

# HIV Risk Behaviors among Women Living in Low-Income, Inner-City Housing Developments

## ABSTRACT

**Objectives.** This study describes the prevalence and predictors of human immunodeficiency virus (HIV) risk behaviors among women living in low-income, inner-city housing developments.

**Methods.** Anonymous questionnaires were administered to 671 women living in 10 inner-city, low-income housing developments in five US cities to determine their levels of HIV risk behavior and predictors of HIV risk practices.

**Results.** Approximately one third of women were at high risk for HIV because of the risk behavior of their sexual partners. HIV risk was highest among women who accurately perceived themselves to be at increased HIV risk, held strong beliefs about barriers to condom use, and reported weak behavioral intentions to reduce risk. Women at higher risk were also younger and reported higher rates of alcohol and substance use.

**Conclusions.** HIV prevention efforts are needed for inner-city women. Interventions should focus on overcoming women's barriers to condom use, strengthening their intentions to change behaviors, and managing the risk related to their use of substances. (*Am J Public Health.* 1996;86:1123-1128)

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## Introduction

Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) is now the fourth leading cause of death among adult American women under the age of 45.<sup>1</sup> As with the historical pattern of HIV infection among men, risk for the disease is not equally distributed across the entire population of women but is disproportionately high among impoverished minority women in our inner cities. Approximately 77% of female AIDS cases diagnosed in the United States in 1994 occurred among African-American and Hispanic women, although African-American and Hispanic women make up only 21% of all US women.<sup>2</sup> The epidemiology of HIV infections among women is also changing, with heterosexual transmission rather than a woman's own injection drug use now accounting for the majority of new infections.<sup>3</sup> Recent sentinel seroprevalence studies show increasing levels of HIV infection among inner-city women seen in sexually transmitted disease clinics, reproductive health clinics, and urban primary health care programs.<sup>4,5</sup>

A large number of studies have identified the prevalence of HIV sexual risk behaviors among gay or bisexual men and have examined factors predictive of gay men's risk behavior. Across studies with various samples, such factors as age, perceived self-efficacy of behavioral change, intentions to practice safer sex, perceived norms among peers and sexual partners concerning condom use, sexual negotiation or assertiveness skills, and use of alcohol or recreational drugs in association with sexual activity have emerged as

salient predictors of gay men's sexual risk behavior.<sup>6-12</sup>

Much less is known about the prevalence and nature of such risk behavior and predictive factors among inner-city women.<sup>13</sup> Jemmott and Jemmott<sup>14</sup> have found that normative beliefs concerning condom use are salient influences on minority women's intentions to use condoms, while Nyamathi and her colleagues have reported an active coping style, high self-esteem, and less drug use as determinants of low levels of HIV risk behavior among homeless and drug-addicted minority women.<sup>15,16</sup> Sexual communication skills between partners and enjoyment of condom use have been shown to influence condom use among sexually active urban women.<sup>17</sup> A number of writers have also noted that social and cultural factors such as patterns of traditional sex role socializa-

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tion, lack of power in dyadic sexual relationships, social and economic dependence on a male relationship partner, male resistance to condom use, and life chaos associated with impoverishment all constitute barriers to a woman's ability to take protective steps against sexually transmitted HIV infection.<sup>18-20</sup> In addition, and in contrast to patterns observed among men in which sexual HIV risk is often conferred through having very large numbers of different partners, women may be more often at risk because of their main partner's extrarelationship sexual or drug use activity.

The purpose of the present study was to characterize the nature and prevalence of HIV risk characteristics in a large sample of low-income adult women living in inner-city housing developments. In contrast to previous research, which has often relied on small convenience samples drawn from a single city, the present research surveyed low-income women in five American cities. Within the population of low-income women, considerable variability in levels of HIV risk was expected, with some women at very high risk and others at little or no risk. Consequently, a second purpose of the research was to determine the extent to which social and psychological characteristics such as HIV risk knowledge, substance use patterns, perceived HIV risk, intentions to change behavior, perceptions of safer sex norms, and beliefs about condoms predicted HIV risk behavior in community samples of low-income women.

## Methods

### Setting and Participants

This research was conducted in spring 1994 in 10 inner-city, low-income housing developments in Milwaukee, Wis; Roanoke, Va; Cleveland, Ohio; Rochester, NY; and Tacoma, Wash. These cities were selected because, based on local HIV seroprevalence studies, they are typical of middle-sized cities in the United States that are now encountering an increase in HIV infections among impoverished women. Housing developments were selected primarily because they had female heads of household, were of moderate size with relatively stable tenant populations, and were located in disadvantaged areas of the city. Two matched housing developments were identified in each of the five cities. Each development had 65 to 150 households, and all were located in central urban areas with high

rates of poverty, sexually transmitted disease, and drug use.

Data were collected from 671 women in the 10 developments (range: 89 to 207 women per city). All women over the age of 18 in each development were approached by female research staff and asked to participate in the study. Based on the housing management's census from each development, approximately 80% of all adult women living in each development completed the survey. The demographic characteristics (age, race, number of children, income, and educational level) of the respondents were comparable to those of all adult female residents in each of the housing developments. For completing the assessment, women were compensated \$15, part of which was intended to cover the cost of child care.

### Assessment Measure

Women completed the assessment in small groups that met in community rooms within each housing development. Because interview data collection methods may promote inaccurate reports of sexual or drug use behaviors owing to social desirability,<sup>21</sup> each woman anonymously recorded her responses on a printed survey questionnaire. To ensure that women with low reading levels understood assessment measures and to provide an opportunity to explain each question in more detail if necessary, research staff used an overhead projector to display a facsimile of the questionnaire and read aloud each item while participants privately marked responses on their own form. Content of the questionnaire was adapted from previous research on factors related to HIV risk.<sup>7,22,23</sup> The survey measure was pilot tested with 100 women from other housing developments to ensure that questions were clear and easily understood and to establish psychometric indices of multi-item scales. The measure, which took approximately 30 minutes to complete, assessed the following variables:

**Demographic characteristics.** Women indicated their age, race/ethnicity, education, income, number of children, history of HIV testing and treatment for sexually transmitted diseases, and current relationship status.

**HIV risk behavior knowledge scale.** Practical understanding of AIDS risk behavior and risk reduction steps was assessed using a 12-item true-false scale. Sample items included the following statements: "Latex is the best material a condom can be made of for protection

against the AIDS virus" and "Most people who carry the AIDS virus look and feel healthy." This scale demonstrated adequate internal consistency (Cronbach's alpha = .74).

**Sexual and substance use behavior.** Women were instructed to think about their sexual behavior during the past 2 months. They were then asked to report the number of their male sexual partners, the total number of times they had intercourse, and the number of times they used condoms during intercourse over this specified time period. This format has been extensively tested, and the "past 2 months" time frame was used because it elicits reliable reports of sexual behavior.<sup>24</sup> Women described their sexual behavior with both their regular sexual partner and any other sexual partners. Regular partners were defined as a man with whom the respondent had a current or long-term relationship; other partners were defined as any other man with whom the respondent had sex within the past 2 months. Additionally, each woman indicated the number of days in the past 2 months when she used alcohol, marijuana, cocaine or crack, and injection drugs.

**Risk level of male sexual partners.** Women may be at risk for HIV infection if they have multiple sexual partners or if they have an exclusive sexual relationship with a man who either injects drugs or has unprotected sex with other people. Therefore, participants completed items assessing the HIV risk behavior of their regular partner and any other sexual partner. Using 4-point Likert ratings (from 1 = "sure he did not" to 4 = "sure he did"), women were asked to rate how sure they were that their regular and other sexual partners had ever injected an illegal drug or had sex with anyone else in the past year.

**Personal risk estimation.** Based on her behavior over the past 2 months, the respondent was asked to indicate her perceived risk for getting the AIDS virus. Responses to this question ranged from 1 = "no risk at all" to 5 = "a lot of risk." The time frame for risk self-estimation was the same as for sexual behavior self-reports to permit comparison of risk behavior with risk estimation over the same period. In addition to its face validity, this measure has exhibited predictive validity in previous investigations of HIV risk among gay men.<sup>12,25</sup>

**Risk reduction behavioral intentions.** Women completed a three-item scale assessing their intentions to use condoms

during their next intercourse occasion. Each item consisted of a statement (e.g., "I will say no to sex with a male partner if he will not use a condom") and a 4-point Likert scale to indicate her level of agreement (from 1 = "strongly disagree" to 4 = "strongly agree"). This scale yielded scores ranging from 3 to 12, with higher scores indicative of stronger intentions to engage in safer sex, and it demonstrated satisfactory internal consistency (Cronbach's  $\alpha = .82$ ).

**Safer sex peer norms.** Respondents completed a four-item scale to assess perceptions of peer norms concerning condom use. Each item consisted of a statement (e.g., "Most of my closest women friends use condoms when they have sex with a man") and a 4-point Likert scale to indicate level of agreement (from 1 = "strongly disagree" to 4 = "strongly agree"). This scale produced scores ranging from 4 to 16 (Cronbach's  $\alpha = .82$ ).

**Condom barrier beliefs.** Four items were used to assess beliefs about barriers to condom use. The four items included the following statements: "Sex is not as good with a condom," "Using condoms means you don't trust your partner," "I do not have a need to use condoms," and "My partner would react badly if I suggested the use of a condom." Women again indicated their level of agreement with each statement using a 4-point Likert scale (from 1 = "strongly disagree" to 4 = "strongly agree").

**Conversations with male partners about condoms and AIDS concerns.** To assess the salience of AIDS concerns and safer sex, communication between the woman and her partner about condoms and health, and negotiation efforts concerning risk reduction, the women reported the number of times in the past 2 months when they had talked with their partners about condoms and, separately, about AIDS concerns.

### Statistical Analysis

To identify factors predictive of high HIV risk among inner-city women, respondents were classified into high or low risk groups, and the classification was modeled with logistic regression. High-risk women were defined as those who (1) had multiple male sexual partners in the past 2 months and reported any unprotected intercourse; (2) had unprotected intercourse with a partner believed to have injected illegal drugs or to have had sex with other people in the past year; (3) had unprotected intercourse with an HIV-

positive man; (4) had used injection drugs in the past 2 months; (5) had been treated for a sexually transmitted disease in the past 2 months and reported any unprotected intercourse; or (6) had unprotected intercourse with a regular partner with whom she had been sexually involved for less than 1 year and was uncertain whether that partner had injected drugs or had sex with other people. Low-risk women were those who reported no intercourse, no occasions of unprotected intercourse (i.e., no intercourse occasions when condoms were not used), and involvement in a mutually monogamous relationship with a man who she reported had tested negative for HIV and who she believed did not inject illegal drugs or have sex with other people. This classification scheme yielded 319 low-risk women and 206 high-risk women. The remaining women in the sample could not be reliably categorized as high or low in risk either because of missing responses on items used to determine risk categorization or because they reported relationships with regular male partners who did not have known risk characteristics but were not described as monogamous. Given uncertainty concerning their risk level, these women were not included in the risk-level group comparisons.

A series of univariate logistic regressions was conducted to identify individual predictor variables of risk classification. To establish the relative contributions of predictor variables, many of which were intercorrelated, a forward stepwise logistic regression analysis was conducted. The odds ratio was used to assess the strength of bivariate associations.<sup>26</sup>

### Results

The mean age of surveyed women was 33.2 years (SD = 11.8, range = 18 to 76), and the average level of education completed was 11.5 years (SD = 1.9, range = 3 to 17 years). Eighty-two percent of the women were African American, 10% were White, 5% were Hispanic/Latina, and 3% were of other ethnicities. Sixty-three percent of women had household incomes below \$700 per month, and 93% of women had children (mean = 3.1 children, SD = 2.0 children).

#### HIV Risk Behavior Knowledge

As Table 1 shows, the women's knowledge of HIV risk behavior varied; the mean score for correct answers on the 12-item knowledge measure was 72%. While most of the women were aware of

**TABLE 1—Percentage of Inner-City Women (n = 655) Correctly Answering Each of 12 Items Constituting an HIV Risk Knowledge Test\***

Item	% Responding Correctly
Birth control pills protect against the AIDS virus (F)	90
If a man pulls out right before orgasm (cumming), condoms don't need to be used to protect against the AIDS virus (F)	89
Most people who have the AIDS virus look sick (F)	80
Vaseline and other oils should not be used to lubricate condoms (T)	56
Latex is the best material a condom can be made of for protection against the AIDS virus (T)	46
Cleaning injection needles with water is enough to kill the AIDS virus (F)	89
Most people who carry the AIDS virus look and feel healthy (T)	46
Hand lotion is not a good lubricant to use with a condom (T)	60
A woman is not likely to get the AIDS virus from having sex with a man unless he is bisexual (F)	87
Condoms cause men physical pain (F)	74
If you're seeing a man and he agrees not to have sex with other people, it is not important to use a condom (F)	85
Always leave some room or "slack" in the tip of the condom when putting it on (T)	62

\*Percentages are based on women who provided responses to all 12 HIV risk knowledge scale items.

HIV risks related to injection drug use and heterosexual transmission, there were also important areas of misconception. For example, most of the women did not know that people with HIV often look and feel healthy and that latex condoms

**TABLE 2—Percentage of Women (n = 671) Living in Low-Income Housing Developments Reporting Various HIV Risk-Related Sexual Behaviors in the Past 2 Months<sup>a</sup>**

Risk Behavior	% (No.) Women Reporting the Behavior
Intercourse with two or more sexual partners	14 (97/671) <sup>b</sup>
Intercourse with a regular sexual partner believed to have injected drugs	6 (29/499) <sup>c</sup>
Intercourse with a regular sexual partner believed to have had sex with others in the past year	40 (199/503) <sup>c</sup>
Intercourse with a regular partner whose HIV serostatus is unknown	60 (304/510) <sup>c</sup>
Intercourse with other sexual partners believed to have injected drugs	9 (9/95) <sup>d</sup>
Intercourse with other sexual partners believed to have had sex with others in the past year	68 (63/93) <sup>d</sup>

<sup>a</sup>Denominators vary because all items do not pertain to every participant or because some data were missing. Belief about partner risk was based on women reporting that they were "sure" or "pretty sure" of their partner's risk characteristics.

<sup>b</sup>Pertains to all women.

<sup>c</sup>Pertains only to women with at least one sexual partner.

<sup>d</sup>Pertains only to women with more than one sexual partner.

afford the best protection against the AIDS virus. Large proportions of the women believed that Vaseline, hand lotions, or oils are good lubricants for condoms, and more than one quarter of them believed that use of a condom causes men pain.

### Sexual Behavior Patterns

Table 2 summarizes findings with respect to HIV sexual risk behavior. During the previous 2 months, 77% of all respondents reported at least one male sexual partner and 14% had two or more. A substantial proportion of the women

**TABLE 3—Logistic Regression Analysis of High vs Low HIV Risk among Inner-City Women (n = 494)**

	Univariate Effect		Multivariate Effect	
	OR	95% CI	OR	95% CI
Age, in decades	0.68	0.6, 0.8	0.74	0.6, 0.9
HIV risk behavior knowledge score <sup>a</sup>	1.3	0.6, 3.1		
Personal risk estimation score	2.0	1.6, 2.4	1.8	1.4, 2.2
No. conversations about condoms, past 2 months <sup>b,c</sup>	1.7	1.1, 2.9	1.1	0.5, 2.1
No. conversations about AIDS concerns, past 2 months <sup>b,c</sup>	2.2	1.4, 3.7	1.3	0.7, 2.5
No. days in past 2 months alcohol or illegal substances were used <sup>b</sup>	2.2	1.6, 3.1	1.7	1.2, 2.5
Safer sex peer norms score <sup>c</sup>	0.92	0.88, 0.97	0.98	0.3, 3.3
Risk reduction behavioral intentions score	0.86	0.8, 0.9	0.88	0.8, 0.9
Condom barrier beliefs score	1.1	1.0, 1.2	1.1	1.1, 1.2

Note. OR = odds ratio; CI = confidence interval.

<sup>a</sup>Variable not used in multivariate model because of nonsignificant OR.

<sup>b</sup>Log<sub>10</sub>(x + 1) transformation applied to variable.

<sup>c</sup>Variable did not enter in multivariate stepwise analysis.

were at increased risk of exposure to HIV because of the risk behavior of their sexual partners. For example, 40% of the women with a regular sexual partner and 68% of the women with other sexual partners believed that their partners had had sex with someone else during the past year. Nine percent of the women with casual sexual partners were either "sure" or "pretty sure" that their partners had injected illegal drugs at sometime in the past. Condom use varied by partner type; 33% of intercourse occasions with regular partners were protected while 60% of intercourse occasions with other partners were protected (data not shown). Under-scoring the issue of increased HIV risk because of partner risk behavior, only 36% of intercourse occasions with regular partners who were believed to have had sex with others or to have injected drugs were protected.

### Logistic Regression Analysis Identifying Factors Differentiating Low- and High-Risk Women

To identify factors associated with HIV risk level, we compared the high- and low-risk groups using a forward stepwise logistic regression analysis.<sup>26</sup> Table 3 summarizes the univariate and multivariate logistic regression results. Of the nine predictor variables investigated, eight were statistically related in univariate analyses to risk-group classification and were used in the regression analysis: (1) respondent's age, (2) personal risk estimation score, (3) number of conversations in the past 2 months with male sexual partners

about using condoms, (4) number of conversations in the past 2 months with male sexual partners about AIDS concerns, (5) number of days in the past 2 months in which alcohol or illegal substances were used, (6) safer sex peer norms score, (7) risk reduction behavioral intentions score, and (9) condom barrier beliefs score. The HIV risk behavior knowledge score did not relate in univariate analyses to risk-group classification and was not used in the regression analyses. To ensure that regression analysis assumptions were satisfied, a log<sub>10</sub>(x + 1) transformation was applied to the two conversation indices to reduce distribution skew, decrease the number of outliers, and improve the normality of residuals.<sup>26</sup>

The multiple logistic regression analysis was used to evaluate all the variables that were significant in the univariate analysis. As shown in Table 3, five variables entered the multivariate model: (1) personal risk estimation score, (2) condom barrier beliefs score, (3) risk reduction behavioral intentions score, (4) age, and (5) substance use during the past 2 months. Women who were at high risk of HIV infection accurately perceived themselves to be at increased HIV risk. High-risk women perceived stronger barriers to condom use, such as the belief that sex is not as good if condoms are used and that their male sexual partner would react badly if condom use were suggested, and they reported weaker intentions of engaging in safer sex. Women at high risk were also younger and reported greater

rates of alcohol and other substance use during the past 2 months. HIV risk-group classification was not statistically associated with the number of conversations in the past 2 months about condoms or AIDS concerns, or with safer sex peer norms scores.

Overall, of the women included in the regression analysis, the five-variable model correctly classified 69% into their respective HIV-risk category. Specifically, the model correctly identified 81% of the women at low risk of HIV infection and 52% at high risk of HIV infection.

## Discussion

Many women living in inner-city, low-income housing developments are at risk of contracting HIV infection. Women are at high risk because of their involvement in sexual relationships with regular partners who have extraregular sex or have injected drugs, or because of their multiple partners. High rates of recent treatment for sexually transmitted disease and low rates of condom use with regular partners substantiated this risk for many of the women in our study. A large proportion of these women reported knowing that their regular sexual partners had sex with other people, injected drugs, or were of unknown serostatus, and not using condoms in more than two thirds of intercourse occasions with these partners. These findings underscore that women may be at risk for HIV because of their main partner's extraregular activities, their own practice of having unprotected intercourse with multiple male partners, or their use of injected drugs. At the same time, not all the women were at risk; a relatively large proportion of participants were not sexually active in the past 2 months, had only a single regular partner not known or believed to be at elevated risk, or consistently used condoms.

Women in this sample exhibited high overall levels of HIV risk knowledge; however, they also had knowledge deficits related primarily to proper condom and lubricant use, and misconceptions about the physical appearance of most people with HIV infection. A large number of women had been treated for a sexually transmitted disease in the past 2 months, confirming the HIV vulnerability of these inner-city poor women.

Social and psychological characteristics predicted the HIV risk level of women in the sample. Women at high risk for HIV were younger, held weak behavioral

intentions to engage in condom-protected intercourse, perceived greater relationship barriers to condom use, and had higher rates of substance use. However, high-risk women also reported accurate perceptions of HIV risk. These findings are consistent with social-cognitive<sup>27,28</sup> and reasoned action<sup>29</sup> theories that identify beliefs, skills, self-efficacy, and social norm characteristics as determinants of HIV risk behaviors. However, the regression analysis used in this sample correctly classified 81% of the low-risk women as compared to 52% of high-risk women. This suggests that while the assessed variables are strongly predictive of risk-related behavior, additional and unassessed factors may influence high-risk sexual behavior.

These findings support the social-cognitive HIV prevention approaches that emphasize the strengthening of behavioral intentions and self-efficacy through skill development of proper condom use, behavioral self-management, and sexual negotiation and communication appropriately tailored for low income, inner-city women. Group interventions that focus on increasing accurate perceived risk of contracting HIV infection, identifying and managing factors (especially substance use) related to high-risk behavior, developing problem-solving skills related to changing risk behavior, learning sexual communication and negotiation skills, and receiving social support for behavior change efforts have proven effective with other populations.<sup>30-32</sup> However, interventions for women must also incorporate prevention messages and skills focused on partner relationships and the issues of power imbalance in traditional sexual relationships, social and economic dependence on a male partner, and the priorities of daily life for impoverished women.

Inner-city housing developments are an appropriate and important setting for HIV risk reduction interventions as they constitute identifiable and accessible communities in which to reach adult and adolescent women at risk for HIV infection. Characteristics of housing developments, such as their accessibility, the potential for multiple contacts, and the formulation of resident-controlled intervention components, increase the likely efficacy of such preventive programs. With the changing epidemiology of HIV infection among women and the competing life stress priorities encountered by impoverished women, innovative HIV preventive approaches integrated into health, social service, and residential

activities within housing development communities are urgently needed. □

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