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Sexual Risk Behavior, Knowledge, and Condom Use Among Adolescents in Juvenile Detention

Diane M. Morrison,[1] Sharon A. Baker,[2] and Mary R. Gillmore[3]

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This paper reports on sexual behavior, knowledge of sexually transmitted diseases (including AIDS) and condoms, and condom use among African-American and white incarcerated adolescents in Seattle, Washington. One hundred nineteen adolescents in a juvenile detention facility completed questionnaires that assessed their lifetime and recent sexual behaviors, an objective test of disease and condom knowledge, attitudes and norms regarding condom use with steady and casual partners, prior condom use, and intentions to use condoms. The results indicate that these adolescents are at high risk by a number of indicators: They have a high average number of partners, have unprotected vaginal and anal sex, and many have sex with known or suspected drug users. Their overall knowledge of condoms and sexual transmitted diseases risks is high, but high knowledge is not correlated with positive attitudes; for one attitude measure, high knowledge is significantly correlated with negative attitudes toward condom use. These findings suggest that programs designed solely to increase knowledge are unlikely to effect behavior change.

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[1]Research Associate Professor, School of Social Work JH-30, University of Washington, Seattle, Washington 98195. Received Ph.D. in social psychology from the University of Washington. Research interests are in sexual decision making and attitude–behavior relationships.

[2]Research Assistant Professor, School of Social Work JH-30, University of Washington, Seattle, Washington 98195. Received Ph.D. in educational psychology from the University of Washington. Research interests are in sexual behavior and health.

[3]Research Associate Professor, School of Social Work JH-30, University of Washington, Seattle, Washington 98195. Received Ph.D. in sociology from the University of Washington. Research interests are in problem behaviors of adolescence.

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INTRODUCTION

In the past five years, concern about adolescent exposure to HIV through sexual behavior has increased sharply. Although the total number of reported cases of AIDS among adolescents is low (less than 1% in Seattle/King County, as of March 1991; Washington State/Seattle-King County Department of Public Health, 1991), AIDS has become the sixth leading cause of death among 15–24-year-olds (Novello, 1988). Twenty percent of AIDS cases are among individuals in their 20s (Washington State/Seattle-King County Department of Public Health, 1991); given the long latency of HIV, many of these individuals were undoubtedly exposed in their teens. Rates of gonorrhea are higher among 15–19-year-old females than among any other female age group; for males, rates for 15–19-year-olds are second only to rates for 20–25-year-olds. Rates of syphilis are increasing alarmingly in minority teenaged women, and teenage women have the highest rates of chlamydia of any age group (Cates, 1990). These high rates of sexually transmitted diseases (STDs) and unplanned pregnancies among teenagers testify to their participation in behaviors that put them at risk for AIDS, as well as other STDs and unplanned pregnancies.

Prevalence rates of STDs are particularly high among incarcerated adolescents (Alexander-Rodriguez and Vermund, 1987; Bell *et al.,* 1985). These adolescents are also more likely to use intravenous drugs than the general population of adolescents (DiClemente *et al.,* 1991). Compared to national norms, they are more likely to have had an unintended pregnancy (Melchert and Burnett, 1990). Each of these findings suggests that incarcerated adolescents are at increased risk for HIV; taken together, they suggest that incarcerated adolescents may be at greatly increased risk.

One response to concern about adolescent exposure to HIV has been an emphasis on education to increase awareness of AIDS. This effort has been successful insofar as most teenagers know some basic AIDS facts (Committee on AIDS Research and the Behavioral, Social, and Statistical Sciences of the National Research Council [Committee on AIDS Research], 1990). In a recent statewide survey of adolescents in Massachusetts, all had heard about AIDS, including 82% whose teachers had discussed AIDS and 68% who had formal school instruction about AIDS (Hingson *et al.,* 1990). Among inner-city New York youth, 98% had heard about AIDS and 49% had had a class in school that included AIDS information (Goodman and Cohall, 1989). Knowledge of intercourse as a risk behavior is also high. DiClemente *et al.,* (1988) report that 97% of the adolescents in their sample of San Francisco high school students knew that having sex with someone who has AIDS is one way of getting it. In Massachusetts,

99% knew of heterosexual transmission and 98% knew of homosexual transmission of HIV (Hingson *et al.,* 1990).

Somewhat fewer, but still a large majority of, adolescents know that using condoms can decrease the risk of disease transmission. This number has increased rapidly: DiClemente and his colleagues (1988) reported that only 64% of the San Francisco high school students surveyed in 1985 knew that using a condom during sex can reduce AIDS risk, but by 1988, 85% of a similar sample knew this (DiClemente *et al.,* 1991). Similar results are reported by Goodman and Cohall (1989). Asked to rate condoms' effectiveness in preventing the spread of HIV during intercourse, only 5% of Massachusetts adolescents said that condoms were of little or no use (Hingson *et al.,* 1990).

Less is known about adolescents' understanding of STDs other than AIDS: Are teenagers aware of STDs? Do they know what the health consequences of STDs are? Do they know what behaviors put them at risk for contracting STDs, or what they can do to protect themselves? In one study that addresses these questions, Kegeles *et al.* (1988) found that teenagers in San Francisco area health clinics had a high degree of awareness that condoms prevent STDs. Teens' knowledge of STDs is important for several reasons. Because STDs carry grave health risks for teenagers, including increased risk for cervical cancer, infertility, and perinatal morbidity and mortality (Brookman, 1990), preventing STDs among teenagers is an important health goal. Preventing STDs also involves many of the same behaviors as preventing AIDS—delaying intercourse, practicing mutual monogamy, using condoms. Give the higher rates and much shorter latencies of STD infections (compared to HIV) teenagers are more likely to have had personal experience with STDs. Risk of STD infection may therefore be more immediate and more understandable to teens than risk of HIV infection, and STD awareness may provide an avenue for promoting behaviors that lower risk for both STD and AIDS. At the same time, teenagers may trivialize STDs other than AIDS, Especially if they are unaware of long-term consequences. One goal of the research presented here is to determine how knowledgeable high-risk adolescents are about not only AIDS, but also STDs and condoms. Little is known about knowledge among adolescents in detention in particular, who may have had relatively little exposure to school-based health education messages.

Although awareness of risk may be a necessary spur to health-protective behavior, it does not follow that increased knowledge will increase the likelihood of protective behavior. The question of whether increasing knowledge of the risk of disease transmission leads to increases in protective behavior is an important one, particularly for adolescents who are at the beginning of their sexual careers. Presenting information about disease

risk is a logical and relatively easy first step in motivating individuals to protect themselves. The cognitive theories that underlie much social psychological research on health-protective behavior (such as the Health Belief Model) stress the importance of beliefs and perception of risk, both factors that might be amenable to modification by presenting information. Informational interventions are relatively inexpensive, easy to deliver, and noncontroversial; interventions that teach skills to negotiate safer sex, that increase self-efficacy with regard to safer sex, or that teach alternative sexual practices are costly, difficult, and time-consuming to deliver, and particularly in the case of adolescents, often politically unacceptable (Committee on AIDS Research, 1990).

Unfortunately, over two decades of research on adolescent pregnancy prevention suggests that changing knowledge does not change behavior. Over 25 years of research on adolescent contraceptive use attests to adolescents' ability to discount, depersonalize, and otherwise ignore information about the risk of pregnancy from unprotected intercourse (cf. Morrison, 1985; Whitley and Schofield, 1985–86). Prominent recent evaluation of interventions designed to reduce adolescent sexual risk taking with regard to both pregnancy and STDs have concluded that increasing knowledge alone does not decrease risk-taking behavior (Eisen *et al.,* 1990; Howard and McCabe, 1990; Kirby *et al.,* 1991), as have recent reviews (Basch, 1989; Flora and Thoresen, 1988). The clear lesson from research on adolescent contraceptive use is that knowledge is insufficient to alter sexual risk-taking behavior.

Many programs aimed primarily at disease prevention and increased condom use, however, continue to emphasize knowledge of the consequences and transmissibility of STDs, and the empirical literature on the relationship of AIDS knowledge to risky sexual behavior is now emerging. There is mixed evidence of links between particular knowledge and teens' likelihood of engaging in behaviors that reduce the risk of HIV transmission (Committee on AIDS Research (1990). In their review of research on the relationship of knowledge of AIDS facts to risky behavior among teens, the Committee on AIDS Research (1990) cites examples of studies that find lower risk behavior among those more knowledgeable about AIDS (Hingson and Strunin, 1989; Reuben *et al.,* 1988), and others that find more *un*safe sex among those more knowledgeable (McKusick *et al.,* 1988). They conclude, as do other researchers concerned with condom use to prevent transmission of AIDS and STDs, that programs designed to counter misinformation about AIDS and to teach adolescents about their level of risk may be efficacious in this context (Committee on AIDS Research, 1990; Ku *et al.,* 1992; Strunin and Hingson, 1987).

It should be emphasized that none of these authors are suggesting that presentations of simple "facts" about AIDS, STDs, or condoms are sufficient interventions. Rather, the as-yet unanswered question is whether knowledge has *any* positive relationship to attitudes, intentions, or behaviors and, if so, under what conditions and for what groups of adolescents these relationships hold.

This paper presents analyses of sexual risk behavior and condom use, as well as knowledge of AIDS, STDs, and condoms, among sexually experienced adolescents surveyed while they were in a juvenile detention facility. It addresses several questions: To what extent do adolescents in juvenile detention engage in sexual behaviors that put them at risk for AIDS and other STDs? How much, and what, do these adolescents know about AIDS, STDs, and condoms? Are adolescents' self-ratings of knowledge accurate? Does knowledge vary by race or by sex? How is knowledge related to attitudes toward using condoms, experience using condoms, or intention to use condoms in the future?

METHOD

Overview

These data are drawn from an ongoing longitudinal study of condom attitudes, intentions, and use among individuals at high risk for STDs, including AIDS. Participants include adolescent and adult STD clinic clients, and adolescents in a juvenile detention facility. Data were collected regarding STD and condom knowledge; attitudes, norms, intentions, and self-efficacy with regard to using condoms with different types of partners; condom use history; contraceptive history; drug and alcohol use history; sexual experience history; and demography factors.

Subjects

One hundred nineteen adolescents in a residential juvenile detention facility completed the scale as part of the larger interview described above. Participants' ages ranged from 14 to 19; two-thirds were 16 or 17. The length of stay in this facility varies from a few days to a month or more, depending on the adolescent's charge and history, and on the court calendar.

Two-thirds (64%) of the respondents live with their parents, 11% live with a partner, 5% live alone, and 20% live with nonrelatives. All are unmarried (98% never married and 2% divorced or windowed). Socioeco-

nomic status (SES) was measured using mother's education: 9% reported that their mothers had less than a high school education, 37% of mothers were high school graduates, 41% had some post high school education (college or trade school), and 13% were college graduates. Alcohol and drug use are high among the respondents. Ninety-eight percent have used alcohol and 92% have used marijuana or hashish. One third (35%) have used psychedelics, and about one-quarter have used crack (29%), cocaine (29%), sedatives (23%), amphetamines (27%), and inhalants (23%). Opiate and needle use are lower (11% and 8%, respectively).

Clinicians in the detention health service referred adolescents based on the adolescents' requests for sexual health care and other indications that the adolescent was sexually active. Adolescents referred to the study were asked whether they had had intercourse in the past 3 months. Because the focus of the study is on condom use in heterosexual intercourse, only those who had intercourse with an opposite-sex partner in the past 3 months were eligible (whether or not they had same-sex intercourse as well). Subjects were selected to ensure that equal numbers of males and females, and equal numbers of whites and African Americans, were interviewed. One African American young woman inadvertently was interviewed twice; data from her second interview were discarded. The sample therefore includes 30 white males, 30 African-American males, 30 white females and 29 African-American females.

Data Collection

Participants were interviewed at the juvenile detention facility, in a private room. Trained interviewers determined eligibility and obtained informed consent. Questionnaires were individually administered. Study participants decided whether to self-administer the questionnaire or have it read to them by an interviewer. The interviewer remained in the room, and was available to answer questions. Time to complete the entire questionnaire was about 30–45 minutes for most respondents; slightly longer for those who had the questionnaire read to them. Subjects were paid $10 for their participation.

Measures

Data collected include a 20-item true/false knowledge scale, sexual experience history (age at first intercourse and number of partners), self-rating of knowledge, attitudes toward using condom, intentions to use condoms, and prior use of condoms.

Knowledge Scale

Because the study focuses on determinants of condom use among high-risk heterosexuals, we developed a knowledge scale focused on items of disease knowledge and condom knowledge that have implications for using condoms in heterosexual encounters, and omitted items that tap less behaviorally relevant information (e.g., whether AIDS is caused by a virus or a bacteria, whether mosquitos can spread STDs or AIDS, etc.). We began with a pool of 62 items drawn from a variety of existing questionnaires and knowledge measures, from clinical literature, and from our own knowledge of, and experiences with, high-risk clients. The entire pool of 62 items was administered to several samples of individuals at high risk for STDs and AIDS, including adolescents in juvenile detention, adolescents and adults at the STD clinic, and to women jailed on charges of prostitution.

From these 62 items we chose 20 of varying levels of difficulty, with the aim of developing a short, psychometrically sound scale that includes relevant knowledge of AIDS, STDs, and condoms. Coefficient alpha for the 20-item scale is .73. The corrected item-total correlations range from .18 to .41. Separating the items into subscales of items that cover STD knowledge, AIDS knowledge, and condom use yields highly intercorrelated scales with lower reliability, which suggests that the items comprise a single univariate scale. Principal component analyses did not separate items into factors interpretable as STD, AIDS, and condom knowledge, further suggesting that these knowledge areas are strongly interrelated in this subject population.

This scale differs from many other AIDS knowledge scales in that it focuses on knowledge that has implications for sexual behavior or condom use. Only one question about nonsexual routes of transmission is included, and several questions about sexually transmitted diseases in general, and about the proper use of condoms, are included. Note also that the test is relatively difficult, insofar as it is designed for a sexually experienced and often STD-experienced subject population.

Age at first intercourse is measured in years.

Number of partners is a categorical variable, with seven categories: 1, 2–4, 5–10, 11–25, 26–50, 50–100, and over 100.

Self-rating of knowledge is a 5-point scale in which subjects rated how much they know relative to others: A lot more than most people, somewhat more, about the same, somewhat less, a lot less. Higher scores indicate greater perceived knowledge.

Attitudes toward using condoms was measured separately for steady partners (defined as "someone you have sex with and have an ongoing relationship with") and casual partners ("someone you have just met, or

have had sex with once or only a few times"), using four 7-point semantic differential scales for each type of partner. Anchor for the four scales were bad/good, helpful/harmful, foolish/wise, and pleasant/unpleasant. Higher scores were assigned to the positive anchors.

Intention to use condoms was also measured separately for steady and casual partners, asking "How likely are you to use condoms with your steady/casual partner(s) over the next three months?" The response scale is a 7-point semantic differential anchored with very unlikely and very likely. Higher scores indicated greater likelihood.

Prior use of condoms was also assessed for steady and casual partners separately. Two measures of prior condom use were used for each partner type: "Did you and your steady/casual partner use a condom the last time you had intercourse?" (no = 1/yes = 2) and "How often have you used condoms for vaginal sex with your steady/casual partner(s) in the past three months?" (5 categories: never, less than half the time, about half the time, over half the time, every time), with higher scores indicating more use.

RESULTS

Sexual Risk Behaviors

Tables I and II present data on lifetime (Table I) and recent (Table II) sexual behaviors, by sex and race. These heterosexually-active adolescents had first intercourse early in adolescence, have high rates of heterosexual activity and little homosexual activity, and their total numbers of lifetime partners is high. (Recall that adolescents who have only same-sex partners were not eligible for the study, and that these rates should not be generalized to all sexually active adolescents in detention.) Almost one third of the white girls and about half as many African American boys and girls have engaged in paid sex. A substantial minority in all groups have had sex with known or suspected intravenous drug users, including over one quarter of the white girls. A larger minority have been tested for HIV, including a majority of African American boys. With the notable exception of the African American girls, most subjects have bought condoms at least once; only a third of African American girls have.

Table II shows data related to sexual activity in the past 3 months. Although most respondents have a steady sexual partner, this is typically not their only partner in the past 3 months; many have had more than one steady partner and/or casual partners in that period. Girls' steady partners are several years older, on average, than boys'. Most have used condoms at least once with their steady partners in the past 3 months and an even

Table I. Lifetime Sexual Behaviors of Adolescents in Detention

	White		African American	
	Males (n = 30)	Females (n = 30)	Males (n = 30)	Females (n = 29)
Median age at first intercourse	12.9	12.6	11.8	12.8
Median lifetime partner category	11–25	5–10	11–25	5–10
Percent who have ever				
Been paid for sex	3	30	14	14
Had sex with a known or suspected needle user	13	27	10	10
Had a same sex partner	3	0	3	0
Bought condoms	70	83	83	31
Been tested for HIV	24	33	62	39

higher percentage have used condoms with their casual partners. Only about half as many report using condoms regularly (i.e., more than half the time). About one third used condoms the last time they had sex with their (primary) steady partner, and about half used condoms at last with casual partners, although only one quarter of white males did. A substantial minority of respondents reported anal sex in the past 3 months, and very few used condoms with anal sex.

Condom Attitudes and Intentions

Attitudes toward condom use were moderately positive: Mean attitude toward use with a steady partner was 5.39 (SD = 1.50, n = 102) and with a casual partner was 5.88 (SD = 1.34, n = 59) on a 7-point scale, with 7 the most positive response. Mean intention to use condoms with a steady partner was near the scale's neutral point (X = 4.19, SD = 2.40, n = 102). Intention to use condoms with a casual partner was significantly more positive (X = 5.49, SD = 1.81, n = 59; t = -3.61, $p < .001$).

Knowledge

The average overall knowledge score was 75.2% (SD = 14.2), or about 15 correct out of the 20 items. Whites, as a group, knew more (78.9%; SD = 12.6) than African Americans (71.4%; SD = 14.7; t = -3.01, p =.003); there was no significant sex difference (t = 1.09, ns).

Table III shows the text of the 20 questions and the percent of respondents who answered each question correctly, broken down by race and

Table II. Sexual Activity of Adolescents in Detention in the Past 3 Months

	White		African American	
	Males (n = 30)	Females (n = 30)	Males (n = 30)	Females (n = 29)
Current steady partner				
None	17%	13%	13%	14%
One	57%	67%	43%	52%
More than 1	27%	20%	43%	35%
Mean age of primary steady partner	16.6	20.5	16.6	20.0
Current casual partners				
No casual partners	47%	57%	33%	62%
One or more casual partners	53%	43%	67%	38%
Mean number of casual partners	5.0	3.3	5.6	3.7
With primary steady partner	N = 25	N = 26	N = 26	N = 25
Used condoms for vaginal intercourse at least one time	64%	65%	69%	54%[a]
Used condoms for vaginal intercourse more than half the time	36%	23%	31%	33%[a]
Condoms were handy at last intercourse	48%	65%	58%	60%
Used condoms at last intercourse	32%	35%	31%	36%
Anal intercourse without condoms	16%	11%	8%	26%
Anal intercourse with condoms	0%	8%	0%	0%
With casual partners	N = 16	N = 13	N = 20	N = 10
Used condoms for vaginal interourse at least one time	71%[b]	77%	90%	78%[a]
Used condoms for vaginal intercourse more than half the time	36%[b]	54%	55%	67%[a]
Condoms were handy at last intercourse	37%	62%	75%	70%
Used condoms at last intercourse	25%	46%	60%	50%
Anal intercourse without condoms	7%	23%	10%	20%
Anal intercourse with condoms	0%	0%	5%	0%

[a]Not applicable for one respondent who had no vaginal intercourse with this partner type in the past 3 months.

[b]Not applicable for two respondents who had no vaginal intercourse with this partner type in the past 3 months.

sex. The greatest number of incorrect responses were to items related to STD contagion. A quarter or more of the respondents did not know that AIDS is less contagious than the common cold (No. 2), that risk of infection is less than certain for a single exposure (No. 6), that if you have an STD you may not have gotten it from the last person you had sex with (No. 8), or that you won't catch HIV from donating blood (No. 17). With the exception of white males, most subjects had a very pessimistic (and inaccurate) assessment of how often condoms break (No. 5), and over a quarter

of the subjects believe, incorrectly, that condoms should fit snugly at the tip of the penis.

Table IV presents the correlations of total knowledge score with subjects' current age and the two measures of sexual experience. Knowledge is unrelated to age, possibly due to restriction of range. Knowledge is also unrelated to either age at first intercourse or number of partners. Self-rating of knowledge and scale score are correlated significantly, but not highly.

Correlations of knowledge with attitude items are also shown in Table IV. Knowledge was significantly *negatively* correlated with the attitude that condoms are pleasant, with both steady and casual partners.

Greater knowledge was uncorrelated with intention to use condoms in the next three months, with either partner type. It was also uncorrelated with both measures of prior use—use at last intercourse and frequency of use in the past 3 months—for both partner types.

DISCUSSION

The sexually active incarcerated adolescents studied here represent a group at high risk for STDs. Their early age at first intercourse, large numbers of partners, and sporadic use of condoms combine to increase their risk, relative to a general population of adolescents. These sexual behavior data are consistent with similar data reported for incarcerated adolescents in San Francisco, most of whom had 3 or more lifetime partners and half of whom had first sexual intercourse by age 12 (DiClemente *et al.,* 1991).

The high rates of anal intercourse reported are also of concern. Unfortunately, representative sample data on adolescent rates of heterosexual anal intercourse do not exist, and it is difficult to determine whether the high rates reported here are higher than rates in a general population of adolescents. In one recent study of midwestern undergraduates, about one fifth of sexually experienced men and women reported ever having heterosexual anal intercourse (Reinisch *et al.,* 1992). Rates for the past year were about one tenth, and for the past month, 3%. The undergraduate rates are lower, overall, than the 3-month rates reported by these subjects (about 17% with steady partners and 15% with casual partners). Given the high rates of disease transmission associated with unprotected anal intercourse, of greatest concern is that almost all of the anal intercourse reported was unprotected. These data do not address adolescents' motivation for engaging in anal intercourse; anecdotal reports suggest that some adolescents believe they protect themselves from STDs as well as pregnancy by substituting anal for vaginal intercourse. Among this sample, almost all of the white respondents, 93% of African-American males, and 83% of African-

Table III. Percent Correct by Item, Ethnic Group, and Sex[a]

	African Americans		Whites	
	Males	Females	Males	Females
1. Withdrawing ("pulling out") the penis before ejaculating ("cuming") works just as well as a condom for preventing sexually transmitted diseases (VD). [F]	90	100	97	97
2. AIDS is less contagious than the common cold. [T]	47	28	47	37
3. If your symptoms go away you probably don't have a sexually transmitted disease (VD). [F]	97	93	90	97
4. A diaphragm with jelly works better than a condom to prevent sexually transmitted diseases (VD). [F]	89	89	97	79
5. Condoms (rubbers) break about half the time for most people. [F]	43	50	70	40
6. If you have unprotected sex (sex without a condom) with someone who has a sexually transmitted disease (VD) you will catch it for sure. [F]	21	14	47	60
7. You will *not* catch the AIDS virus by eating food prepared by a cook who has it. [T]	97	83	87	93
8. If you get a sexually transmitted disease (VD), you probably got it from the last person you had sex with. [F]	63	45	60	60
9. You can tell if someone is infected with the AIDS virus because they look sick. [F]	90	100	90	93
10. A person can be infected with the AIDS virus and not have the disease AIDS. [T]	79	68	83	82
11. A woman can only get AIDS from a man if she has anal (rectal) sex with him. [F]	93	83	100	97
12. AIDS can reduce the body's natural protection against disease. [T]	86	69	87	90
13. Men always have a discharge (drip from the penis) when they have a sexually transmitted disease (VD). [F]	75	38	77	60
14. A condom (rubber) should be worn so it is snug at the tip. [F]	64	74	62	79
15. It's a good idea to use hand lotion for lubrication when using a condom (rubber). [F]	67	89	90	90

Table III. Continued

	African Americans		Whites	
	Males	Females	Males	Females
16. A condom (rubber) should *not* be unrolled before putting it on a man's penis. [T]	93	85	93	100
17. You won't catch the AIDS virus by donating blood. [T]	55	75	80	63
18. Only people who have lots of sex partners get sexually transmitted diseases (VD). [F]	79	68	90	87
19. Some kinds of sexually transmitted diseases (VD) don't give you symptoms until six weeks or more after you catch the infection. [T]	79	81	80	90
20. Men seem to catch the AIDS virus much easier than women do. [F]	71	57	63	76
Total score	73.7	69.0	79.5	78.4
N	30	29	30	30

[a][T] or [F] indicates the correct answer for each question. Percentages exclude missing data; some percentages are based on fewer subjects, but in no case fewer than 26.

Table IV. Correlations of Knowledge with Demographic Factors and Self-Ratings

	Correlation with Knowledge	*n*
Age	.09	119
Age at first intercourse	.06	119
Number of partners	.10	119
Mother's education	.03	106
Self-rating of knowledge	.17[a]	119

[a]$p < .05$, two tailed.

American females know, at least, that AIDS can be passed from men to women through anal intercourse.

These adolescents are more cautious with their casual partners than with their steady partners. About two thirds used condoms for vaginal intercourse with a steady partner in the previous 3 months; four fifths had used them with casual partners during the same period. Among girls, the

Table V. Correlations of Knowledge with Attitudes, Intentions, and Prior Use of Condoms, with Steady and Casual Partners

	With Steady Partners		With Casual Partners	
	Correlation with knowledge	*n*	Correlation with knowledge	*n*
Attitudes toward condoms				
Good/bad	−.02	101	.01	59
Helpful/harmful	−.16	101	−.03	59
Wise/foolish	−.06	102	−.05	59
Pleasant/unpleasant	−.19[a]	101	−.21[a]	59
Intention to use condoms in the next 3 months	−.07	102	−.10	59
Prior use of condoms				
At last intercourse	−.12	102	−.01	59
In the past 3 months	−.10	101	.05	56

[a] $p < .05$, two tailed.

proportion using condoms regularly (more than half the time) is twice as high with casual partners, compared to steady partners. African American boys are also more likely to use condoms regularly with casual partners (55% vs. 31%), but white boys are no more likely to use with casual partners (36%) for both partner types. White boys are least likely to have condoms available; only 37% had them available at last intercourse with a casual partner, compared to 62% to 75% for other groups. Generally, for both partner types, about half of the adolescents who had a condom available at last intercourse used it.

Direct comparisons of these respondents with subjects in other studies of AIDS knowledge are hampered by the noncomparability of the items used. To our knowledge, no general sample studies of adolescents report responses to similar STD or condom use questions. A few AIDS-risk related items are similar to those reported in other studies. "You can tell if someone is infected with the AIDS virus because they look sick" is similar to DiClemente *et al.'s* (1991) question "You can tell if a person has the AIDS virus by looking at the person." Two thirds (64%) of incarcerated adolescents and 71% of a school sample gave the correct answer in that study; 92% of these respondents answered this item correctly. Strunin and Hingson (1987) asked two similar questions of a random-digit dial sample in Massachusetts. Sixty percent of those adolescent respondents believed they could contract AIDS by donating blood; only half as many (32%) of these respondents believe this. Thirty-seven percent of the Massachusetts

sample thought that you could catch AIDS by sharing eating or drinking utensils with someone who has AIDS; 90% of our respondents know that you cannot contract the AIDS virus by eating food prepared by a HIV-infected cook. These limited comparisons suggest that these adolescents are quite knowledgeable about AIDS and HIV, relative to other samples of adolescents. One can speculate that this may be attributable to education received from outreach programs aimed at street youth, or to community-wide interventions focused on street youth that are currently being implemented and evaluated in Seattle.

These findings suggest that knowledge of STDs, AIDS, and condoms is not associated with more positive attitudes toward condom use or intention to use condoms with either steady or casual partners. Because these adolescents are generally knowledgeable about AIDS, STDs and condoms, their failure to use protection cannot easily be attributed to ignorance, although it may reflect an inability to apply this information to themselves. Clarification of the role of basic information is important because, when resources for disease prevention programs are low, education is the element we often try hardest to retain, reasoning that if we cannot give clients anything else, we should at least give them essential facts. The results of this study suggest, however, that we should assess their knowledge base before assuming that information is what clients lack. Scarce resources might be better spent on programs designed to counter anti condom attitudes, change peer groups norms, or increase communication skills.

This is not to argue that basic education should be ignored, or that most adolescents have all the information they need. These findings are based on a sample of adolescents who have had a great deal of sexual experience, and their level of information cannot be generalized to the larger population of adolescents. Adolescents' (and adults') knowledge of AIDS, STDs, and condoms varies widely, and is changing rapidly. Because levels of knowledge are changing so rapidly, and because the relationship between level of knowledge and risk behavior may be attenuated at higher levels of knowledge, we should be alert for a trend toward diminishing returns from education over time. Catania *et al.* (1989) have noted that although a number of studies have demonstrated that knowledge levels are associated with protective behaviors, including condom use, other studies have failed to confirm this relationship. This inconsistent pattern of findings is consistent with the hypothesis that there is a threshold of knowledge, beyond which additional education is of little benefit.

Knowledge-enhancing interventions that are intended to increase adolescents' perceived susceptibility to STDs, AIDS, or unintended pregnancy are further hampered by people's inability to apply information about risk to themselves. Subjective estimates of the probability of negative outcomes

of unprotected intercourse are colored by the immediacy of the perceived costs of implementing safer sex practices, such as reduced sexual pleasure, loss of spontaneity, or partner rejection. These concerns may be particularly salient for adolescents, who are relative novices in the realm of sexual behavior (Morrison and Shaklee, 1990) and who may also be developmentally ill-equipped to process information about risky behavior (cf. Jorgensen, 1980; Cvetkovich *et al.,* 1975). Risks that are objectively understood, in the sense that they can be accurately reproduced in a test of knowledge, may not be applied to oneself. Interventions may be better aimed, then, at personalizing risk, rather than at teaching abstract risk rates.

These data also demonstrate the range of adolescents' knowledge, even among adolescents drawn from the same site, and the importance of attention to subculture in assessing knowledge. We found that white respondents had higher knowledge scores than African-American respondents. It is difficult to determine whether the race factor represents a meaningful cultural difference or whether ethnic group is acting as a proxy for SES because income data are incomplete; only half of the adolescents could report estimated family income. Knowledge scores were uncorrelated with mother's education ($r = .03$, ns), and the race difference persists when mother's education is covaried. Also, different items were missed by African Americans and white adolescents, and by boys and girls. African American girls were more likely to think that AIDS is as contagious as a cold (No. 2), that venereal disease (VD) probably came from the last person you had sex with (No. 8), that women do not catch AIDS as easily as men (No. 20), and that diseased partners will necessarily have a discharge (No. 13). They also think that they are sure to get VD if they have unprotected sex with someone who has it; note that most of the African American boys and half the whites think this, too. This my be protective in that it would suggest more caution, or it may mislead people into thinking that if they haven't caught anything from this partner so far, they are safe during subsequent encounters. Surprisingly, boys were more frequently incorrect than girls on the question about whether condoms should fit snugly at the tip (No. 14), and African American boys were mostly likely to believe incorrectly that hand lotion is good lubrication for condoms (No. 15).

Nonetheless, correcting these misperceptions is unlikely, according to these data, to change these high-risk adolescents' attitudes toward using condoms. Those adolescents who know most about condoms like them least. This may be a result of having tried them and learned first hand of their disadvantages—that they interrupt sex, decrease sensation, etc. Interventions should therefore be aimed less at knowledge *per se* and more at attitude change—challenging and changing adolescents' negative perceptions of condoms.

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