Microbicide acceptability research: current approaches and future directions

Joanne E. Mantella, Landon Myer, Alex Carballo-Diéguez, Zena Stein, Gita Ramjee, Neetha S. Morar, Polly F. Harrison

Abstract

With growing recognition of the potential value of microbicides for HIV/STI prevention, the importance of the acceptability of this brand-new technology has been widely acknowledged. We review the current body of microbicide acceptability research, characterize the limitations in assessment approaches, and suggest strategies for improvement. Electronic databases and abstracts of recent meetings were searched for acceptability data regarding vaginal and rectal products that may be used for HIV prevention. Of the 61 studies reviewed, more than half assessed acceptability based primarily on the description of a hypothetical microbicide, or with the demonstration of a spermicide or lubricant. Physical characteristics of microbical products, their effects after insertion, and their effects on sensation during intercourse (for both partners) were the dimensions most frequently assessed (measured in 77%, 49% and 49% of studies, respectively). Attention to the social context of use was inadequate. As acceptability is likely to be a key determinant in the use-effectiveness of microbicides, in-depth understanding of the social processes that shape microbicide acceptability across diverse populations will become increasingly valuable. This includes exploring the effects that sexual partners, health care providers, and key opinion leaders have on the acceptability of microbicides among women and men, including youth and people living with HIV. Future research will benefit from studies of the acceptability of other contraceptive-barrier methods (especially the female condom), use of an agreed-upon operationalization of acceptability, use of acceptability assessments within clinical trials, expansion of measurement domains, and assessment of changes in perceptions of acceptability and use over time. Failure to understand the

---

This research was supported by NICHD Grant R01 HD37343 (Theresa M. Exner, Ph.D., Principal Investigator) and NICHD Grant R01 HD040154 (Gita Ramjee, Ph.D., Principal Investigator). The HIV Center for Clinical and Behavioral Studies is supported by a center Grant from NIMH (P30-MH-43520, Anke A. Ehrhardt, Ph.D., Principal Investigator).

*Corresponding author. HIV Center for Clinical & Behavioral Studies at the New York State Psychiatric Institute and Columbia University; 1051 Riverside Drive, Unit 15, New York, NY 10032, USA Tel: +1-212-923-7281; cell: +1-917-640-5472; fax: +1-212-543-6003.

E-mail address: jmantell@cnvlz.com (J.E. Mantell).

0277-9536/$ - see front matter © 2004 Elsevier Ltd. All rights reserved.
doi:10.1016/j.socscimed.2004.05.011
key factors associated with microbicide acceptability is likely to hinder the adoption and continued use of products that are effective in preventing HIV infection.

© 2004 Elsevier Ltd. All rights reserved.

Keywords: Microbicides; HIV/AIDS prevention; Sexually transmitted infections; Vaginal products; Spermicides; Female condom

Introduction

More than 20 years into the HIV epidemic, options to prevent sexual transmission of HIV are still limited. Male and female condom use, particularly within primary partnerships, remains extremely low in most parts of the world (Chaya, Amen, & Fox, 2002). In many settings, women lack the power to negotiate condom use within sexual relationships due to gender inequities, thus increasing their vulnerability to sexually transmitted infections (STIs) (Logan, Cole, & Leukefeld, 2002). Microbicides, substances that can be applied inside the vagina or rectum before sexual intercourse to prevent the transmission of HIV and possibly other infections, were proposed in 1990 and widely researched as one alternative to condoms (Stein, 1990; Elias & Heise, 1994). They have the potential to allow women to implement, or at least to initiate, prophylaxis against disease transmission. With women now comprising half of all global AIDS cases (UNAIDS, 2003), effective, safe, and acceptable microbicides are urgently needed.

Sixty candidate microbicides are in various stages of laboratory or clinical development, with six either in or about to enter Phase III efficacy trial testing (Alliance for Microbicide Development, 2004). The majority of early studies focused on product safety and efficacy (van de Wijgert & Coggins, 2002), with comparatively little research conducted on potential users’ needs and preferences (Elias & Coggins, 2001). However, recently evaluations of product acceptability have been incorporated into microbicide research. We define acceptability to include both perceived acceptability, i.e., satisfaction with the product and willingness to use it in the future or recommend it to others, and actual correct and consistent product use during sexual intercourse, based on experience with a surrogate product. Here, we argue for the importance of acceptability research, describe how introduction of the female condom serves as a prototype for understanding the acceptability of microbicides, and then highlight the critical gaps in microbicide acceptability studies that require attention.

Value of microbicide acceptability research

A critical and largely unanswered question concerns what can we learn from acceptability research, given that an effective microbicide is not yet available. We see two possible options: first, to abandon acceptability research until a proven product is found, or alternatively, to determine how acceptability research conducted alongside the process of microbicide development and testing may be useful in predicting its uptake and consistent use.

Despite the present lack of a microbicide for HIV prevention, we believe that microbicide acceptability research may still contribute to the potential of microbicides to have a significant public health impact at three levels: (1) product design and development; (2) practice or rehearsal with surrogate products; and (3) product promotion and educational campaigns.

Product design and development

Acceptability research can provide useful information about potential users’ preferences regarding product characteristics and design, such as formulation, application, and the relative importance of disease versus pregnancy protection, while a product is being developed. Failure to conduct well-designed acceptability research during the early stages of product design and clinical testing may lead to low product adherence in efficacy trials and, in turn, low use-effectiveness. The evaluation of acceptability will be most useful in Phase I and II trials. Any significant modifications to product formulation in a Phase III trial typically would require a re-review by regulatory agencies, costing additional time and money.

Product use rehearsal

In HIV research, prototypic models have been established to prepare individuals to meet study protocol restrictions or the demands of antiretroviral (ART) medication regimens. Some ART adherence support programs have incorporated a “readiness” component, including mock trials, stage-based behavioral counseling, and participant–provider relationship building; these may be correlated with short-term HIV suppression (Mundy et al., 2001). In the case of microbicides, asking individuals to use a surrogate product in clinical trials might better prepare them for use under real-world conditions (e.g., by anticipating partners’ reactions). However, trials of surrogate products cannot mirror the situation of potential stigma and attendant contra-
ceptive or non-contraceptive issues that we anticipate will be associated with use of an effective microbicide.

**Product promotion and educational campaigns**

Product acceptability will be an important determinant of market demand and positioning of microbicides relative to other prevention technologies once an efficacious, safe microbicide is available. Current acceptability findings can be used to shape the content of prevention messages and determine appropriate dissemination strategies for promoting microbicide use in different populations. For example, since we know that a microbicide will not have 100% efficacy, a hierarchy of counseling messages can be tested to determine what messages are acceptable to providers who ultimately will play a significant role in integrating microbicides into the array of HIV/STI prevention choices. Understanding providers’ willingness to prescribe a microbicide under varying levels of efficacy can help tailor messages in product promotion campaigns and in developing counseling interventions for providers.

**The female condom as a parallel to microbicide acceptability**

The female condom is an excellent example for examining the acceptability of microbicide use since it is an approved contraceptive device that has high potential for disease prevention without adverse side effects. Insights gained from the introduction of the female condom can help to elaborate further the potential value of conducting acceptability research at each of the three levels noted above. Several positive features of the female condom, such as enhanced sexual sensation for women and partners, greater coverage of the genital surface, insertion prior to sexual intercourse, greater control of prevention for women (Susser & Stein, 2000), augmentation of women’s and men’s choices of protection methods, design and packaging, and provider bias are likely to apply to microbicides as well.

Despite positive findings from more than 100 acceptability studies conducted worldwide (UNAIDS, 1997; Cecil, Perry, Seal, & Pinkerton, 1998), continued use of the female condom has not been easy. Since most relevant studies were initiated only after the female condom was approved in the US in 1993, design features that affect female condom acceptability have not been clearly articulated. Consequently, health workers were unprepared to face the challenges to product use and marketing. Some populations have not been receptive to the female condom due to concerns about its unfamiliar appearance, reported discomfort from the inner ring, lack of partner support, high cost, and prejudice against its use by providers. As well, inadequate attention to design and packaging features and product marketing, inadequate country-level introductory plans, and study design limitations have hampered uptake and distribution (Hoffman, Exner, Leu, Ehrrhardt, & Stein, 2003; Bekinskska, Rees, McIntyre, & Wilkinson, 2001). Since the female condom has some parallels to microbicides, throughout this review we emphasize analogies with the female condom that might inform the field of microbicide acceptability.

**Approaches to assessing acceptability**

Measurement and conceptualization of the acceptability of microbicides is an ongoing challenge. Although researchers recognize that the methods employed to assess acceptability may influence study outcomes (Mauck, Rosenberg, van Damme, & the International Working Group on Microbicides, 2001), attention to the conceptual approaches and methodologies used in acceptability studies of vaginal and rectal microbicides has been limited until recently. Therefore, we reviewed microbicide acceptability studies to document systematically the conceptual and methodological approaches, identify gaps, and suggest strategies for improving the quality of the research.

**Methods for reviewing microbicide acceptability studies**

Electronic searches were conducted in MEDLINE, POPLINE, AIDSLINE and PsychInfo on articles published from 1980 to 2002 using the keywords “microbicide”, “vaginal product”, “spermicide”, “HIV”, and “STI/STD”. In addition, published abstracts from the International AIDS Conferences (1995–2002) and the Microbicides 2000 and 2002 meetings were identified through hand searches of conference proceedings. We excluded studies published prior to 1995 since most of these focused on clinical tolerance and adverse localized effects and did not specifically address acceptability. The search was limited to English-language publications.

Two of the present authors (JEM, LM) independently reviewed articles to determine eligibility and separately abstracted information into a data collection template describing the target population, study design, approach to acceptability and the dimensions measured. To be eligible for inclusion, studies had to present primary quantitative or qualitative data assessing acceptability of vaginal or rectal products. Clinical trials of potential microbicides were included only if they reported measurements of acceptability beyond clinical data on product tolerance. Spermicide acceptability studies were included only if authors explicitly referred to the applicability of results to potential HIV/STI prevention products. All disagreements on the eligibility of studies
or the content of abstracted data were resolved through discussion. A full table summarizing the relevant aspects of each study included in the review is available from the authors upon request.

### Study characteristics

Table 1 summarizes the key characteristics, including types of target population, methods used to assess and the content of abstracted data were resolved through discussion. A full table summarizing the relevant aspects of each study included in the review is available from the authors upon request.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data source</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anecdotal reporting on product acceptability only</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Formal data collection on product acceptability</td>
<td>53</td>
<td>87</td>
</tr>
<tr>
<td><strong>Strategies for studying acceptability</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypothetical product description only</td>
<td>24</td>
<td>39</td>
</tr>
<tr>
<td>Hypothetical product description with product demonstration</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>Use of non-prescription spermicide</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>Short-term use of candidate microbicides being evaluated in clinical trials</td>
<td>17</td>
<td>28</td>
</tr>
</tbody>
</table>

### Characteristics of study populations

**Target populations**

<table>
<thead>
<tr>
<th>Population</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women only</td>
<td>36</td>
<td>59</td>
</tr>
<tr>
<td>Men only</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>Both women and men</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Heterosexuals from general population</td>
<td>37</td>
<td>61</td>
</tr>
<tr>
<td>Couples only</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Adolescents</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Sex workers</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>Drug-involved</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Family planning clients</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>STI clinic clients</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Men who have sex with men</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Providers</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

**HIV status**

<table>
<thead>
<tr>
<th>Status</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not reported</td>
<td>39</td>
<td>64</td>
</tr>
<tr>
<td>Reported</td>
<td>22</td>
<td>36</td>
</tr>
<tr>
<td>HIV-negative only</td>
<td>11</td>
<td>50</td>
</tr>
<tr>
<td>HIV-positive only</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Both HIV-negative and HIV-positive</td>
<td>9</td>
<td>41</td>
</tr>
</tbody>
</table>

**Data collection methods**

<table>
<thead>
<tr>
<th>Method</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviews</td>
<td>39</td>
<td>64</td>
</tr>
<tr>
<td>Focus groups only</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Combination of interviews and focus groups</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Coital logs/diaries&lt;sup&gt;a&lt;/sup&gt;</td>
<td>9</td>
<td>15</td>
</tr>
</tbody>
</table>

**Acceptability constructs assessed**<sup>a</sup>(53 studies with formal data collection)

<table>
<thead>
<tr>
<th>Construct</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product physical characteristics</td>
<td>41</td>
<td>77</td>
</tr>
<tr>
<td>Product taste, smell, colour</td>
<td>29</td>
<td>55</td>
</tr>
<tr>
<td>Viscosity/texture</td>
<td>27</td>
<td>51</td>
</tr>
<tr>
<td>Product acceptability during use&lt;sup&gt;a&lt;/sup&gt;</td>
<td>26</td>
<td>49</td>
</tr>
<tr>
<td>Lubrication provided by product</td>
<td>29</td>
<td>55</td>
</tr>
<tr>
<td>Preferred timing of product use prior to sex</td>
<td>18</td>
<td>34</td>
</tr>
<tr>
<td>Sensation during sex (participant and/or partner)</td>
<td>26</td>
<td>49</td>
</tr>
<tr>
<td>Focused primarily on applicator</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Preferences regarding contraceptive activity of product</td>
<td>18</td>
<td>34</td>
</tr>
<tr>
<td>Perceptions of partner attitudes</td>
<td>12</td>
<td>23</td>
</tr>
<tr>
<td>Advantages of female-controlled method</td>
<td>21</td>
<td>40</td>
</tr>
<tr>
<td>Potential microbicide use with different partners</td>
<td>10</td>
<td>19</td>
</tr>
</tbody>
</table>

<sup>a</sup>Not mutually exclusive categories.
norms regarding sexual practices, relationship dynamics, and pregnancy risk perceptions, cultural and gender behavior is influenced by a complex interplay of disease and disease prophylaxis research have shown that sexual handler & Simmons, 1994). Decades of contraception introduction of new contraceptive technologies (Spice-
in the World Health Organization's paradigm for the that may be linked to microbicide use, an idea reflected also must include the significant sociocultural concerns Although these are important features, acceptability since study participants are likely to develop better insights into what it means to insert and use a product before or during sex. Yet, whether the product offers potential protection or not may influence study participants’ intentions to use the product in the future and willingness to tolerate possible discomfort. Lastly, the generalizability of acceptability data nested within clinical trials findings may be limited, as these trials are conducted under artificial conditions over relatively short periods, and trial requirements, such as colposcopies and laboratory tests, may affect accept- ability in unknown ways. Therefore, they do not capture the range of situations in which most people select and use HIV/STI prevention and/or contraceptive methods and also may not mirror what people would actually do if the product had established efficacy. Moreover, clinical trial participants are not necessarily representa- tive of the community-at-large due both to selective recruitment into the trial and selective participant retention over the course of the trial.

Challenges in the evaluation of microbicide acceptability

Microbicide acceptability studies have concentrated primarily on product formulation characteristics, including color, texture, viscosity, and application. Although these are important features, acceptability also must include the significant sociocultural concerns that may be linked to microbicide use, an idea reflected in the World Health Organization’s paradigm for the introduction of new contraceptive technologies (Spice-handler & Simmons, 1994). Decades of contraception and disease prophylaxis research have shown that sexual behavior is influenced by a complex interplay of disease and pregnancy risk perceptions, cultural and gender norms regarding sexual practices, relationship dynamics, peer influences, as well as the service delivery environment (Agha, Kusanthan, Longfield, Klein, & Berman, 2002; Luke & Kurz, 2002).

Based on our review of 61 microbicide studies, we highlight six areas to address in future microbicide acceptability research: (1) diversity of study populations, (2) trade-offs in microbicide decision-making, (3) cultural norms regarding intravaginal practices, (4) gender relations, (5) acceptability of microbicides alongside other barrier methods, and (6) methods of measurement.

Diversity of study populations

Understanding microbicide acceptability from the perspectives of a wide range of potential user groups in both high- and low-HIV prevalence settings is urgently needed.

Few of the reviewed microbicide studies focused on male partners, couples, and other types of sexual partnerships

As shown in Table 1, only 10 studies involved heterosexual men and two involved couples. Lessons learned from a recent evaluation of the South African government’s introductory female condom program indicate that more than two-thirds of the women who had received a female condom said that it would be easier to get a partner to use a female than a male condom, and a third claimed that they could use the female condom in situations in which their partners refused to use the male condom (Mqhayi, Bekinska, Smit, & Rees, 2003). Yet, relatively few female condom studies have targeted men or couples directly (e.g., Musaba, Morrison, Sunkutu, & Wong, 1998; Seal & Ehrhardt, 1999; Penman-Aguilar et al., 2002).

Given that several studies report that the female condom is more likely to be used within the context of marriage or regular partnerships and that relationship characteristics influence male condom use, patterns of microbicide use may differ within primary and/or casual heterosexual and homosexual partnerships and paid sexual encounters with clients (Macaluso, Demand, Artz, & Hook, 2000; Kerrigan, Mobley, Rutenberg, Fisher, & Weiss, 2000). Therefore, microbicide acceptability research should explore the characteristics and dynamics of sexual partnerships, including stability, partner exclusivity, risk behaviors and HIV status of both partners, management of risk, communication and obligations within the relationship, motivations to avoid pregnancy or HIV, and how these dynamics might interact with users’ perceptions of product attributes. In addition, given that the potential of microbicides to prevent infection but not fertility is unknown, assessment of both partners’ fertility desires and intentions is important.
The above issues suggest that it is preferable to explore directly partners’ physical and emotional reactions to a microbicide. Reliance on one partner’s perceptions of the other partner’s beliefs and intentions ignores the possibility that partners may have discordant beliefs and intentions, particularly regarding reproductive health decisions (Harvey, Bird, Henderson, Beckman, & Huszti, 2004), or that the influence of one partner overshadows that of the other (Bankole & Singh, 1998). Although recruiting sexual partners is challenging, exploring partner concordance regarding acceptability has hardly been attempted. Yet, this would allow assessment of the individual and joint contributions of partners and their influence on product satisfaction, behavioral intentions and initial and consistent use. This also may improve prediction of adherence to microbicide use.

Although one of the founding principles for microbicides was to provide women with a method that would not require their dependence upon male partners, and another was the possibility that at least some microbicides could be used clandestinely, this is not always the case. However, this does not invalidate the concept or its retention as an objective. The involvement of men in microbicide acceptability studies can begin to increase men’s sensitivity to women’s needs and create more gender equitable relationships, and once a microbicide is available, marketing it to men can help to make it more normative and acceptable. Also, including men as an audience for microbicide use can instill and capitalize upon their sense of responsibility for sexual and reproductive health protection.

Microbicide acceptability research focused on HIV-positive populations is limited

As shown in Table 1, of the studies in which HIV status was reported, only nine included HIV-positive persons. Yet, they may have unique acceptability issues due to differences in health status, coital frequency, and contraceptive method preferences and use. Microbicides can benefit HIV-positive people, possibly conferring protection from other STIs and reducing the likelihood of HIV transmission to HIV-negative partners. Consequently, acceptability should be assessed in safety trials of microbicides for HIV-positive people.

Only three studies in the review explored the acceptability of microbicides among adolescents

Adolescents’ high risk for HIV infection due to high frequency of sex and rate of partner change, short duration of sexual relationships, risk-taking behavior, low perceptions of HIV/STI risk, and limited access to contraception point to the importance of conducting microbicide acceptability research with this population. However, major challenges facing the field in testing microbicides in adolescents are finding a way to address these issues and the ethics in conducting this research with this population. Acceptability issues for adolescents may differ from those of adults. For instance, one study suggests that timing of use will be a salient issue for some adolescent girls who may have sex secretly in semi-public venues and report that their male partners are impatient (Short, Mills, Majkowski, Stanberry, & Rosenthal, 2003); this evidence suggests that a fast-acting microbicide would be especially desirable for this population.

Acceptability studies with homosexual and heterosexual populations practicing anal sex are limited

As shown in Table 1, five studies addressed the acceptability of a rectal microbicide among men who have sex with men (MSM). Yet, unprotected receptive anal intercourse is the sexual behavior with the highest probability of HIV transmission (Royce, Sena, Cates, & Cohen, 1997). Acceptability of a rectal microbicide or a vaginal product applied to the rectum should be accorded high priority, given that unprotected anal sex is practiced by significant numbers of MSM (Semple, Patterson, & Grant, 2003) and heterosexuals (Laumann, Gagnon, & Michael, 1994).

Given the differences in the physiology of the vagina and rectum, there may be unique acceptability considerations, although many of the issues relevant to vaginal products, such as product characteristics, apply to rectal microbicides as well. The acceptable dose level is important since rectal fullness and discomfort have been reported in safety and toxicity trials (Gross et al., 1999). In addition, because anal sex is highly stigmatized in most cultures, the packaging and distribution of a rectal microbicide should receive attention.

Acceptability of a rectal microbicide may differ by type of sexual partnerships among populations practicing anal sex. With MSM who also have sex with women, the gender of the partner may influence product acceptability. It is unknown whether men who engage in bisexual sexual behavior would use a microbicide for vaginal and anal sex with female partners and a rectal microbicide with male partners. Also, whether the individual is the insertive or the receptive partner may affect microbicide acceptability. Whereas some studies suggest that the use of lubricants is highly acceptable to MSM (Carballo-Diéguez et al., 2000), their acceptability for anal sex among heterosexuals is unknown.

Only one of the studies reviewed focused on the role of community/key leaders and/or other ‘gatekeepers’ in shaping opinions about the acceptability of microbicides

Key opinion leaders, including traditional healers, religious leaders, and television/sports personalities, can be central to shaping and reinforcing HIV
prevention norms and behaviors (Kelly et al., 1997). Thus, they will play a significant role in the introduction of microbicides. With female condom promotion, limited attention to key opinion leaders may have contributed to the slow uptake of the method and should be tackled in the marketing of microbicides. Drawing opinion leaders’ attention to microbicides will elevate community awareness of these products, while preparing communities for microbicide efficacy trials may help to demystify the product, identify potential concerns, and encourage community participation.

Only four studies reviewed addressed the role that health care services may play in promoting microbicides

Lessons drawn from the introduction of the female condom, where there has been a dearth of studies exploring its acceptability among health care providers, sound a wake-up call for microbicide researchers. Female condom studies conducted in Nigeria, South Africa, and New York (Adeokun et al., 2002; Mantell et al., 2001; Mantell, Scheepers, & Abdoool Karim, 2000), and Kenya (Feldblum et al., 2001) found that providers’ beliefs and attitudes were pivotal to influencing clients’ initial acceptance and continued use of microbicides. Similarly, with respect to emergency contraception (EC), providers’ lack of knowledge has been an impediment to recommending the method to clients (Kaiser Family Foundation, 2000; Ngoc, Ellerton, Surasrang, Loc Ly Thai, 1997). As gatekeepers of contraceptive methods and perceived credible sources among potential end-users, health care providers’ views will be critical in determining their willingness to integrate microbicides into the mix of HIV/STI prevention methods. One recent study indicated that publicized levels of effectiveness will be one of the most important determinants of microbicide acceptability among providers (Hoffman et al., 2002).

More research on providers is needed. Understanding providers’ beliefs and attitudes now, even before we know the level of effectiveness of a potential microbicide, may help to erode some of the impediments to their recommending it to users, and may inform the development of training programs for providers. Harm-reduction principles, which promote prevention alternatives in the treatment of addictions (e.g., safe injection practices when complete cessation of drug use appears unlikely), may be particularly useful in helping providers accept the benefits of promoting microbicides and other barrier methods that are less than 100% effective in preventing HIV sexual transmission.

Trade-offs in microbicide decision-making

Efficacy and the knowledge of the degree of protection are key determinants of microbicide acceptability and are likely to influence women’s and men’s acceptance of a product and promote their willingness to use it during sex. The first generation of microbicides is expected to have lower disease prevention efficacy than the male condom (Rockefeller Foundation, 2002). Hence, their incorporation into the array of method choices will require clear counseling guidelines around hierarchical safer sex prevention messages based on a harm-reduction approach incorporating a spectrum of strategies. The inconclusive findings in one study about the female condom’s efficacy in preventing STIs (Welsh, Feldblum, Kuyoh, Mwarogo, & Kungu, 2001) may have contributed to skepticism on the part of providers and users of the method and, in turn, limited uptake. Causes and effects of user preferences regarding the female condom’s contraceptive and disease-protective properties remain little studied.

Research is needed to understand how different users will weigh the trade-offs of microbicidal efficacy versus acceptability as well as contraceptive versus disease prevention efficacy. This information must be considered in product design. It is unclear whether potential users will view microbicides as a harm-reduction strategy, representing a second line of disease prevention for people who are unable to use condoms consistently. If a microbicide increases sexual pleasure and has minimal side effects, will it increase the likelihood of its use, even if the product has lower efficacy than condoms? One of our greatest challenges will be educating providers and potential users about the “partial effectiveness” of microbicides (Foss, Vickerman, Heise, & Watts, 2003).

Concerns about the effect of fertility on technology should not be underestimated (Altman, 2004). As fertility and child survival decline in those countries most severely affected by AIDS, the desire for pregnancy may be expected to grow. In fact, some studies in developing countries report that HIV-infected women do not want to avoid pregnancy after learning they are infected (Allen et al., 1993; Forsyth et al., 2002). At least one of the microbicides going forward into effectiveness trials show no anti-spermicidal activity.

Cultural norms regarding intravaginal practices

Assessment of vaginal microbicide acceptability should address how cultural norms affect sexual practices, sexual satisfaction, product use during menstruation, perceptions about product use on fertility, and vaginal insertion of a “foreign” substance, intravaginal product use. Extant study findings about this are mixed (Myer et al., 2004; Smit, McCfadyen, Zuma, & Preston-Whyte, 2002). Cultural norms may affect the acceptability of microbicides and whether the product is used alone or in conjunction with a condom. Norms regarding vaginal cleanliness and its symbolic significance may differ across cultures and the relationship
between intravaginal substance use and experience with tampons, the diaphragm, finger-cleansing and wiping, and comfort with touching the genitalia remains unknown (van de Wijgert et al., 2001). These findings highlight the importance of context-specific assessment of the meanings of “wet” and “dry” sex and their effects on the acceptability of a microbicide.

Gender relations

Social and economic inequalities between men and women in most cultures, reflected in degrees of power within relationships and differing norms for sexual behavior, have propelled the development of HIV/STI prevention methods that women can use without a partner’s knowledge. The need for secrecy and discretion is often voiced as a major advantage of a microbicide (Visness, Ulin, Pfannenschmidt, & Zekeng, 1998). This is relevant not only for product acceptability but for women’s participation in microbicide trials.

Whereas advocacy efforts tend to highlight that a microbicide is truly a female-controlled method (in the same way that the benefits of the female condom have been promoted), a number of studies report that women would prefer to tell their partners they were using the product both during the study and in post-trial real-world use, to preclude their partner thinking they were unfaithful (Coggins et al., 1998; Darroch & Frost, 1999; Green et al., 2001). In a study of South African men, at least 80% reported that they would like to be informed if their partner chose to use a vaginal microbicide (Ramjee, Gouws, Andrews, Myer, & Weber, 2001), a finding confirmed by other studies (van de Wijgert et al., 1999). In a Ugandan study, whereas women in the pre-trial focus groups believed that surreptitious microbicide use was advantageous, after the first week of product use, only 40% used them secretly, 27% after 5 weeks, 22% after 10 weeks, and 13% after 5 months of use (Green et al., 2001).

Concern about partner violence is a primary reason that many women would prefer a method that cannot be detected by their male partners. Consequently, some women may be unable to use a vaginal microbicide. However, discussing microbicide use with primary partners may be a way to increase intimacy or shared responsibility for protection (Mason et al., 2003). Exploring men’s attitudes about a microbicide and women’s expectations of their partners’ responses to the product can help to identify how male partners may facilitate or impede microbicide use.

Acceptability of microbicides considered alongside other barrier methods

Ultimately, microbicides will have to be promoted within the context of existing prevention methods, service delivery system capabilities and users’ needs. Using a model in which informed choice is central will position researchers and health care providers to identify the determinants of microbicide use and how women and their partners may incorporate into their prevention repertoire use of a method that could be only 50–60% as effective as condoms against HIV transmission. Although these products may only have limited efficacy, widening the choice of acceptable methods for people who do not use condoms or use them inconsistently can still curb HIV/STI transmission substantially. In addition, an array of other methods, including some uptake of diaphragms and cervical caps and even rings with slow-releasing microbicide compounds, could be used.

Measurement

The measurement of acceptability can be improved by addressing the following issues.

Disentangling the meaning of acceptability

Currently, there is no consensus about how to define and operationalize acceptability for the study of microbicides, a problem that has also plagued female condom research. Confusion about terminology will continue until we define the different dimensions of acceptability being investigated. The meaning of acceptability is influenced by the context in which individual attitudes, opinions, and practices are elicited; the context has, in turn, vastly different implications for the questions that are asked. The inferences that can be drawn about real-world product use also will vary with context. Cognitive/attitudinal theoretical acceptability is assessed by measuring attitudes, preferences, and initial reactions to a product being simply described or shown and willingness to try method; short-term acceptability is assessed by giving women (and men, in the case of rectal microbicides) the method and asking them to try using it for a limited period of time, subsequently measuring their opinions; clinical trial use acceptability is assessed by evaluating attitudes about and use of a surrogate product under trial conditions and intentions to use an effective product or recommend it to others if it were available; and real-world use acceptability is assessed by contrasting initial or novelty product use and commitment or adherence to use (sustained use for six months or longer) once a product is available.

Consensus on the meaning and operationalization of acceptability applied broadly to diverse populations—women and men at risk or infected with HIV, HIV-discordant couples, adolescents, low and moderate condom users, and health care providers—would enhance the comparability and interpretation of acceptability data across studies, identifying cross-cutting and
differential user issues and help to improve generalizability of findings.

Use of uniform measures

Conducting an evaluation of microbicide acceptability with a uniform set of measures across diverse products, target populations, and settings would elucidate their shared and distinct features. Grounding the study of acceptability in a theoretical framework could help to identify predictors of acceptability and suggest intervention components to promote microbicide use. Use of uniform measures, however, does not obviate the need for culturally contextual and population-specific testing of product acceptability. Although cultural transferability may appear to be ideal, the variables being measured may not be conceptually equivalent and therefore require cultural tailoring. After an effective product is found, associations between components of acceptability and market penetration and maintenance of microbicide use should be assessed. Use of market forecasting models can help to predict changing preferences in microbicides and the potential user audience (Young Holt et al., 2002).

Integration of quantitative and qualitative methods in acceptability assessment

Studies of female condom acceptability have tended to use either qualitative or quantitative methods alone. As we move toward evaluating more potential microbicides, qualitative methods should be used creatively in parallel with quantitative measures to assess product acceptability in all phases of microbicide clinical trials. Focus group and in-depth interview data can report the richness and diversity in participants’ experiences and attitudes reported in their own words and provide a more nuanced understanding of issues, e.g., perceptions of product leakage volume and messiness, understanding of product efficacy, and the effect of a product on sexual pleasure. Focus groups are particularly well-suited for exploring normative beliefs and attitudes.

The temporal sequencing of qualitative and quantitative methods will depend upon study objectives and availability of resources. Qualitative data collected prior to a clinical trial can be used to guide the construction of quantitative measures and shed light on important issues to be considered in the trial. Incorporating acceptability measures in the early phases of clinical trials can reveal critical information about users’ product preferences, and based on feedback from the trial, permit changes in the product at a lower cost and without the need for another review by the FDA or comparable regulatory authority. The incorporation of open-ended questions in primarily quantitative assessments of microbicide acceptability and the use of in-depth interviews and focus groups immediately after a trial can provide a more detailed picture of participants’ comfort and difficulties with product use.

Improvement in accuracy of reporting about microbicide use

Several studies suggest that the use of coital logs/diaries results in a higher level reporting of alcohol use, sexual activity, and condom use (Leigh, Gillmore, & Morris, 1998; Ramjee, Weber, & Morar, 1999) compared to questionnaires. In a study of South African sex workers, when coital diary data were compared to a weekly recall questionnaire, there was a higher level of reporting for questions requiring numerical responses (e.g., numbers of clients, mean condom use with clients, sexual practices) with the coital diary compared to the weekly recall and daily recall questionnaires (Ramjee et al., 1999). However, agreement in reported sex with partners between the diary and daily recall questionnaire was poor, with higher reporting of vaginal, oral, and anal sex and condom use in the diaries. The authors suggest that use of their coital diary was limited because it did not document multiple sex acts with the same partner and many participants did not complete the diary after each act of sexual intercourse or daily. In addition, audio computer-assisted self-interviewing (audio-CASI) is another method that has been shown to yield greater reports of sensitive behaviors in some settings and populations (Norris et al., 2002). Additional studies using diaries and audio-CASI are needed to determine whether they reduce response bias.

Conclusion

Even in the absence of a proven microbicide on the market, empirical evidence indicates that women and men from different socio-cultural backgrounds in both developed and resource-constrained countries are interested in using a microbicide (Darroch & Frost, 1999; Young-Holt et al., 2002). The desired effect of microbicides in reducing women’s risk of infection clearly cannot be achieved without understanding and addressing the issues surrounding product acceptability and use.

Most disease prevention and contraceptive methods take years after development to achieve widespread acceptance. In the case of microbicides, physical barrier methods, and HIV vaccines, the years required for products to achieve widespread acceptability and use also will see millions of women and men becoming newly infected with HIV. With the acceleration in the development and testing of microbicides, any steps taken to reduce the time from the establishment of an efficacious microbicide to its widespread uptake and...
continued use will have an enormous public health benefit. Unlike the female condom, conducting microbicide acceptability studies in the early stages of clinical testing will optimize decisions about product characteristics, understanding impediments to use, and potentially useful promotional strategies. Failure to consider how microbicides are positioned within heterosexual and same-sex relationships may doom an efficacious product to become ineffective in practice. Building on the strengths and avoiding the weaknesses of the introduction of the female condom can better help to translate microbicides and other emerging disease and pregnancy prevention methods into effective public health interventions.

Acknowledgements

The authors greatly appreciate the comments of Theresa M. Exner, Ph.D., Susie Hoffman, Dr.P.H., Kristine Morrissey, B.A., and Patricia Warne, Ph.D., HIV Center for Clinical and Behavioral Studies at the New York State Psychiatric Institute and Columbia University; Jennifer Smit, B.Pharm., M.S., Ph.D., Reproductive Health Research Unit, Durban, South Africa; and Janneke van de Wijgert, Ph.D., International Antiviral Therapy Evaluation Center, The Netherlands.

References


