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Condom Use with Steady Partners Among Heterosexual People Living with HIV in Europe: Testing the Information-Motivation-Behavioral Skills Model

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Abstract

Guided by a modified information-motivation-behavioral skills model, this study identified predictors of condom use among heterosexual people living with HIV with their steady partners. Consecutive patients at 14 European HIV outpatient clinics received an anonymous, standardized, self-administered questionnaire between March and December 2007. Data were analyzed using descriptive statistics and two-step backward elimination regression analyses stratified by gender. The survey included 651 participants ($n = 364$, 56% women; $n = 287$, 44%). Mean age was 39 years for women and 43 years for men. Most had acquired HIV sexually and more than half were in a serodiscordant relationship. Sixty-three percent ($n = 229$) of women and 59% of men ($n = 169$) reported at least one sexual encounter with a steady partner 6 months prior to the survey. Fifty-one percent ($n = 116$) of women and 59% of men ($n = 99$) used condoms consistently with that partner. In both genders, condom use was positively associated with subjective norm conducive to condom use, and self-efficacy to use condoms. Having a partner whose HIV status was positive or unknown reduced condom use. In men, higher education and knowledge about condom use additionally increased condom use, while the use of erectile-enhancing medication decreased it. For women, HIV disclosure to partners additionally reduced the likelihood of condom use. Positive attitudes to condom use and subjective norm increased self-efficacy in both genders, however, a number of gender-related differences appeared to influence self-efficacy. Service providers should pay attention to the identified predictors of condom use and adopt comprehensive and gender-related approaches for preventive interventions with people living with HIV.

Introduction

In the World Health Organization European region countries, heterosexual HIV transmission has become increasingly important with 42% of HIV cases reported due to this transmission mode in 2008, compared to 22% in 1996 and 34% in 2000.[1,2] Evidently, people living with HIV (PLHIV) face the challenge of lifelong adherence to medical treatment, but in addition they also should adhere to safer sex on a lifelong basis.

A growing body of evidence shows that sexual risk behavior remains frequent among PLHIV.[3–5] Less research has been done on factors associated with HIV-protection behavior in heterosexual relationships than in same-sex relationships, especially in the European context.[6–8] Studies looking at partner-related aspects of HIV-protection behavior of PLHIV found that condoms were used less frequently with steady than with casual partners.[9–11] However, HIV transmission frequently occurs within stable relationships. Swiss studies found that 30% of men and 61% of women had acquired HIV

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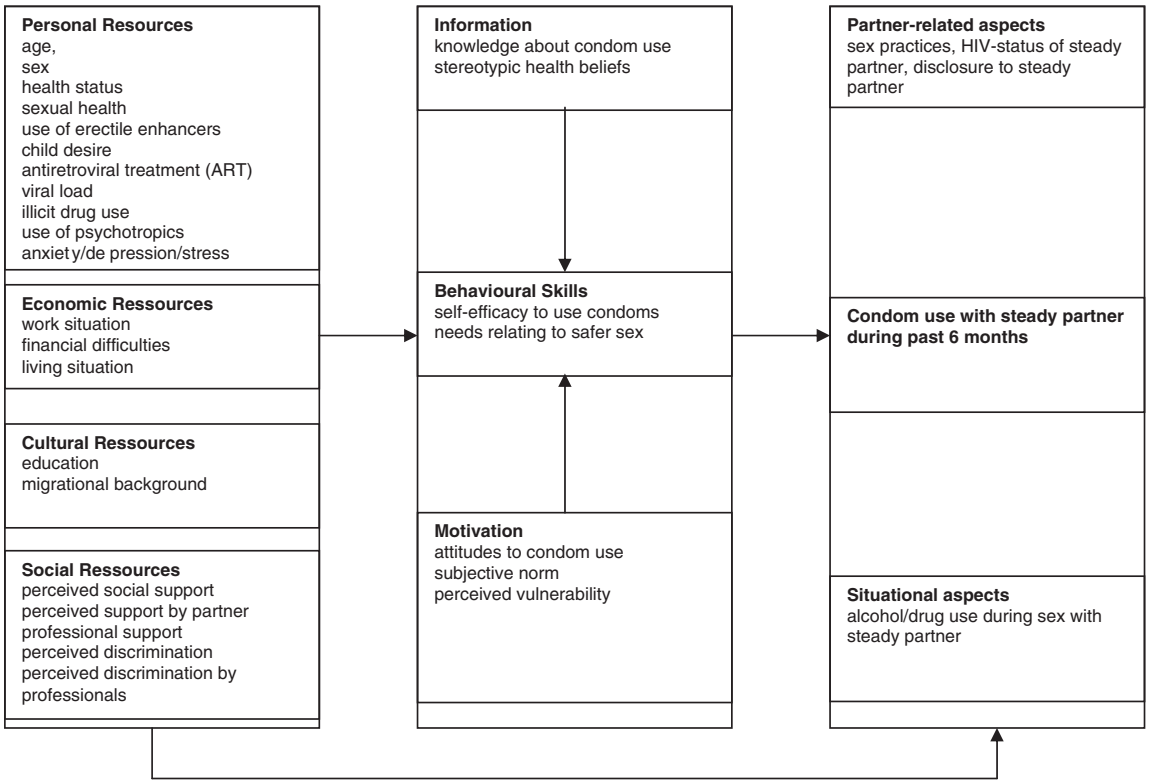

FIG. 1. Modified information-motivation-behavioral skills (IMB) model for heterosexual men and women living with HIV.

within such a relationship.[12,13] Confirming theoretical assumption previously formulated elsewhere,[14] one study by Knight et al.[15] found that an important barrier to safer sex in steady relationships was the desire for intimacy between the couple, which was considered more important than protecting the HIV-negative partner from the virus. Additionally, using condoms may always bring about the association with HIV, which some may experience as frustrating.[16]

The few studies investigating HIV-protection behavior of PLHIV, examined only single factors predicting condom use.[10–12,16–22] Moreover, they often lack an explicit theoretical framework. Therefore, we utilized an empirically tested behavioral theory of HIV risk reduction, i.e., the information-motivation-behavioral skills (IMB) model as conceptual framework in this study.[23,24] This model assumes that three factors essentially influence HIV preventive behavior: (1) information relating to HIV preventive behavior, (2) motivation to perform HIV preventive behavior, and (3) behavioral skills needed to perform the behavior. Empirical research has shown that the IMB model has good predictive value for primary prevention behavior and HIV medication adherence,[25,26] but there may be need to adapt it for sexual protection behavior for HIV-positive populations by including meaningful variables relating to their specific situation.[27]

This study was performed in the framework of the European public health project Eurosupport 5, with the overall goal to collect evidence on improving sexual and reproductive health of PLHIV. It was carried out in 14 European countries and coordinated by the Institute of Tropical Medicine (ITM) in Antwerp, Belgium. Qualitative research, undertaken prior to this study, was used to modify the IMB-model by adding factors theorized to determine condom use among PLHIV.[28] Based on these findings HIV-specific variables (partners' HIV status, HIV disclosure, mental health and social support) were included in the model (Fig. 1). To test this modified IMB model, we identified the factors predicting consistent condom use with steady partners in a sample of heterosexual HIV-positive men and women living in Europe. Using the modified IMB model we hypothesized that behavioral skills predict condom use, while variables relating to the construct information and motivation are predictors of behavioral skills. Additionally, we hypothesized that personal, economic, cultural, and social resources predict condom use, both directly as well as mediated by behavioral skills.

Methods

Study sample

This observational and cross-sectional study was carried out in 17 research sites across Europe, associated with the Eurosupport 5 network and the Swiss HIV Cohort Study. Service providers at the collaborating clinics invited consecutive patients to participate. Inclusion criteria for adult male and female study participants were: diagnosed HIV positive for at least 6 months, comprehension of the study goals and objectives, and able to read and fill in the questionnaire independently. The study sample comprised 651 participants (of 1549 PLHIV surveyed in total): 56% ($n = 364$) women, and 44% ($n = 287$) heterosexual men. Mean age was 39 years for women and 43 years for men. About 57% ($n = 204$) of the women and 47% of the men ($n = 129$) acquired HIV infection through sexual transmission. Other reported transmission categories were: intravenous drug use (women: $n = 55$ or 15%; men: $n = 51$ or 18.5%), combined sexual transmission and

intravenous drug use (women: $n = 27$ or 7.5%; men: $n = 12$ or 4%), blood transfusion (women: $n = 4$ or 1%; men: $n = 19$ or 7%), occupational risk (women: $n = 5$ or 1%; men: $n = 4$ or 1%), mother to child transmission (women: $n = 11$ or 3%; men: $n = 11$ or 4%), and unknown transmission (women: $n = 52$ or 14.5%; men: $n = 50$ or 18%).

Seventy-eight percent ($n = 510$) of all heterosexual participants were on antiretroviral medication, 75% ($n = 382$) of them reported an undetectable virus load.

Procedures and measures

We used an anonymous, standardized self-administered paper-pencil questionnaire developed for data collection by the Eurosupport 5 study group. The study instrument (available in 12 languages) was piloted at the coordinating center for clarity and feasibility. Between March and December 2007, the participating centers distributed the questionnaire to consecutive patients, including a prepaid return envelope (to ITM Antwerp). All study participants provided informed consent for voluntary participation. Ethical approval was obtained at the coordinating center's Institutional Review Board (ITM/University of Antwerp).

Responding to the questionnaire took between 30 and 45 min. The study instrument assessed personal, economic, cultural, and social resources, sexual behavior, and the construct variables of the IMB model. In modifying them to the specific needs of HIV-positive individuals, we followed the specifications of Fisher and Fisher.[23]

Information. The construct information was measured through variables relating to knowledge and stereotypical health beliefs. Knowledge was assessed by 10 true/false items relating to HIV prevention, whereas stereotypical health beliefs measured agreement to 3 distinct items using 5-point Likert scales, for example: "The chance to get HIV infected from anal sex is more likely than from vaginal sex." Items were summed to scores (ranging from 0 to 10 for knowledge, with 10 indicating the highest knowledge; and 3 to 15 for stereotypical health beliefs with 15 indicating the highest degree).

Motivation. The variables attitudes, subjective norm, and perceived vulnerability constituted the construct motivation and were measured using 5-point Likert scales. Attitudes conducive to condom use were measured by 14 items, e.g., "Condoms don't bother me during sex"; adding up to a range from 14 to 70, from very negative to very positive attitudes. Subjective norm relating to condom use included 2 items relating to friends' and partner's condom use norms (e.g., "My partner thinks I should always use condoms when I have sex"; range from 2 to 10, indicating low or high subjective norm, respectively). Perceived vulnerability was assessed using 6 items (e.g., degree of personal fear to contract a sexually transmitted disease). This yielded a composite variable, ranging from 6 to 30, indicating very low to very high perceived vulnerability.

Behavioral skills comprised self-efficacy and support needs relating to condom use, safer sex and communication about sexuality. The first variable was assessed through 7 items using a 5-point Likert scale (e.g., "How hard or easy would it be for you to always use condoms when you have sex?"). The respective variables ranged from 7 to 35, indicating very low to very high perceived self-efficacy. Participants indicated their perceived support needs in specific areas (i.e., multiple choices from a list with predefined items such as safer sex practices, conception, or sexual problems).

Personal resources. Satisfaction with health status was assessed by an 11-point scale ("not at all satisfied" to "completely satisfied"). Currently being on antiretroviral treatment (ART) was measured with one single yes/no question. The use of psychotropic substances was assessed by multiple response questions on the use of anxiety reducers, tranquilizers, and antidepressants. Drug use was assessed by one yes/no question: "Have you used recreational drugs during the past 6 months?" The use of erection-enhancing medication was assessed with the yes/no question: "Have you taken erection-enhancing medication during the past 6 months?" Duration of HIV infection in years was computed on the basis of the date of HIV diagnosis and the date of questionnaire completion. Other medical parameters included viral load (detectable/undetectable), the occurrence of HIV-related physical complaints (yes/no), and having acquired HIV through sexual transmission (yes/no). Satisfaction with sexual health was measured on a scale (0 = "not at all satisfied" to 10 = "com-completely satisfied"). In addition, the number of experiences in sexual violence (0–5), and self-reported changes in sexual activities since HIV diagnosis (0–6) were reported.

Mental health was measured by the 21-item version of the Depression Anxiety Stress Scales (DASS).[29] For this scale, good psychometric properties have been obtained, i.e., for the depression scale, Cronbach $\alpha = 0.87$; for the anxiety scale, Cronbach $\alpha = 0.84$, and for the stress scale, Cronbach $\alpha = 0.87$.

Child desire was measured by a yes/no question ("Do you wish to have [more) children?").

Economic resources. Employment was assessed by asking a single response question on the current work situation (regular full-time employment; part-time employment; student; unemployed; in retirement; not fit to work; housewife/husehusband; other). Financial difficulties were assessed with one multiple response question on the occurrence of different kinds of financial problems during the past 6 months. Relationship status was assessed with one yes/no question ("Are you currently in a steady relationship?").

Cultural resources. Education was measured with a single response question on the highest educational level completed. Migration background was assessed by asking information on the country or region of origin.

Social resources. Social support was assessed using the Social Support Inventory (SSI). Prior research found internal consistency of the subscales to be satisfactory, with α values ranging from 0.70 to 0.86.[30] In our sample, Cronbach α ranged from 0.92 to 0.93. Professional support was measured by multiple response questions on the consultation of medical and psychosocial services. The score for professional support by adding up the respective responses resulted in a value from 0 to 11. Perceived discrimination was assessed by a yes/no question on the experience of HIV-related discrimination during the last 3 years. Participants who answered "yes" could further specify its source (multiple responses). The score

for these variables was obtained by summing the responses resulting in a range from 0 to 8, or 0 to 12, respectively.

Situational and partner-related factors. Alcohol and drug use linked with sex were assessed by asking how often the participants had consumed drugs or alcohol immediately before and/or during sex with steady partners (5-point Likert scale) during the past 6 months. HIV status of steady partners (HIV-positive/HIV-negative/unknown) was measured by one single question: "What is the HIV status of your steady partner?" Sexual practices were assessed by the question: "Which sexual activities have you had with your steady partner during the last 6 months?" (vaginal sex; active/insertive; passive/receptive anal intercourse). Disclosure of HIV status was measured by a yes/no question ("Did you disclose your HIV status to your steady partner?").

HIV-protection behavior. The dependent variable protection behavior was assessed for different sexual practices (vaginal, insertive/receptive anal intercourse). Study participants were asked to estimate the number of sexual encounters relating to these practices during the past 6 months with their steady partner. The dependent variable was then expressed as the percentage of condom use by calculating the ratio of the numbers of sexual acts using condoms, relative to the number of overall sexual acts multiplied by 100 (0–100% condom use). In order to decrease a potential recall bias, respondents were instructed to think about the average number of times per week and multiply this with 4 (per month) and then by 6 (per month). We used count data as they are more specific to a person's risk and usually are seen as superior to dichotomous variables.[31]

Statistical analysis

Descriptive analyses were carried out using frequency analysis and results were described by central tendency, dispersion (mean, standard deviation [SD]) and distribution, where appropriate. Next, backward elimination standard regression analysis was performed to test the fit of the modified IMB model for condom use with steady partners.[32] For both genders, separate two-step procedures were applied: the first step involved a backward elimination standard regression analysis of condom use (as dependent variable) looking at the influences of the IMB-construct variables, and the variables relating to personal, economic, cultural and social resources. The second step was a backward elimination standard regression analysis of behavioral skills-construct variables (i.e., self-efficacy) to determine influences of personal, economic, cultural and social resources; all models were controlled for specific confounders, i.e., alcohol- and drug use during sex, sexual practices, number of casual partners, and partners' HIV status.

The criterion for exclusion of variables from a model was at 1% significance level. Both models controlled for situational and partner-related aspects, i.e., alcohol and drug use during sex, sexual practices, and partners' HIV status. Data analysis was performed using the Statistical Package for Social Science, version 16.0 (SPSS Inc., Chicago, IL).

Results

In exploring condom use with steady partners we computed the regression models for the subsample of $n = 398$, who had at least one sexual encounter with steady partners during the past 6 months prior to the survey. Sixty-three percent ($n = 229$) of all women and 59% of all men ($n = 169$) reported at least one sexual encounter (vaginal/anal intercourse) with a steady partner. More than half of these women and approximately 60% of these men were in a serodiscordant relationship. A small proportion also reported having had sex with casual partner(s) in the same period: 15% ($n = 38$) and 26% ($n = 57$) for women and men, respectively. Fifty-one percent ($n = 116$) of the women and 59% ($n = 99$) of the men reported consistent condom-use, i.e., they always used a condom with steady partners. The mean values and the distribution of the variables of the modified IMB model are shown in Table 1.

For both genders, regression analysis revealed that condom use with steady partners was positively associated with subjective norm conducive to condom use and higher self-efficacy while an unknown, or HIV positive status, was associated with decreased condom-use. Table 2 displays the univariate analysis for both outcome variables by gender, i.e., condoms use with steady partner and self-efficacy for condom use. For women, disclosure of their HIV status to steady partners was additionally negatively associated with condom use (Table 3). In men (Table 4) higher education, knowledge about safer sex, being on antiretroviral treatment and perceived discrimination by health-care providers increased condom use, while the use of erection-enhancing medication decreased it.

Positive attitudes to condom use and subjective norm were the main factors predicting self-efficacy to adopt condom use; in women, self-efficacy was higher for those with greater partner-support, and without migration background (Table 5). In men, higher levels of anxiety, feeling more depressed, lower satisfaction with sexuality, and greater perceived vulnerability were associated with decreased self-efficacy (Table 6).

Discussion

The main purpose of this study was to test the IMB model specifically articulated for HIV-positive heterosexual women's and men's condom use with steady partners. In our sample, condoms were not used consistently, i.e., approximately 49% of women and 41% of men did not use condoms at all sexual encounters with their steady partners during the last 6 months. Our findings add to the growing body of evidence on the theoretical validation of the IMB model and specify its relevance for PLHIV.[32–35] The IMB model appeared to be partially valid, i.e., not all model predictors could be determined as hypothesized. While condom use was significantly related to IMB constructs such as subjective norm and higher self-efficacy, also HIV-specific predictors, derived from the qualitative research had additional explanatory value; for instance having an HIV positive partner, or one with an unknown serostatus, made it less likely to use condoms. We also found relevant gender differences: partner-related factors exerted more influence on women, whereas for men, health-related factors were more influential. Also knowledge relating to condom use was only predictive for men and not for women.

Our results on protection behavior appear to be in line with similar research in the field. For example, Bouhnik et al.[4]

Table 1. Mean Values and Distribution of the Construct Variables (Modified IMB Model)

	Women (n = *229*)		*Men* (n = *169*)	
	Mean (*SD*)	% (n)	*Mean* (*SD*)	% (n)
Personal resources				
Duration of HIV infection in years (0–27)	9.37 (6.79)		10.40 (6.51)	
Satisfaction with health status (0–10)	7.24 (2.33)		7.35 (2.16)	
Physical impairments		23.1 (53)		16.0 (27)
Viral load undetectable		63.3 (145)		61.5 (104)
Drug use		11.4 (26)		16.6 (28)
Use of psychotropic drugs		50.7 (116)		43.2 (73)
Use of erectile-enhancing medication		—		7.1 (12)
Satisfaction with sexuality[a] (0–10)	6.46 (1.78)		7.12 (1.40)	
Number of persons by whom respondent was pressured into sex[b] (0–5)	0.28 (0.61)		0.11 (0.45)	
Number of changes in sexual behavior[a] (0–5)	1.53 (1.26)		1.80 (1.30)	
Economic resources				
Employed[b]		53.3 (122)		69.2 (117)
Financial difficulties[a]		44.1 (101)		33.7 (57)
Cultural resources				
Education (1–6)	4.29 (1.29)		4.57 (1.23)	
Migration background		31.0 (71)		24.3 (41)
Duration of living in country of distribution in years[b] (0–67)	16.74 (8.57)		26.67 (8.79)	
Social resources				
Partner support (0–20)	14.57 (4.70)		15.05 (4.88)	
Social support (0–20)	12.08 (5.23)		12.87 (5.24)	
Professional support[b] (0–11)	2.14 (1.61)		1.68 (1.55)	
Number of experienced discrimination (0–8)	0.48 (0.87)		0.39 (0.77)	
Number of experienced discrimination by health care providers[a] (0–12)	0.58 (1.01)		0.34 (0.71)	
Information				
Knowledge about condom use and safer sex (0–10)	7.28 (0.73)		7.34 (0.62)	
Stereotypic health beliefs (3–15)	12.94 (3.94)		13.22 (3.88)	
Motivation				
Attitudes to condom use and safer sex (7–70)	50.43 (8.49)		50.47 (7.00)	
Subjective norm (2–10)	8.11 (1.92)		8.49 (1.77)	
Perceived vulnerability (6–30)	12.58 (6.05)		12.63 (5.50)	
Stress (0–42)	12.72 (8.53)		12.16 (9.46)	
Anxiety (0–42)	7.73 (7.13)		8.24 (8.82)	
Depression (0–42)	10.66 (8.89)		10.08 (9.34)	
Wish to have (more) children		42.4 (97)		37.9 (64)
Disclosure of HIV status to steady partner		88.2 (202)		88.2 (149)
Behavioral skills				
Self-efficacy (7–35)	26.65 (5.63)		27.95 (4.86)	
Needs relating to prevention and safer sex (0–2)	0.88 (1.24)		0.98 (1.30)	
Needs relating to sexual problems (0–4)	0.66 (0.72)		0.52 (0.65)	
Support needed in problems with condom use		11.4 (26)		7.7 (13)
Support needed in communication about sexuality		13.1 (30)		13.0 (22)
Situational aspects				
Frequency of drug use when having sex with steady partner (1–5)	1.23 (0.66)		1.26 (0.63)	
Frequency of alcohol use when having sex with steady partner (1–5)	1.58 (0.83)		1.75 (0.83)	
Partner-related aspects				
Vaginal sex		94.3 (216)		94.1 (159)
Anal sex/active, passive		17.5 (40)		16.6 (28)
Steady partner HIV-positive		32.3 (74)		30.8 (52)
Steady partner HIV-negative		53.7 (123)		59.2 (100)
Steady partners' serostatus unknown		9.6 (22)		5.3 (9)
No answer provided on steady partner's serostatus		4.4 (10)		4.7 (8)

[a] $p < 0.05$.
[b] $p < 0.01$.
Note: *t* Test or χ^2 Test.
IMB, information-motivation-behavioral skills.

Table 2. Univariate Analysis for Condom Use and Self-Efficacy

	Condom use with steady partner		*Self-efficacy*	
	Women (n = *229*)	*Men* (n = *169*)	*Women* (n = *229*)	*Men* (n = *169*)
	r	r	r	r
Condom use with steady partner	1.00	1.00	0.37[a]	0.34[a]
Age in years	0.07	−0.06	0.02	0.07
Education	0.12[c]	0.19[b]	0.12[c]	0.16[c]
Employed	0.03	0.16[c]	0.19[a]	0.17[b]
Financial difficulties	0.02	−0.04	−0.16[b]	−0.09
Duration of HIV infection in years	0.04	0.07	0.07	0.07
Physical impairments	−0.05	−0.09	0.02	−0.02
Viral load undetectable	0.10	0.09	−0.02	−0.03
Drug use	−0.06	0.02	0.02	−0.10
Use of psychotropic drugs	0.03	0.01	0.07	−0.10
Use of errectile-enhancing medication	—	−0.25[a]	—	−0.12[c]
Satisfaction with sexuality	0.02	0.01	−0.05	−0.09
Number of persons by whom respondent was pressured into sex	0.01	0.00	0.03	−0.12
Number of changes in sexual behavior	0.19[b]	0.24[a]	0.11[c]	0.20[a]
No migration background	−0.04	−0.05	0.07	−0.04
Duration of living in country of distribution in years	−0.05	−0.17[c]	−0.08	−0.07
Satisfaction with health satus	−0.03	0.06	0.15[b]	0.15[c]
HIV by sexual transmission	−0.07	0.04	0.02	−0.08
Antiretroviral treatment	0.02	0.11	0.01	0.07
Partner support	0.03	−0.05	0.15[b]	0.03
Social support	0.11[c]	0.03	0.07	0.04
Professional support	−0.01	0.01	0.13[c]	0.06
Number of experienced discrimination	0.02	−0.02	0.09	−0.06
Number of experienced discrimination by health care providers	−0.02	0.09	0.00	0.00
Stereotypic health beliefs	−0.06	−0.04	0.08	−0.03
Perceived vulnerability	−0.07	−0.16[c]	−0.16[b]	−0.24[a]
Knowledge about condom use and safer sex	0.03	0.12	0.03	0.01
Attitudes to condom use and safer sex	0.26[a]	0.20[a]	0.57[a]	0.38[a]
Subjective norm	0.49[a]	0.36[a]	0.36[a]	0.27[a]
Stress	0.02	−0.06	−0.02	−0.08
Anxiety	0.01	−0.04	−0.03	−0.06
Depression	−0.06	−0.13[c]	−0.09	−0.17
Wish to have (more) children	0.08	−0.20[b]	0.02	−0.08
Disclosure of HIV status to steady partner	−0.05	−0.05	0.15[b]	−0.01
Self-efficacy	0.37[a]	0.34[a]	1.00	1.00
Needs relating to prevention and safer sex	0.05	−0.07	−0.06	0.00
Needs relating to sexual problems	−0.06	−0.02	0.08	−0.04
Support needed in problems with condom use	0.03	−0.06	−0.08	−0.12
Support needed in communication about sexuality	−0.05	−0.07	−0.01	0.07
Frequency of drug use when having sex with steady partner	−0.13[c]	−0.07	−0.02	−0.26[a]
Frequency of alcohol use when having sex with steady partner	−0.01	−0.02	−0.04	−0.13[a]
Vaginal sex	0.04	0.02	0.12[c]	0.05
Active anal sex	−0.16[b]	−0.13[c]	−0.16[b]	−0.14[c]
Passive anal sex	−0.09	−0.06	−0.03	0.06
Steady partner HIV positive	−0.29[b]	−0.26[a]	−0.09	−0.07
Steady partner HIV negative	0.39[b]	0.27[a]	0.19[a]	0.14[c]
Steady partners' serostatus unknown	−0.19[b]	−0.03	−0.18[a]	−0.14[c]

[a] $p < 0.001$.
[b] $p < 0.01$.
[c] $p < 0.05$.

reported a rate of unsafe sex of 26% of men and 34% of women, surveyed in the VESPA Study with sero-different steady partners. In a London-based HIV center, 28% of HIV-infected women and 53% of HIV-infected men always used a condom for vaginal or anal intercourse.[37] The Swiss cohort study reported 76% consistent condom use, and the Swiss analysis revealed that gender, age, ethnicity, HIV transmission group, partner's HIV status, having occasional partners, and living alone were risk factors for unprotected sex.[38] A French study also showed that sexual risk was explained by gender-specific factors and related to social vulnerability.[5]

The finding that the partner's serostatus reduces condom use should be highlighted in terms of prevention policies. The modified IMB model revealed that subjective norm—as part

Table 3. IMB Model for Women's Condom Use with Steady Partners (Correlation Coefficients and β Weights)

Step 1	r	β	R^2 *adj.*
Condom use			
Behavioral skills			
Self-efficacy	0.37[a]	0.20[a]	
Motivation			
Subjective norm	0.50[a]	0.35[a]	
Partner-related aspects			
Steady partner HIV[b]	−0.29[a]	−0.23[a]	
HIV status of partner unknown	−0.19[c]	−0.26[a]	
Disclosure to steady partner	−0.05[d]	−0.16[d]	
Model			0.35[a]

$n = 229$, $\alpha = 0.01$.
[a]$p < 0.001$.
[b]$p < 0.10$.
[c]$p < 0.01$.
[d]$p < 0.5$.

Table 5. IMB Model for Women's Self-Efficacy for Condom Use with Steady Partners (Correlation Coefficients and β Weights)

Step 2	r	β	R^2 *adj.*
Behavioral skills			
Self-efficacy			
Motivation			
Attitudes to condom use	0.57[a]	0.52[a]	
Subjective norm	0.36[a]	0.22[a]	
Social resources			
Partner support	0.15[b]	0.15[b]	
Cultural resources			
No migration background	0.07[c]	0.12[b]	
Model			0.40[a]

$n = 229$, $\alpha = 0.01$. *$p < .05$,
[a]$p < 0.001$.
[b]$p < 0.01$.
[c]$p < 0.10$.

of the motivational construct, and self-efficacy—as part of behavioral skills, were important predictors of condom use in steady relationships. This is consistent with the findings across a large number of studies on determinants of safer sex behavior, which showed that subjective norm contribute significantly to the intention to practice safer sex.[39] Subjective norm on condoms-use, i.e., using them because significant others may expect PLHIV to do so, translated into their actual use. This notion may open an important window for individual or couple support, and for prevention campaigns, targeted toward PLHIV. Subjective norm determined self-efficacy, which was an additional factor in predicting condom use. This is compatible with existing social cognitive theories on health behavior change, in which self-efficacy is either an important predictor or mediator of health behavior.[40,41] Self-efficacy may be shaped differently by gender-specific experiences,[42] and this is corroborated by our study. Influences from social and cultural resources (i.e., partner support and not having a migration background) were more relevant for women than for men in building self-efficacy. Men's self-efficacy, on the contrary, was influenced by aspects related to sexual and mental health.

Some limitations must be acknowledged: This study was conducted among a multi-site convenience sample of PLHIV, and results are not representative for the general population of PLHIV. Study participation was voluntary and data were self-reported. Social desirability may thus have biased our results. Carefully designing the questionnaire, the anonymous nature of the study and the centralized data handling

Table 4. IMB Model for Men's Condom Use with Steady Partners (Correlation Coefficients and β Weights)

Step 1	r	β	R^2 *adj.*
Condom use			
Behavioral skills			
Self-efficacy	0.34[a]	0.20[b]	
Information			
Knowledge about safer sex	0.12[c]	0.15[c]	
Motivation			
Subjective norm	0.36[a]	0.26[a]	
Partner-related aspects			
Steady partner HIV[d]	−0.26[b]	−0.15[c]	
Social resources			
HIV-related discrimination by health care providers	0.09[d]	0.14[c]	
Cultural resources			
Education	0.19[c]	0.16[c]	
Personal resources			
Using erectile enhancers	−0.25[b]	−0.17[b]	
Being on ART	0.11[c]	0.14[c]	
Model			0.29[a]

$n = 169$, $\alpha = 0.01$.
[a]$p < 0.001$.
[b]$p < 0.01$.
[c]$p < 0.05$.
[d]$p < 0.10$.
IMB, information-motivation-behavioral skills.

Table 6. IMB Model for Men's Self-Efficacy for Condom Use with Steady Partners (Corr. Coefficients and β Weights)

Step 2	r	β	R^2 *adj.*
Behavioral skills			
Self-efficacy			
Motivation			
Attitudes to condom use	0.38[a]	0.27[a]	
Subjective norm	0.27[b]	0.19[c]	
Perceived vulnerability	−0.24[b]	−0.22[b]	
Personal resources			
Satisfaction with sexuality	−0.09	−0.14[c]	
Depression	−0.17[c,d]	−0.26[c]	
Anxiety	−0.06[c]	−0.22[c]	
Model			0.22[a]

$n = 169$, $\alpha = 0.01$.
[a]$p < 0.001$.
[b]$p < 0.01$.
[c]$p < 0.05$.
[d]$p < 0.10$.
IMB, information-motivation-behavioral skills.

should have alleviated some of these effects. Furthermore, the cross-sectional design does not allow for assessing causal relationships.

Notwithstanding the methodological imitations, our findings translate into relevant conclusions for evidence-based prevention interventions for PLHIV, indicating that both gender-specific differences and HIV-specific factors (such as couples of same or different HIV status and readiness to disclose), should be taken into consideration when supporting PLHIV in practicing safer sex. In more concrete terms, service providers need to work with their clients on facilitating and hindering factors of condom use. This should include focusing on subjective norm and strengthening self-efficacy, and supporting PLHIV in concrete planning on how to move from intentions to actions. However, this may mean different approaches for women and men, e.g., enhancing negotiation skills, partner support, and assertiveness for HIV-positive women, as well as working on sexual- and mental-health related aspects in men. Couple counseling may offer an entry point here, as an opportunity to focus on managing protection behavior within the relationship, focusing on the couple's resources and strengths. Discussing individual perceptions of condom fit and feel may additionally increase the use of the diverse range of condoms available.[43] Because facilitating factors can be multiple and complex rather than singling out one specific risk behavior, a more comprehensive approach should allow for building on the couples' personal, cultural, and social resources to support them in improving their sexual health.

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