studies identified major concerns from men.^{48,59,79,82,130,132,133} Ugandan men complained that the FC was more difficult to use than the MC,⁴⁸ while South African male students cited appearance, unfamiliarity, and concerns about pleasure as barriers to initial use, but felt that these might improve with experience.¹¹⁵ In another South African study, male students with prior use of the FC reported discomfort with their partners' suggestion of FC use, as well as female partners' insertion prior to negotiation.⁵⁹ Other studies found that men felt threatened by a woman taking control of her own sexuality and were concerned that the FC might encourage promiscuity if women no longer feel at risk.^{82,130,132,133} Ugandan and Indian men feared that women would reuse FC without adequate cleaning.^{45,118}

Negative attitudes were sometimes fuelled by misconceptions: men in Cameroon, Nigeria, and Zimbabwe reported a refusal to use FCs with FSWs for fear of multiple use or "sperm harvesting" for black magic.¹³³ Some men in South Africa believed that they might not be protected by a device that is not worn by a man.¹¹⁵

Some studies found that women often reported positive responses from male partners, despite initial objection.^{63,88,102,134} For example, while some women in Zimbabwe reported partner refusal for fear of women becoming "casual about sex", most said they were encouraged to get more FCs.¹⁰⁸ In South Africa, over 80% of women reported partner approval, based on natural feel, sexual pleasure, size, and strength. Conversely, attributes perceived as "disliked" were overlubrication and large size.⁵⁰ Notably, these responses were mainly reported by women who had successfully negotiated FC use.

Women's empowerment and negotiating use

The relationship between FC and women's empowerment was frequently commented on, yet inconsistently interpreted by study authors. A few studies noted that by catalyzing processes that challenge established gender norms, FCs had the potential to transform gender relations. For example, university students in Nigeria reported that a key reason for FC use was the sense of empowerment that the method afforded.⁹⁷ FC provision in Cambodia reinforced FSWs' intentions to share experiences and support each other to adopt new methods.¹²⁷ In Mozambique, nearly 5,000 women have met in FC "empowerment groups" to discuss negotiation tactics with partners and the correct use of FCs, including basic education about women's bodies.¹³⁵ Conversely, most authors

characterized the FC as a protective tool for use within the existing constraints of gendered power imbalances, usually whereby women were empowered to protect themselves with the FC when their partner refused MC use.^{43,50,67,68,105,112,126,128} Commentaries were similarly mixed on the question of whether the FC truly “empowers”, or whether it can only be used by already “empowered” women.^{12–14,125} In Tunisia, the authors of a study on FSWs commented that FC acceptance would be slow due to women’s highly proscribed gender roles and the fact that “customs imposed a real obstacle to social innovations”.¹⁰³ A number of other studies found that FCs were of limited value to women, who were only able to use them with full partner awareness and agreement.^{82,125,136} Indeed, in one Zimbabwean study, two-thirds of women said that FC use depended on partner permission.⁸² Nonetheless, studies conducted in over half the countries found that the FC’s female-initiated nature was perceived as a major advantage. In Zimbabwe, 35.6% of female inconsistent condom users said they could use FCs more consistently than MCs, simply because they did not have to rely on the man to wear it.^{79,137} In Vietnam, women said that the FC offered more control over unwanted pregnancy, even if desired by their husbands, and it provided sexual security if they doubted their husbands’ fidelity.⁸¹ Women in several settings preferred the FC to the MC because they could guarantee that it had not been deliberately damaged by men.^{70,126} FSWs often valued the potential for FC use with drunk clients,^{43,68,127,138} and some women saw benefit in inserting the FC before drinking themselves: “When I am going to date, and know I am going to drink, then I put the female condom before, because I think it is more safe, because I know that if I drink I can forget to put it on” (28-year-old drug user, Brazil).¹⁰²

The FC is also used as a bargaining tool to negotiate either MC or FC use.^{127,128,138} For example, following an FC intervention in Thailand, 60% of FSWs reported that more clients agreed to use an MC after learning that the only alternative was the FC.¹³⁸ Other gender dynamics reported include men’s involvement in FC use; for example, one South African study found that 45% of women reported partner assistance with FC insertion, stabilizing the device, or removal. In this study, male involvement was most commonly reported by students and least commonly by FSWs.¹³⁹

Discussion and conclusion

FCs can be highly acceptable to women and men with diverse risk profiles across a variety of settings, and as a female-initiated method, the device can be used as an additional tool to protect women within the context of

gendered power imbalances. Furthermore, FCs are often used interchangeably with MCs, and thus their provision can positively impact the proportion of protected sex acts in a population, through uptake by women or couples for whom other methods of contraception or HIV prevention are inaccessible. The fact that most FC users employ the method interchangeably with the MC means that consistent FC use is less important than its role in increasing consistent condom use overall. Despite clear advantages at both an individual and population level, the national prevalence of FC use remains extremely low, even in the context of high awareness; these data suggest that models of successful programming are still not being implemented on a sufficiently wide scale. Current FC use was less than 1% (average: 0.04%) for all countries, compared with current use of the IUD, pill, and injectables, which averaged between 2%–6%, ranging up to 30% for the IUD (data not shown).^{33,35,36,41} Ever use of FC was also less than 1% for most countries – notable exceptions were South Africa (7.2%), Swaziland (3.3%), Guyana (1.5%), Malawi (1.2%), and Zambia (1.2%) – compared with ever use of the IUD, pill, and injectables, which averaged between 9%–21%, ranging up to nearly 50% for the IUD (data not shown) (Figure 1).^{33,36,41}

Several important conclusions can be drawn from our data. Since the same method attributes are perceived positively and negatively within and between localities, contextual and environmental factors arguably play a greater role in determining overall FC acceptability and uptake. This is evidenced by the pervasive influence of stigma and male partner responses in determining initial and continued use of FCs. Indeed, even its female-initiated nature may limit acceptability if men fear loss of control. The fact that most of the physical and contextual factors negatively influencing use can be overcome with practice and adequate support suggests that demand creation is at least as important a component of programming as adequate supply.

Currently, since most research has focused on FC acceptability in trial settings, little is known about the profile of FC users and nonusers within the general population, and systems and market research to identify effective promotion and distribution mechanisms at a local level (ie, lower than national) is lacking. The scarcity of studies addressing FC use for anal sex by heterosexual couples and MSM in developing countries is an additional research gap, which perhaps reflects sociocultural taboo, as well as a general lack of attention to male perspectives on FC use. Policymakers, international donors, civil society groups, and programmers therefore

have a responsibility not only to increase FC availability and advocate the sexual rights of women, but also to identify and implement local evidence-based strategies for effective FC programming.

There was near-universal endorsement, across the studies and population groups reviewed here, that increasing availability and access will contribute to increased FC use and limit reuse, although reuse levels were found to be low (current World Health Organization guidelines advise that a new FC should be used with every sexual act; Family Planning Global Handbook, 2011).¹⁴¹ Integrating FCs into a wide variety of services, programs, and nontraditional settings will inevitably improve access, but it may also increase exposure and normalize the device, thus contributing to the narrowing of the observed gap between awareness and use. Adequate programmatic support must also be available to ensure implementation of strategies with proven efficacy, such as FC demonstration, negotiation skills counseling, and user support. Greater efforts are also required to target men in FC programming and advocacy, by using male-specific branding and addressing potential anxieties related to female-initiated methods. One example is the recent branding as “inner condoms” by the South Africa-based Population Services International affiliate¹⁴⁰ (see Figure 2). Promotional messaging should draw on local evidence to increase FC acceptability in the general population, by promoting commonly cited advantages such as sexual pleasure, while combating stigma and taboo.

Limitations

This review used peer-reviewed literature, country surveys, and other sources available via the Internet, and is thus subject to these limitations. Papers and reports outside our language scope would not be represented here. The fact that most research to date has been conducted with the discontinued FC1 suggests that some results may lack relevance to current programming. Our study was not intended to be a systematic review, and therefore did not include a complete count of articles retrieved and rejected. Scoping studies represent a broad approach to a topic, where the aim is to map a wide range of literature and identify the nature, range, and extent of the evidence. Some qualitative reports reviewed here were based on small sample sizes, although most were based on greater than 100 participants. Finally, the fact that our paper selected developing countries as a focus should not be construed to mean that the FC is not appropriate or acceptable for women in developed countries, as considerable literature has already shown.



Figure 2 Lovers+ inner condoms.

Disclosure

The authors report no conflicts of interest in this work.

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