Consistency of Condom Use Among Low-Income Hormonal Contraceptive Users

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CONTEXT: *Hormonal contraceptive users may be at increased risk for HIV and other STDs. An understanding of their decisions and abilities to use condoms is needed to focus intervention programs aimed at improving their protective behaviors.*

METHODS: *Between 1999 and 2001, 426 new users of depot medroxyprogesterone acetate (DMPA) and oral contraceptives were recruited from public clinics providing family planning services to low-income women and surveyed when they began their method and again three months later. Bivariate analyses examined the consistency of condom use across subgroups, and multivariate analyses assessed associations between consistent use and various characteristics.*

RESULTS: *Among women who had used condoms consistently before starting on DMPA or the pill, 54% discontinued consistent use after taking these contraceptives. Overall, 20% of women consistently used condoms with their hormonal method, and such use did not vary significantly by contraceptive type. Seventy-five percent of women in nonmonogamous relationships were inconsistent users, though nearly a third had been consistent users prior to beginning a hormonal method. Factors associated with an elevated likelihood of consistent use were the male partner's positive opinion of condoms (odds ratio, 3.3) and the woman's strong belief that condom use is important for vaginal intercourse (3.5) and even if the couple is using another form of birth control (4.1).*

CONCLUSIONS: *Many women at highest risk for disease have a decreased likelihood of using condoms, and disease prevention programs should be customized to target these women. Educational efforts focusing on women's attitudes and negotiation skills may be the best means of increasing dual method use.*

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Oral contraceptives are the leading birth control method among U.S. women younger than 30, and are used by 19% of all women aged 15–44. The injectable depot medroxyprogesterone acetate (DMPA) is the second most commonly used hormonal method among the latter group (3%).[1] Hormonal contraceptive users may be exposed to an increased risk for HIV and other STDs because of the reported link between hormonal methods and cervical ectopy.[2] Progestin-only regimens, such as DMPA, cause thinning of vaginal and cervical mucosa,[3] and as a result may increase one's chance of being infected with disease-causing pathogens. When compared with women using no method, pill and DMPA users are at increased risk of chlamydial infection and vaginal candidiasis.[4] Early results from a large, prospective cohort study of prostitutes in Mombasa, Kenya, showed a significantly increased risk of HIV-1 infection with DMPA use, but the findings for high-dose pill use were only marginally significant.[5] The positive link between pill use and HIV infection was later supported by a meta-analysis of 28 studies, including seven prospective studies.[6] An update of the cohort in Mombasa has provided further evidence for an increased risk of HIV acquisition with use of both DMPA and the pill.[7]

Correct and consistent use of condoms with hormonal contraceptive methods (dual use) is recommended for women at increased risk for STDs and pregnancy, and specifically for those with multiple sex partners. Despite this recommendation, overall dual method use in the United States is very low among women aged 18–44 (2%).[8] Furthermore, women employing user-independent hormonal contraceptives may use condoms to a lesser extent than those selecting the pill. This tendency has been observed in studies comparing implants and the pill.[9] Also, lower rates of condom use have been observed among DMPA users[10] than among pill users.[11] However, a direct comparison of condom use among pill and DMPA users has not been conducted. Hence, it is not clear whether users of injectable methods have different patterns of condom use than do pill users and, as a result, may benefit from modified STD and HIV intervention programs.

In the past decade, consistent condom use has been the primary focus of disease prevention educational programs. Despite these efforts, the overall use of condoms remains low, and the national objective "to increase to at least 50% the proportion of sexually active unmarried adults who used a condom at last sexual intercourse" has not been met.[12] Significant attitudinal and situational barriers (in particular, partner influences and partnership dynamics) prevent the desired increase in consistent condom use, and the persistence of these barriers highlights the necessity for fur-

ther research in this area. Because women account for a steadily increasing proportion of AIDS cases—currently, 26% of all U.S. cases diagnosed[13]—and because the primary route of HIV transmission to women is through heterosexual contact,[14] the promotion of condom use should be a significant public health imperative.

The main objectives of this study were to compare the prevalence of condom use among women who had selected DMPA or the pill for the first time, and to identify correlates of dual method use. We also examined the extent and patterns of condom discontinuation with the uptake of hormonal methods. The findings can help focus educational efforts aimed at expanding protective behaviors among sexually active women.

METHODS

Participants and Procedures

In this prospective study, 600 sexually active women who selected the pill (200) or DMPA (400) for the first time were surveyed at 10 public family planning clinics in Texas between August 1999 and December 2001. Nine of the clinics were operated by Planned Parenthood of Houston and Southeast Texas, and one was a university-based family planning clinic. They served mostly low-income women. The exact pill preparation was not ascertained; however, 95% of women selecting the pill at the participating clinics are given combined preparations, and the remainder receive progestin-only regimens. The study was approved by the review boards at the Centers for Disease Control and Prevention, Baylor College of Medicine and the clinics.

The sample size of 600 was based on having adequate power to compare the prevalence of condom use among oral contraceptive and DMPA users, assuming an attrition rate of 25–30% over a three-month study period. Eighteen percent of women using DMPA[15] and 38% of those using the pill[16] can be expected to also use a condom; we chose a more conservative estimate of 30% for the pill users. To have 80% power to detect a 12% difference in the rate of condom use between DMPA and pill users at a 5% significance level, about 420 women were needed for the final analyses. Because the overall rate of condom use was expected to be lower among DMPA users, we sampled a higher number of women using this contraceptive.

The normal procedure for obtaining a contraceptive method in these clinics included a counseling session, at which time each method and its contraindications were explained to the woman. If a client selected the pill or DMPA and reported being sexually active (in response to the question "Are you currently sexually active?"), the clinic nurse or another staff member explained the study to the woman and invited her to participate. The client was then asked to complete an anonymous, self-administered questionnaire, which took approximately 15 minutes. The questionnaire covered the woman's demographic, reproductive and contraceptive histories; history of STDs; knowledge about condoms and hormonal contraceptives; and psychosocial and attitudinal characteristics related to condom use. It was available in both English and Spanish, and a clinic staff member was available to respond to any queries. Participants were given a five-dollar McDonald's gift certificate. Ten percent of the women who were approached were ineligible because of their inability to read the survey and answer questions independently, and another 5% declined to participate. No information is available on these women.

Participants were asked to complete a follow-up questionnaire upon return to the clinic three months later, at which time they received a second injection of DMPA or an additional supply of the pill. If participants did not return, they were contacted by phone to complete the survey. The follow-up questionnaire gathered information on sexual behavior, risk factors and condom use over the past three months. Women were also questioned about their partners' opinions of condoms and of the hormonal contraceptive the women had been using.

Of the women enrolled in the study, 426 (71%) completed the follow-up survey three months later (117 pill and 309 DMPA users). The remainder did not return to the clinics and were inaccessible by phone or mail. The proportion of women lost to follow-up was significantly higher among pill users than among DMPA recipients (41% vs. 23%; $p<.001$). Also, women lost to follow-up were slightly older (25.1 vs. 23.7 years, on average; $p<.05$) and were more likely to be Hispanic (52% vs. 34%; $p<.01$). However, the two groups were similar regarding education, number of pregnancies, marital status, histories of STDs and abortion, use of alcohol or drugs during sex, and whether they were in a monogamous or nonmonogamous relationship.

The questionnaire included questions from social-psychological models that have been used to study practices of healthy behaviors: the theory of reasoned action,[17] the health belief model[18] and social cognitive theory.[19] We examined various elements of each theory that have been related to condom use, including attitudes toward condoms and intentions of using them (theory of reasoned action),[20] perceived susceptibility to disease and perceived benefits of condom use (health belief model),[21] and condom use self-efficacy (social cognitive theory).[22] Other questions, such as partner influence on birth control method and condom use, were added on the basis of findings from in-depth participant interviews that were conducted at the beginning of the study.[23] All interviews were conducted by the first author.

The questionnaire was pilot-tested among 40 women who were using the pill or DMPA as their main method of contraception. The primary purpose of the pilot study was to assess clients' level of understanding of the questions. From this pilot, we determined the internal consistency reliability, reproducibility, test-retest reliability, and clarity of the questions and scales. Most variables and constructs demonstrated good internal reliability (Cronbach's alphas, 0.74–0.87) and test-retest reliability ($r=0.80–0.96$), and the kappa statistics were satisfactory (0.57–0.92). Variables with low scores on these parameters were modified or omitted from the survey.

Variables

The study's primary outcome measure, use of condoms in the past three months with a main partner (defined as a steady boyfriend or husband), was assessed by the question "In the past three months, how often did you use condoms when you had vaginal sex with your main sexual partner?" Possible answers were "every time," "almost every time (90% of the time or more)," "sometimes," "almost never" and "never." This was asked at both the beginning and the end of the study period. Because very few reported using condoms every time, we classified these women and those who used condoms almost every time as consistent condom users, and the remainder as inconsistent users. Condom use was dichotomized because effective disease prevention is possible only through consistent use.

The woman's plans for future use of condoms were assessed at the follow-up visit: "In the next three months, how likely do you think it is that you will use a condom *every time* you have vaginal sex with your partner?" Choices were "very sure I will," "somewhat sure I will," "undecided/not sure if I will or will not," "somewhat sure I will not" and "very sure I will not." Women were also asked to identify their reasons for using condoms; options were "prevent getting pregnant," "prevent spreading disease" and "prevent getting disease."

Several questions assessed women's level of STD risk. Their history of STDs was ascertained by "Have you ever been told by a doctor or nurse that you have any sexually transmitted disease, such as gonorrhea, syphilis, chlamydia, herpes, pelvic inflammatory disease, or an infection in your tubes"? Women were asked how often they used alcohol or drugs during sex; those who answered "every time," "almost every time (90% of the time or more)" and "sometimes" were grouped as users, whereas those who indicated "almost never" and "never" were grouped as nonusers. Frequency of intercourse was also assessed; choices were "several times a week," "several times a month," "once a month" and "once or twice during the three months."

Sexual behavior was assessed by the question "How would you describe your sexual relationship during the past three months?" Possible answers were "sexually active with more than one person"; "sexually active with only one person, but I think he is having sex with others"; "sexually active with only one person, but I think he may be having sex with others"; and "sexually active with only one person, and I'm certain neither of us has sex with anyone else." Women who selected any of the first three options were defined as being in a nonmonogamous relationship. The first option refers to "individual concurrency"; the next two indicate definite or possible "partner concurrency." Individual concurrency was verified by two additional questions: "During the past three months, did you have sexual intercourse with a main partner?" and "During the past three months, did you have sexual intercourse with someone who was not your main sexual partner?" Women who answered yes to both questions were defined as being in a concurrent relationship. The level of agreement among all three questions was high (kappa=0.93), and 50 women were classified as nonmonogamous on the basis of their answers to all three. Two women were considered nonmonogamous on the basis of their answers to the second and third questions.

To assess the partner's risk-taking behavior, women were asked whether, in the past three months, their main partner had injected drugs, had had sex with others without using condoms or had had an STD. Women who answered yes to any of these options were defined as having a high-risk partner. To determine the partner's role in the decision to use condoms, each woman was asked whether her main partner knew she was using a contraceptive and his opinion of it. His opinion of condoms was solicited by "How does your male partner feel about using condoms with you?" This question was measured on a five-point Likert scale, ranging from "very positive" to "very negative."

Women's level of knowledge was assessed by asking whether they thought their hormonal contraceptive was effective in preventing HIV or STDs. The perceived benefits of condom use were assessed with a similar question. In addition, their perceived susceptibility to disease was solicited by asking them to characterize their chances of getting an STD or HIV. Responses were based on a five-point Likert scale, ranging from "no chance" to "big chance." For analysis, the scores for STDs and HIV were combined. Women with scores of less than six were classified as having low perceived susceptibility to disease, and those with scores equal to or greater than six were classified as having high perceived susceptibility.

Women's attitudes about the importance of condom use were assessed by asking whether a condom should always be used for vaginal sex, for anal sex, even if partners know each other well and even if they are using another birth control method (choices were "definitely yes," "probably yes," "probably no" and "definitely no"). For each category, responses of definitely or probably yes were compared with definitely or probably no.

TABLE 1. Selected characteristics of first-time DMPA and pill users visiting family planning clinics in Texas, by method, 1999–2001

Characteristic	All (N=426)	DMPA (N=309)	Pill (N=117)
Means			
Age	23.7	24.2	22.3***
Education (yrs.)	12.6	12.6	12.7
No. of pregnancies	1.5	1.8	0.8***
No. of births	1.0	1.2	0.5
Percentages			
Married	21	23	17
Non-Hispanic white	32	27	44***
Hispanic	34	36	30
Black	29	32	23
In a nonmonogamous relationship†	34	32	39
Has had an abortion	35	40	21***
Has had an STD	24	28	13***
Has used alcohol/drugs during sex	28	29	24
Has had a high-risk partner‡	22	20	27

***p<.001. †Either the woman or her male partner was nonmonogamous in the past three months. ‡A main partner who in the past three months had injected drugs, had sex with others without using condoms or had an STD.

A woman's perceived ability to use condoms was determined by adapting the Condom Use Self-Efficacy Scale.[24] Women were asked whether they would be able to use condoms in the following situations: if they really wanted one to be used; if they knew their partner for a long time; if they were really turned on; if they or their partner was using alcohol or drugs; and if it reduced their or their partner's sexual pleasure. For each situation, women who answered that they were very or somewhat sure they could use condoms were compared with those who answered that they were very or somewhat sure they could not.

Nine statements assessed the level of a couple's communication about sexual matters and contraception: "My partner rarely responds when I talk about our sex life"; "some sexual matters are too upsetting to discuss with my sexual partner"; "there are sexual issues or problems in our sexual relationship that we have never discussed"; "my partner rarely responds when I want to talk to him about birth control planning or methods"; "my partner has no difficulty talking to me about his sexual feelings or desires"; "talking about sex is a satisfying experience for both of us"; "I have little difficulty telling my partner what I do or don't do sexually"; "my partner has no difficulty talking to me about his feelings about birth control planning or methods"; and "I have little difficulty telling my partner what I do or don't do for birth control." The response to each statement was ranked from 1 to 4 ("definitely yes" to "definitely no"). Scores on the last five items were reversed, and then all scores were added. A score of less than 20 indicated a low level of communication, 20–30 indicated a medium level and greater than 30 was considered a high level of communication.

Statistical comparison of groups was performed with the t test and chi-square analysis. Multivariate logistic regression analysis was used to identify attitudinal and situational correlates of consistent condom use (dual method use). All analyses were performed using SAS statistical software (version 9.1).

RESULTS

The mean age of participants was 24 (range, 18–44), they averaged 13 years of education (range, 4–17) and one-fifth were married (Table 1). The sample was nearly equally divided among non-Hispanic whites, Hispanics and blacks. About a third of women reported being in a nonmonogamous relationship in the past three months (12% cited individual concurrency, and 22% partner concurrency), and the rest reported that both they and their partner were monogamous. One in three had had an abortion, and one in four had had an STD. More than one-fourth had used alcohol or drugs during sex, and more than one-fifth reported a high-risk partner.

Compared with pill users, DMPA users were slightly older and had had more pregnancies, and significantly higher proportions had had an abortion (40% vs. 21%) or STD (28% vs. 13%). There was also a significant racial difference between the two groups: Whites represented 44% of all women using the pill and 27% of those using DMPA.

Among women who completed the follow-up questionnaire, 134 (31%) reported having used condoms consistently during the three months prior to taking DMPA or the pill (not shown). More than half of these consistent users (54%) did not continue such use after initiating hormonal contraceptives. Discontinuation of consistent condom use was lower among black women (33%) than among whites and Hispanics (61% and 67%, respectively; $p<.05$), and lower among unmarried than married women (47% vs. 86%; $p<.01$). Discontinuation did not vary significantly by hormonal method (56% of DMPA users vs. 51% of pill users), age (51% of women younger than 25 years vs. 61% of those 25 or older) or sexual relationship (44% for individual concurrency, 48% for partner concurrency and 57% for both monogamous), although the small number of women in this subgroup limits the statistical power for detecting differences.

Twenty percent of all participants consistently used condoms with their main partner while using hormonal contraceptives, 17% reported sometime use and 63% reported that they almost never or never used them (Table 2). The frequency of consistent use did not differ significantly by contraceptive type (19% among DMPA users and 24% among pill users). Similarly, the proportion who said they were very sure or somewhat sure they would use condoms every time they had vaginal intercourse over the next three months (32% overall) did not differ between DMPA and pill users. We also asked women who had ever used condoms while on DMPA or the pill to identify their reasons for use. The most commonly given reasons were to prevent getting disease (66%), becoming pregnant (38%) and spreading disease (23%). Reasons for dual use did not differ significantly by contraceptive method.

Women who used condoms consistently were younger than inconsistent users (mean, 22.7 vs. 23.9; $p<.05$), and higher proportions were unmarried (94% vs. 75%; $p<.001$) and black (48% vs. 25%; $p<.001$—not shown). Seventeen percent of women in mutually monogamous relationships, 12% of women who had multiple partners and 33% of

TABLE 2. Percentage distribution of women, by recent and intended condom use with their main partner, and percentage citing various reasons for use, according to contraceptive method

Use and reason	All	DMPA	Pill
Previous three months			
Every time/almost every time	20	19	24
Sometimes	17	18	15
Almost never/never	63	63	62
Next three months			
Very/somewhat sure will use	32	30	36
Undecided/not sure	15	16	13
Very/somewhat sure will not use	54	54	51
Reasons†			
Prevent disease acquisition	66	62	75
Prevent pregnancy	38	42	30
Prevent disease spread	23	27	12

†Based on women who had ever used condoms after initiating DMPA or pill use (113 and 44, respectively). Women could give multiple reasons for condom use. *Note:* Percentages may not total 100 because of rounding.

women whose partners were nonmonogamous reported consistent use (p<.001). Overall, 75% of women in nonmonogamous relationships did not use condoms consistently with their main partner; nearly a third of these women had used condoms consistently prior to beginning their hormonal method.

In analyses controlling for age, marital status and race, compared with women who reported having intercourse once or twice in the past three months, those who had had intercourse several times a week had a decreased likelihood of using condoms consistently (odds ratio, 0.4—Table 3). Women whose partners were in concurrent relationships had an elevated likelihood of being consistent users compared with women in monogamous relationships (2.2). However, no significant association was found between consistent use and individual concurrency. Of the psychosocial characteristics examined, the factors that were significantly associated with consistent use were the partner's positive opinion of condoms (6.6), the woman's positive attitude toward condom use in various situations (3.3–7.3) and several measures of the woman's condom self-efficacy: her ability to use condoms in a long-term relationship (4.6), if she was "really turned on" (2.6) and even if it decreased her or her partner's sexual pleasure (2.9–3.7). Perceived susceptibility to disease was unrelated to dual method use; this lack of association may be explained in part by the fact that 95% of the women surveyed, including 50% of those in nonmonogamous relationships, believed they were at no or very small risk for disease (not shown).

TABLE 3. Percentage of women reporting consistent condom use, by selected characteristics, and odds ratios (and 95% confidence intervals) from logistic regression analysis of associations between consistent use and characteristics

Characteristic	%	Odds ratio†
Behavioral influences		
Has had an STD (vs. no history)	22	1.24 (0.67–2.25)
Has used alcohol/drugs with sex (vs. no use)	19	0.92 (0.51–1.72)
Frequency of sex in past three months (vs. <monthly)		
>once a week	13	0.37 (0.14–0.97)*
>once a month	23	0.73 (0.31–1.73)
Once a month	27	0.76 (0.23–2.50)
Sexual concurrency in past three months (vs. none)		
Individual	12	0.67 (0.23–1.59)
Partner	33	2.23 (1.26–3.94)*
Partner influences		
High-risk partner (vs. low-risk)	25	1.43 (0.79–2.53)
Partner knows about DMPA/pill use (vs. does not)	20	0.65 (0.28–1.58)
Partner has positive opinion of condom (vs. negative)	46	6.57 (2.91–16.94)***
Partner has positive opinion of DMPA/pill (vs. negative)	20	1.35 (0.33–9.12)
Knowledge and communication		
Believes method is effective in STD/HIV prevention (vs. not)		
DMPA/pill	26	1.86 (0.86–3.91)
Condom	21	1.25 (0.69–2.34)
Couple's communication about sex and birth control (vs. low)		
Medium	20	1.09 (0.50–2.60)
High	21	1.10 (0.45–2.84)
Perception of risk		
Perceives high susceptibility to disease (vs. low)	25	1.57 (0.42–4.86)
Attitude toward condom use		
Believes condom should always be used (vs. should not)		
For vaginal sex	25	5.76 (2.27–19.48)***
For anal sex	23	3.30 (1.38–9.81)***
Even if couple knows each other well	25	3.74 (1.80–8.78)***
Even if other birth control is used	29	7.28 (3.54–17.05)***
Condom self-efficacy		
Believes she could use condom (vs. could not)		
If really wanted to	22	2.51 (0.95–8.66)
Even if knew partner for a long time	26	4.60 (2.22–10.80)***
Even if really turned on	26	2.60 (1.45–4.89)***
Even if using alcohol/drugs	23	1.67 (0.95–3.02)
Even if partner was using alcohol/drugs	23	1.61 (0.88–3.06)
Even if it reduced her sexual pleasure	26	2.88 (1.61–5.36)***
Even if it reduced partner's sexual pleasure	27	3.68 (2.09–7.26)***

*p<.05. ***p<.001. †Adjusted for age, marital status and race. *Note:* Consistent condom users were those who used condoms every time or almost every time with their main partner.

TABLE 4. Odds ratios (and 95% confidence intervals) from logistic regression analysis of associations between consistent condom use and psychosocial characteristics

Characteristic	Odds ratio†
Partner influence	
Partner has positive opinion of condom (vs. negative)	3.34 (1.70–6.82)***
Attitude toward condom use	
Believes condom should always be used (vs. should not)	
For vaginal sex	3.53 (1.12–15.64)*
For anal sex	2.88 (0.92–12.80)
Even if other birth control is used	4.08 (1.78–10.63)***
Condom self-efficacy	
Believes she could use condom (vs. could not)	
Even if knew partner for a long time	2.15 (0.98–4.99)
Even if really turned on	1.67 (0.84–3.46)
Even if it reduced partner's sexual pleasure	1.75 (0.86–3.69)

*p<.05. ***p<.001. †Adjusted for age, race, frequency of intercourse, sexual concurrency and the other variables in the table.

To further examine the influence of psychosocial factors on dual method use, we constructed a model containing the significant variables from Table 3 while controlling for all possible confounders. Because of collinearity between a woman's beliefs that condoms should always be used, even if partners know each other well, and that she could use condoms with a longtime partner, only the latter was included in this model. In addition, the self-efficacy components of reducing her partner's pleasure and reducing her own pleasure were highly correlated, so only the former was included. Also, because of the correlation between marital status and sexual concurrency, only concurrency was retained in the model. Interactions between the remaining variables were not statistically significant.

The factors significantly associated with an increased likelihood of consistent condom use were the partner's positive opinion of condoms (odds ratio, 3.3—Table 4) and the woman's positive attitude toward dual method use—specifically, her belief that condoms should always be used for vaginal sex (3.5) and even if the couple is using another form of birth control (4.1). The measures of condom self-efficacy were no longer significantly related to dual method use after controlling for both partners' general attitudes toward condoms.

DISCUSSION

In this sample of clients at public family planning clinics in Texas, only 20% of women who began using DMPA or the pill also used condoms consistently, and more than half who had consistently used condoms prior to initiating DMPA or

the pill subsequently stopped such use. Women who selected DMPA did not use condoms less frequently than did those who selected the pill, although our study may have been underpowered to detect a difference. Future studies with a larger number of women and longer follow-up period are needed to verify our findings and to identify long-term patterns of dual method use among hormonal contraceptive users.

Inconsistent findings have been reported concerning long-term (up to one year) use of condoms with hormonal methods, including a slight increase in use among DMPA acceptors,[25] decreased use among implant users and no change among women using the pill.[26] With respect to condom use, DMPA users may be dissimilar to users of other long-term hormonal or permanent user-independent methods, such as the IUD, implants and sterilization, since women taking DMPA have more frequent contact with family planning providers. Consequently, like pill users, they have increased opportunities to be reminded about the importance of dual protection.

The overall low rate of condom use and high frequency of concurrent partnerships, combined with exposure to hormonal contraceptives that have been associated with increased risk of contracting HIV and STDs, contribute to the spread of these diseases. The women in this study were primarily young and unmarried. Furthermore, one-third were involved in nonmonogamous relationships, and three-fourths of these women did not use condoms consistently with their hormonal method. We also observed different rates of condom use by concurrency type. Although 33% of women whose partners had concurrent relationships used condoms consistently with that partner, only 12% who had multiple partners themselves did so with their main partner.

Few empirical data are available on concurrency and condom use. In a random-digit dialing survey in Seattle, 18% of women said they had been nonmonogamous during their most recent sexual relationship, and another 18% believed that their partners had had other partners. Overall concurrency was more common among infrequent condom users,[27] but condom use data by type of concurrency (individual vs. partner) were not presented. Another study reported less condom use among couples with one nonmonogamous partner than among those in which both partners reported concurrent relationships.[28] The role of concurrent sexual relationships in intensifying the spread of HIV infection has been established.[29] This type of partnership amplifies the growth rate of HIV epidemics by as much as 10-fold during the initial phase,[30] and ensures the persistence of infection in low-risk groups.[31]

Of the personal and partner characteristics studied, two factors were strongly and independently associated with women's reduced willingness and ability to combine effective contraception and disease protection: male partner dislike of condoms and women's belief that dual method use is not necessary. Self-efficacy, an important correlate of contraceptive behavior and condom use,[32] was not associated with consistent condom use in analyses controlling for women's general attitude about the importance of dual method use and the partner's opinion of condoms. Furthermore, contrary to what has been reported elsewhere,[33] low perception of risk did not differentiate consistent and inconsistent users, possibly because of the overall homogeneity of our sample with respect to this characteristic. More than 95% of the women surveyed, and more than 50% of those in nonmonogamous relationships, believed they were at no or very low risk for various STDs, including HIV infection.

Implications

How can the findings of the present study be utilized by STD and HIV prevention programs? Although women are not solely responsible for condom use, most intervention efforts among heterosexuals are centered on women. However, our data reinforce the necessity of developing interventions to influence male partners' attitudes toward condom use in different situations, and to improve their awareness of the risks of STD and HIV infection concurrent with the risk of unintended pregnancy. Prior work with black adolescent men has shown that interventions aimed at increasing AIDS-related knowledge and countering negative attitudes about using condoms can improve protective behaviors.[34]

There is also an urgent need to improve women's understanding of the importance of simultaneous pregnancy and STD prevention, particularly in high-risk situations such as concurrent partnerships. Our data indicate that women may be able to overcome barriers that have historically been related to lower levels of condom use—such as reduction in pleasurable sensations, lack of spontaneity and involvement in long-term relationships—if they believe dual method use is necessary. In this context, condom promotion campaigns for women must supplement and integrate the "you can" with the "you should" message. Obviously, changing general attitudes about disease prevention will be more difficult than targeting specific barriers, and may be achieved only through continued educational efforts.

Because of the independent nature of male partner influences, improving women's attitudes and skills alone will not increase condom use to desirable levels. Thus, educational programs should focus on the couple and on enhancing women's negotiation skills. Interventions that improve sexual negotiation strategies, including communication skills and conflict resolution, have led to increased condom use among diverse populations of women, even when measured a year after the intervention.[35] Also, couple-based programs have been shown to be more effective in improving preventive behaviors than programs targeted at males or females.[36]

Obviously, such program expansion will require additional resources and time, and hence is costly. However, bringing men and women together in a brief community-based educational program may be as effective as more intensive and costly couple-based interventions,[37] although more research in this area is warranted. Meanwhile, an important means of overcoming male partner influences may be the development of easy-to-use and inexpensive female-controlled barrier methods that are effective in preventing

disease transmission. The female condom is one such option, and it has been shown to help diverse groups of women negotiate protective behaviors with their partners.[38] Unfortunately, several factors, including difficulty with insertion and removal[39] and appearance,[40] have limited its acceptability and widespread use.

Limitations

Specific limitations of this study must be noted. Participants were seen in public clinics and were, therefore, economically disadvantaged. Because preventive behaviors and attitudes toward condom use may differ with respect to socioeconomic status, broad generalization to all DMPA and pill users may not be possible. Also, 15% of the women who were solicited to participate were unwilling or ineligible. We did not collect behavioral or attitudinal information on these women, although they were similar to participants with respect to socioeconomic status.

Another limitation arises because partner concurrency and other high-risk behaviors were assessed by asking the women, and so these factors may be underestimated. A study that assessed concurrency simultaneously for both members of sexual dyads showed that only 26% of individuals whose partners have other partners are aware of this behavior.[41] Furthermore, because the partner's opinion of condom use was obtained from the woman, negative views may be overestimated: Although women's reports about their partners' attitudes toward condoms are more accurate than men's reports, in general both men and women may view condoms more favorably than their partners realize.[42] Nevertheless, the observed association between partners' positive views and consistent condom use in this study is not the artifact of a possible overestimation of negative views. Such misclassification is a minor threat to validity because any bias it introduces is always in the direction of underestimating the effect.[43]

A further limitation, as in most research on sexual behavior, is that the data were obtained from self-reports. Hence, behaviors that are perceived to be socially stigmatizing (e.g., having multiple partners) may be underreported, whereas condom use, a socially desirable behavior, may be overreported. The bias associated with the possible overreporting of condom use can be minimized by asking about use in several ways, but this was not done in the current study. Also, data on condom use pertain to use with the "main" partner, and women may have different patterns of and motives for condom use with "casual" partners.[44] Finally, participants' actual level of STD risk was unknown because of the lack of information on infection status for both women and their partners.

Conclusion

There is a clear need for innovative public health efforts directed at populations similar to the women surveyed in this study. HIV and STD prevention messages should be customized to address the impact of concurrent partnerships in intensifying the spread of HIV infection. Furthermore, the present study provides evidence that situational barriers to condom use may be overcome by altering women's often ambivalent feelings about the need for disease prevention, and also demonstrates that educational efforts focusing on women's attitudes and negotiation skills may be the best means of increasing dual method use.

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