High School Seniors' HIV-Related Knowledge, Behaviors, and Attitudes

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Abstract

This study examined adolescents' HIV-related knowledge, attitudes, and behaviors, and the relationship between self-protective behaviors and beliefs about HIV-related medical technologies. The sample consisted of 20 male and 30 female high school seniors with a mean age of 17.5 years. Participants completed a questionnaire and an open-ended interview. Knowledge about HIV transmission and prevention was high. Seventy percent of the sample was sexually active. Only 49% of the sexually active adolescents reported consistent condom use during sexual intercourse. Males and females did not differ on most items; however, males reported using protection during intercourse more often than females ($p = .02$). Participants reported low feelings of personal vulnerability to HIV/AIDS but placed high value on self-protection against HIV/AIDS. No differences were found in beliefs about HIV-related medical technologies among three sexual behavior groups (abstinent, use condoms always, use condoms inconsistently).

HIV cases are on the rise in the United States (Centers for Disease Control [CDC], 2003). AIDS is the 6th leading cause of death among people 25-34 years old (Anderson, 2002). Individuals in this age group who die of AIDS are likely to have contracted HIV during adolescence or early adulthood, since the average amount of time it takes for HIV to develop into AIDS is 12 years (Rosenberg, Biggar, & Goedert, 1994). There is particular concern about adolescents because at least one quarter of all new HIV infections occurs among people 22 years old or younger (Rosenberg et al.). This paper examines adolescents' knowledge and misconceptions about HIV, including their beliefs about new technologies for HIV treatment. Attention is paid to the media. Adolescents' sexual and self-protective behaviors are also examined.

HIV Knowledge

Adolescents are generally knowledgeable about HIV and AIDS. Walker (1992), Goh, Primavera, & Bartalini (1996), and Hancock et al. (1999) all found that high school students answered a mean of 81% of HIV/AIDS knowledge questions correctly. Several studies found knowledge differences related to grade level, gender, and ethnicity. Walker found that junior and senior students scored higher on knowledge questions than freshmen and sophomores; he specified that this might have been due to the fact that juniors and seniors had received HIV/AIDS education, while freshmen and sophomores had not. Hancock et al. found that seniors who had previous HIV/AIDS education were significantly more knowledgeable about HIV/AIDS than seniors who had no HIV/AIDS education. Anderson et al. (1990) found that twelfth grade students from a national sample of high schools were more knowledgeable about HIV/AIDS than ninth, tenth, and eleventh grade students. They also found that female students were slightly more

knowledgeable than male students. Further, female high school seniors were found by Hancock et al. (1999) to have significantly higher knowledge scores than male seniors. Hancock et al. (1999) also found that Caucasian seniors had the highest knowledge, followed by Asian Americans, Hispanics, students identified as "other," and African Americans, respectively. The low African American scores should be interpreted with caution because of the small number of African American participants (12% of the sample). Goh et al. (1996) found no knowledge differences due to gender or grade level, but this may be due to smaller sample size or differences in educational opportunities among samples.

Adolescents are aware of the major modes of HIV transmission. Over 96% of high school students in Walker's (1992) sample knew the four major modes of HIV transmission (blood, semen, vaginal secretions, and breast milk). Ninety-seven percent knew that condoms are effective in preventing HIV transmission. Similarly, 98% of high school students in Anderson et al.'s (1990) national sample were aware that sexual intercourse and needle sharing are the two most frequent modes of HIV transmission; 93% were aware that condoms can prevent HIV infection.

There are a number of misconceptions about HIV that still cause confusion among adolescents. As many as one-third to two-thirds of high school students hold at least one misconception about HIV. First, there are misconceptions about HIV prevention methods. In a study of African-American adolescents, St. Lawrence (1993) found that 40% of her participants believed that coitus interruptus makes intercourse safe. This figure may not be generalizable to high school seniors because the average grade level of participants in this study was 9.6; further, they may not be generalizable to students who

are not African-American. Anderson et al. (1990) found in a national sample of more than 8,000 students that 12% believed birth control pills provide protection against HIV infection. Although this figure is relatively small, the belief that birth control pills decrease HIV risk may lead to risky sexual behavior among adolescents.

Misconceptions about the types of people who are and could become HIV infected also exist, suggesting that information about HIV is not being sufficiently conveyed. In Anderson et al. (1990), 23% of participants believed that it is possible to identify an HIV infected person by appearance. Sikand, Fisher, and Friedman (1996), in a study of high school students (*M* age = 16 years), found that 34% of students believed that only homosexuals have a high risk of HIV infection. The resolution of such misconceptions may lead to a decrease in inadvertent risky behaviors and, consequently, a decrease in HIV infection rates among adolescents.

HIV-Related Medical Technologies

Research suggests that knowledge about medical advances in HIV treatment, such as the development of new and better drugs, may lead to the belief that HIV is an easily treatable or curable disease. The belief that HIV is easily treatable or curable may lead to a decrease in protective sexual behaviors. Decreases in protective behaviors have been documented among adult homosexual males (Dilley, Woods, & McFarland, 1997) and may be present among adolescents as well.

Since 1996, when a new class of HIV medication was introduced, there has been a decrease in the percentage of HIV-positive individuals who progress to full-blown AIDS status (CDC, 2002a). The new drugs, called protease inhibitors, were combined with drugs already in use to form an effective combination drug therapy called Highly Active

Antiretroviral Therapy (HAART). This drug therapy works by keeping the HIV viral load (the amount of HIV virus in the blood stream) down and the body's T-cell count (the amount of disease-fighting cells in the blood stream) up (CDC, 2002a). Some medical professionals worry that knowledge of and beliefs about HAART may cause individuals to increase unsafe sexual behaviors because of confidence that HARTT will prevent AIDS once HIV infection has occurred (Dilley et al., 1997).

Dilley et al. (1997) interviewed 54 homosexual men about their attitudes toward HAART and found a decrease in concern about HIV infection and an increase in unsafe sexual behaviors among some of the participants. Participants were asked to indicate their levels of agreement with statements regarding HAART. When given the statement, "I am much less concerned about becoming HIV-positive myself" because of the availability of HAART, 4% strongly agreed and 22% somewhat agreed. When given the statement, "I am more willing to take a chance of getting infected when having sex" because of the availability of HAART, 2% strongly agreed and 11% somewhat agreed. When given the statement, "I have already taken a chance of getting infected when I had sex" because of the availability of HAART, 4% strongly agreed and 11% somewhat agreed. Although most participants did not show reduced concern about HIV infection, the fact that HAART was associated with decreased concern and increased risky behavior among 13% to 26% of participants is troubling. The findings may not be generalizable to heterosexual adolescents, however, because the mean age was 32 years and all participants were homosexual males.

Although the above study focused on adult homosexual males, adolescents may also believe that relying on medical technology to avoid becoming sick from HIV

infection can be as effective as using preventive behaviors to avoid infection. A study by Boone et al. (2003) on perceived AIDS vulnerability among Latina adolescents and their mothers alludes to this phenomenon. Adolescent females were given a questionnaire in which one section referred to a cure or vaccine for AIDS. Sixty-six percent of Latina adolescents believed that doctors can cure AIDS if the disease is detected early and 69% believed there is a vaccine used to protect people from AIDS (Boone et al., 2003). Although this study focused exclusively on Latina adolescents and did not include behavioral data, this study raises the question of whether adolescents' motivation to protect themselves from HIV is being undermined by confidence in new medical technologies.

The Media

Research has shown that the media influence the ways in which adolescents perceive sexual intercourse. The average youth in the United States spends as much as 35% of his or her time engaged in some form of media interaction, including watching television or movies, listening to CDs or the radio, playing video games, using the internet, and reading (Roberts, 2003). Television and magazines have been cited as being two of the most important sources of sexual and contraceptive information among adolescents (Strasburger, 1995; Sutton, Brown, Wilson, & Klein, 2002). Strasburger cites the media, especially television, as being the main source of sexual education for adolescents in the United States. Sutton et al. reported that more than half of all high school students receive contraception information from television, although television was not reported as being an exclusive source of such information. Arnett (1995) cites television as one form of media through which adolescents engage in self-socialization, a

process in which adolescents actively choose sources of information that correspond to their personal preferences.

Adolescent attitudes about HIV/AIDS may be subject to influence by the media. Newspaper coverage of the AIDS epidemic has waned, giving the impression that AIDS is no longer a health threat (Ng, 2000). Women's and girls' magazines, read by more than two-thirds of female high school students (Sutton et al., 2002), lack important information about HIV/AIDS (Walsh-Childers, Gotthoffer, & Lepre, 2002). It has also been suggested that media coverage has led to an optimistic view of the AIDS epidemic since the introduction of protease inhibitors in 1996 (Ng). Media suggestions that an AIDS vaccine or cure is soon to come may influence some to take fewer precautions against HIV (Kelly, Otto-Salaj, Sikkema, Pinkerton, & Bloom, 1998). Backstrom and Robins (1998) measured the quality of media coverage about HIV/AIDS by surveying state officials of health departments, hospital associations, and legislative health committees from all fifty states. Their survey occurred at a time when the media were providing strong coverage of HIV/AIDS and state officials were making decisions about how to react to the problem of HIV/AIDS. Backstrom and Robins found that while most respondents believed that the media accurately portrayed factual information derived from experts' reports about HIV and AIDS, most also believed that that the media were overly optimistic regarding drug treatments for HIV. Respondents believed that the media depicted the new treatments as miracle drugs, rather than effective but often fallible treatments. A majority of respondents believed that newspapers and television did not present explicit information about HIV prevention. Expressions of optimism and

the lack of HIV prevention information might lead some to believe that HIV is easily treatable and therefore no longer life threatening.

Sexual Behavior

Behavioral data indicate that adolescents' rates of unsafe sex are high. Recent studies have shown that rates of sexual intercourse have declined among adolescents in the last decade. For example, the CDC (2002b) reported that in 1991, 54% of high school students had had sexual intercourse, and by 2001 this percentage had decreased to 46% (CDC, 2002b). However, some unsafe sexual practices continue. Unprotected sexual intercourse (intercourse without a condom) is one such behavior. Everett et al. (2000) observed that almost half (43.2%) of sexually active high school students in a national sample had not used condoms the last time they had sexual intercourse. African American students reported more condom use (64.0%) than White (55.8%) and Hispanic (50.8%) students. More males than females reported using condoms (62.5% and 50.8%, respectively). Sikand et al. (1996) also found that more males (52%) than females (23%) reported using condoms at any point. Although the rates of unprotected sex vary from study to study, it is clear that unprotected sexual intercourse persists among young people.

A factor involved in unprotected intercourse is the practice of combining sexual intercourse with alcohol or drug use. Keller et al. (1991) found that, among inner city adolescents, alcohol and drug use predicted risky sexual behaviors. Goh et al. (1996) found a significant correlation between sexual intercourse and use of marijuana as well as a significant correlation between sexual intercourse and consumption of alcohol. The CDC (2002b) found that the overall incidence of alcohol and drug use before last sexual

encounter increased 18% among sexually active high school students between 1991 and 2001. The increased prevalence of the combination of drug and alcohol use and sexual intercourse has dangerous implications for adolescents because risky sexual behaviors are more likely than abstinence or safe sexual behaviors to lead to HIV infection and other STDs (CDC).

In summary, adolescents are generally knowledgeable about HIV/AIDS, although some misconceptions still exist. Studies have shown that rates of sexual intercourse have declined among adolescents in the last decade. However, unsafe sexual practices are still prevalent among adolescents. Beliefs about the efficacy and availability of HIV medical treatments may be associated with decreases in self-protective sexual behaviors.

The goal of the present study is to assess high school seniors' sexual and self-protective behaviors, HIV/AIDS-related knowledge, and sources of HIV knowledge. Relationships between HIV knowledge and sexual behaviors will be examined. HIV-related attitudes and the relationships between attitudes and sexual behaviors will be examined.

Method

Participants

High school seniors from three urban schools in the greater Boston area were invited to participate in this study. Parental permission forms were given to 216 seniors. Of these, 50 parental permission forms were returned, yielding a 23% participation rate. The sample included 30 females and 20 males between the ages of 16 and 19 (M = 17.5 years). Thirty percent of the participants were African American, 24% West Indian, 20% Hispanic/Latino, 13% Caucasian, 7% Cape Verdean, and 7% Asian American. On a

scale from 1 to 5 (1 = completely heterosexual, 5 = completely homosexual), 89% of the sample identified as heterosexual, 2% as homosexual, 4% as bisexual, and 4% as between heterosexual and bisexual.

Parents who returned the parental consent form and demographic questionnaire were given $5 as a token of appreciation for their participation, and students were given $25 as a token of appreciation for their participation.

Schools and sexual/HIV education. One school was a large public high school with a total of 1,262 students enrolled in grades nine through twelve. This school provided no sexual education for students. A second school was a small charter high school with a total of 173 students enrolled in grades nine through twelve. Current seniors at this school received a brief sexual education class in their sophomore year of high school but no further sexual or HIV education. The third school was a small public high school to which students are admitted based on a recommendation and an interview; 168 students were enrolled in grades nine, eleven, and twelve. This school provided sexual and HIV education, which consisted of a yearly weeklong program for students in all grade levels.

This study was approved by the Boston College Institutional Review Board, and was part of a larger study of high school seniors.

Measures

Parental questionnaire. The parental questionnaire consisted of 14 items including date and place of birth, household occupants, relationship to student, ethnic background, occupation, and education level.

Student questionnaire. The student questionnaire consisted of 89 items, which inquired about demographic information, language use, sexual practices, HIV/AIDS-related knowledge and attitudes, and religion. This paper will focus only on questions regarding sexual practices, 14 items related to HIV/AIDS knowledge (Cronbach's α = .29), and 11 items related to attitudes about HIV (Cronbach's α = .64). Knowledge questions included items on HIV transmission, prevention, symptoms, and the existence of a cure for HIV/AIDS. Attitude questions included items on feelings of personal vulnerability to HIV/AIDS, beliefs about the threat of HIV/AIDS in the general population, beliefs about a cure or vaccine for HIV/AIDS, and beliefs about medical treatments for HIV/AIDS (see Appendix). Some questions were adapted from Anderson et al. (1990), Barling & Moore (1990), St. Lawrence (1993), and Goh (1993); the remaining questions were created for the purpose of this study. Questions included standard 3-, 4-, and 5-point Likert-type scales, yes/no items, and true/false/uncertain items.

A total HIV knowledge score was created for each participant, with 16 being the maximum possible score. On 12 of the knowledge items, 1 point was given for each correct answer and 0 points were given for each incorrect answer. On 2 of the knowledge items, there were two possible correct answers, the most accurate of which was assigned 2 points and the other of which was assigned 1 point. A transmission subscale was created to measure participants' total knowledge on HIV transmission items; the maximum possible score was 5. Each correct answer was assigned 1 point and each incorrect answer was assigned 0 points. A prevention subscale was created to measure participants' total knowledge on HIV prevention items; the maximum possible score was

6. Each correct answer was assigned 1 point and each incorrect answer was assigned 0 points.

Student open-ended interview question. A 21 item open-ended interview was conducted and recorded using a Marantz Professional CD recorder, which recorded audio data directly onto recordable compact discs. The open-ended interview questions were created for the purpose of this study and included items on ethnic identity, language use, adolescent decision-making, HIV/AIDS knowledge, and religion. This paper will focus only on the following HIV/AIDS knowledge question:

Think back to when you first heard about HIV or AIDS.

- How did you hear about it? How old were you at that time?
- Are there any other ways you've learned about HIV or AIDS?

Following the interview sessions, interviews were transcribed and coded by two independent coders. Responses to the interview question analyzed for this paper were divided into the following categories: personal relationship, television, public advertisements, print media, the internet, school setting, and other institutional setting. Coder agreement (number of agreements/[number of agreements + disagreements]) was calculated at 69%. Disagreements were resolved by discussion.

Procedure

Participating parents completed a brief demographic questionnaire and sent it, along with the parental consent form, to school with their student. The student questionnaire was administered in groups or individually during study hall periods to students whose parents returned the parental consent form. Student assent was obtained before the questionnaire was administered. Questionnaires took about 15 minutes to

complete. Interview sessions were scheduled with students who completed the questionnaire. Interviews took place approximately one week after the questionnaire was administered. Interviews lasted about 30 minutes and were individually conducted in the school library or a private room in the school during study hall periods.

Results

Results are presented in order of the main questions of this study. The first section presents descriptive data on sexual and self-protective behaviors. The next section presents descriptive data on HIV knowledge. This section also describes the relationship between HIV knowledge and sexual behavior. Results for the open-ended question on sources of HIV knowledge are included in this section. The final section presents descriptive data on adolescents' HIV-related attitudes. Findings on the relationship between sexual behavior and HIV-related attitudes are presented.

Analyses for gender differences were performed for all questionnaire items. Because few gender differences were found, findings will be presented for the entire sample unless otherwise specified. Analyses for differences among ethnic groups were performed. For these analyses, West Indian and Cape Verdean participants were grouped with African-American participants to create a larger group of African-American participants. No differences among African-American, Hispanic/Latino, Caucasian, and Asian American students were found. Findings will be presented for the entire sample.

Data analyses utilized were standard descriptive statistics, independent samples t-tests, 2 x 2 chi-square analyses, and one-way analysis of variance.

Sexual Behavior

Thirty-five participants (70%) were sexually active. The mean age of first intercourse was 15.4 years (range = 13-17 years). More males (85%) than females (60%) were sexually active; a 2 x 2 chi-square analysis revealed that this difference was not statistically significant. Examination of participants' frequency of intercourse revealed a bimodal distribution. Of the sexually active participants (n = 35), an equal proportion (31%) reported engaging in intercourse "a few times a year" (n =11) and "once a week" (n = 11). Nineteen percent (n = 7) reported engaging in intercourse "a few times a week," 11% (n = 3) "once before," and 8% (n = 3) "once a month."

Among the sexually active participants (n = 35), self-protective behaviors varied. Males and females differed significantly in how often they reported using protection during sexual intercourse. On a scale from 1 to 5 (1 = never, 5 = always), males reported using protection more often (M = 4.7; SD = .59) than females (M = 4.0; SD = 1.03), $t(33) = 2.47$, $p < .05$. Fifty-four percent (n = 19) of sexually active participants reported always using protection during intercourse, 31% (n = 11) reported almost always using protection, and 11% (n = 4) reported sometimes using protection. Only 3% (n = 1) reported never using protection. Protective methods included condoms (91%; n = 32), birth control pills (29%; n = 10), coitus interruptus (15%; n = 5), the morning after pill (9%; n = 3), the birth control patch (6%; n = 2), the rhythm method (6%; n = 2), and injectable methods (3%; n =1); some participants used more than one method.

Consistent condom use was not common among sexually active participants. Only 49% (n = 17) reported always using condoms; this group included 11 males and 6 females. A 2 (gender) x 2 (always uses condoms, never/inconsistently uses condoms)

chi-square analysis determined that the difference between the percentage of males and females who always used condoms was not significant. About three-fourths (77%) of the sexually active participants reported never having intercourse while under the influence of drugs or alcohol. Less than half (43%) had been tested for HIV.

Given the wide range of frequency of intercourse and the low rates of protective behaviors during intercourse, an independent samples t-test was performed to examine differences in protective behaviors among two groups: sexually active participants who engaged in intercourse once a month or less (n = 17) and those who engaged in intercourse once a week or more (n = 18). These groups were significantly different in how often they reported using protective methods during intercourse. On a scale of 1 to 5 (1 = never, 5 = always), participants who had sex once a month or less used protective methods more often (M = 4.7; SD = .59) than those who had sex once a week or more (M = 4.0; SD = 1.03), $t(33) = 2.47$, p = .02.

HIV Knowledge

A total HIV knowledge score was created for each participant based on a 14-item knowledge scale, with a maximum score of 16. The mean knowledge score of the sample was 69% correct (M = 11; SD = 2.42). Scores ranged from 1 to 14. An independent samples t-test was used to examine gender differences in total HIV knowledge. No significant difference in knowledge was found between males and females. A one-way analysis of variance revealed differences in total HIV knowledge across ethnic groups. Post-hoc pair-wise comparisons showed that Asian-American students' HIV knowledge was significantly lower than that of other ethnic groups. However, there were too few Asian-American students in the sample (n = 3) to warrant any interpretation of this

finding. Independent samples t-tests were used to examine relationships between total HIV knowledge and sexual behavior. No significant difference in knowledge was found between sexually active (n = 35) and abstinent (n = 15) participants. No significant difference in knowledge was found between sexually active participants who engaged in intercourse once a month or less (n = 17) and those who engaged in intercourse once a week or more (n = 18). A one-way analysis of variance was conducted to examine further the differences in total HIV knowledge among three sexual behavior groups (abstinent, use condoms always, and use condoms inconsistently or never). No significant difference in HIV knowledge was found across the three groups.

Because of the interest in specific areas of HIV knowledge, individual knowledge items were examined. These analyses revealed that accuracy of HIV knowledge varied across areas. The mean score on the transmission subscale, which had a maximum score of 5, was 80% correct (M = 4; SD = .85). The mean score on the prevention subscale, which had a maximum score of 6, was 67% correct (M = 4; SD = 1.31). Participants were knowledgeable about symptoms, but less knowledgeable about whether there is a cure for AIDS.

Adolescents were aware that HIV can be transmitted by having sexual intercourse or sharing drug needles with an infected person (98% and 96%, respectively). Almost all (99%) knew that using condoms during sexual intercourse is an effective method of HIV prevention. The majority (90%) knew that abstinence is a sure way to prevent sexual transmission of HIV. Participants were also aware that coitus interruptus is not an effective prevention method (93% said it never or sometimes prevents HIV). The majority knew that the HIV virus can live in the body for years before symptoms appear,

and that it is not possible to tell if someone is HIV-positive based on his or her appearance (86% and 88%, respectively).

Compared to the previous questions where almost all participants answered correctly, accuracy of HIV knowledge was lower in some areas. About four-fifths (78%) knew that there is not a cure for AIDS; one participant (2%) believed that there is a cure, and 20% were unsure. About four-fifths (78%) knew that using birth control pills does not prevent sexual transmission of the HIV virus. Less than three -fourths (71%) knew that condoms are not 100% effective in preventing HIV. Knowledge of mother-to-child transmission of HIV was generally low: 71% knew that HIV can be transmitted from mother to child during pregnancy; 51% knew that HIV can be transmitted from mother to child through breast feeding; and 50% knew that HIV can be transmitted from mother to child during birth.

Sources of HIV knowledge.[1] Adolescents were asked how old they were when they first heard about HIV/AIDS, and how they learned about it. Adolescents first heard about HIV/AIDS at an average of 10.7 years of age (*SD* = 2.62). The most frequent source of HIV information was school, cited by 86% of the sample. Specific school categories included guest lecturers (39%), health or biology classes (33%), and sexual education classes (29%). The second most frequent source of HIV information was television (51%). Specific categories for television included television programs (22%) and television commercials (20%). Ten percent (*n* = 5) of the adolescents reported the television stations MTV (Music Television) and BET (Black Entertainment Television) as sources of HIV information. A frequent source of HIV information for a smaller

[1] Analyses of the open-ended interview question were conducted for 49 participants; all interviews were not completed at the time of analysis.

portion of participants was parents or other adult relatives (20%). Responses were not mutually exclusive; participants could provide more than one source from which they received HIV information.

HIV-Related Attitudes

In general, participants' feelings of vulnerability to HIV infection were low. Fifty-six percent of the sample believed there was no chance that they could get HIV/AIDS and 32% believed there was a small chance. Sixty-two percent reported that they never or almost never worried about getting HIV and 26% sometimes worried. Forty-eight percent reported that they never or almost never thought about the possibility of getting HIV and 34% reported thinking about it sometimes. Eighty-eight percent of participants saw HIV/AIDS as a serious threat to society, and 80% thought it was very important to plan how they would protect themselves from HIV. Eighty-two percent reported that they would discuss HIV with current or future sexual partners; 18% were unsure, and no participants indicated that they would not speak to their partners.

A series of one-way analysis of variance tests revealed differences in HIV-related attitudes across ethnic groups. Post-hoc pair-wise comparisons showed that significantly fewer Asian-American students than students in other ethnic groups would discuss HIV/AIDS with sexual partners. However, there were too few Asian-American students in the sample ($n = 3$) to warrant any interpretation of this finding. Independent samples t-tests were used to examine the relationships between HIV-related attitudes and sexual behaviors. No significant differences in HIV-related attitude items were found between sexually active participants who engaged in intercourse once a month or less and those who engaged in intercourse once a week or more (all $p > .05$ for 10 tests). No significant

differences were found between sexually active and abstinent participants in any of the attitude items (all $p > .05$ for 10 tests). A one-way analysis of variance was conducted to examine further the differences in HIV-related attitudes among three sexual behavior groups (abstinent, use condoms always, and use condoms inconsistently or never). No significant differences were found in any attitude items across the three groups (all $p > .05$ for 10 tests).

HIV-related medical technologies. Very few participants (6%) foresaw an imminent cure or vaccine for HIV/AIDS; 68% did not believe that a cure or vaccine would be found in the near future, and 26% believed that one might be found. Sixty percent were unsure of whether there are medications that can delay the onset of full-blown AIDS in HIV-positive individuals; 12% did not believe that such medications exist and 28% did believe so. Independent samples t-tests were performed to explore the relationships between sexual behavior and beliefs about HIV treatment technologies. No differences in beliefs about HIV medications and about the development of a cure or vaccine for HIV/AIDS were found between sexually active and abstinent participants. One-way analyses of variance were conducted to explore further the relationships between sexual behavior and beliefs about HIV medications and the development of a cure or vaccine for HIV/AIDS among three sexual behavior groups (abstinent, use condoms always, and use condoms inconsistently or never). No significant differences were found.

Discussion

The main questions explored in this paper concern adolescent sexual behaviors, HIV knowledge, and HIV-related attitudes, including beliefs about personal vulnerability

to HIV and beliefs about medical technologies for the treatment of HIV. Findings on adolescent sexual activity and HIV knowledge were consistent with previous research. The findings of this study indicate that the frequency of condom use varied among the sexually active participants. Only half of the sexually active participants used condoms consistently during sexual intercourse. Adolescents were aware of the major modes of HIV transmission and methods of prevention. Despite low levels of personal vulnerability to HIV infection, participants still believed it was important to protect themselves from HIV and AIDS. No differences were found in knowledge of HIV treatment technologies and beliefs about the development of a cure or vaccine for HIV/AIDS among three sexual behavior groups (abstinent, use condoms always, use condoms inconsistently or never). This is inconsistent with previous research on adult male homosexuals, but differences in age, education levels, and exposure to information about HIV/AIDS may account for differing beliefs and attitudes towards HIV medical treatments. No gender differences were found for any items except that males reported using protection more often than females during sexual intercourse; lack of gender differences may be due to sample size. No meaningful differences across ethnic groups were found for any items.

The majority of the sample (70%) reported being sexually active. This rate is similar to CDC's (2002b) finding that 61% of adolescents have had sexual intercourse by their senior year in high school. Only about half of the sexually active adolescents reported consistent condom use during sexual intercourse. This finding is consistent with previous research in which only about half of sexually active adolescents reported consistent condom use (Everett et al., 2000; Sikand et al., 1996). Sexually active males

reported using protection significantly more often than sexually active females, which is consistent with findings by Sikand et al. (1996). High rates of unprotected sexual activity have implications for this sample, which is 61% African-American (including West Indian and Cape Verdean groups) and 20% Hispanic. Currently, AIDS is the third leading cause of death among African-Americans ages 25-54 and Hispanic-Americans ages 35-39 (Anderson, 2002). Individuals in these age groups who die of AIDS are likely to have contracted the disease during their adolescence, since HIV can take a decade or more before death occurs (Rosenberg et al., 1994). Adolescents who use protection – in this case, condoms – less often are increasing their risk of HIV infection.

Most participants (77%) reported never being under the influence of drugs or alcohol during sexual intercourse; this risky behavior can lead to impairments in judgment and thus less frequent use of protective behaviors during intercourse. This finding is similar to that of the CDC (2002b), which reported that 25% of sexually active high school seniors had used drugs or alcohol before the last instance of sexual intercourse, a figure that represents an increase since 1991 in this risky behavior.

About half of the sexually active adolescents reported having been tested for HIV, half of these in the last six months. This finding is encouraging because it reveals that some adolescents are thinking realistically about their risk of HIV infection. Still, the finding that only half of the sexually active adolescents reported always protecting themselves with condoms during sexual intercourse indicates that adolescents often do not take steps to protect themselves from HIV. Further, adolescents who engaged in intercourse infrequently (once a month or less) reported significantly more use of

protective methods than adolescents who engaged in intercourse frequently (at least once a week).

About one-third (30%) of the sample was not sexually active. Although this portion of the sample is clearly protected from sexual transmission of the HIV virus, it is difficult to determine how long these adolescents plan to remain abstinent and what their protective behaviors will be once they become sexually active (Scott-Jones, Leonard, Romer, and Alloy, 2004). Thus, it is impossible to predict the degree to which they will protect themselves from HIV in the future.

Adolescents in the sample were knowledgeable about the major modes of HIV infection and prevention. Over 95% of participants were aware that sexual intercourse and sharing drug needles are methods of transmitting the HIV virus. Almost all participants (at least 90%) knew that abstinence and condom use are effective methods of HIV prevention and that coitus interruptus is not an effective prevention method. These findings are consistent with previous research on HIV knowledge (Walker, 1992; Anderson et al., 1990). Over 85% of the sample was aware that it can take years for symptoms of HIV to appear and that it is impossible to tell if someone has HIV or AIDS based on his or her appearance. This is consistent with data reported by Anderson et al. (1990), who found that more than three-fourths of adolescents were knowledgeable about symptoms of HIV.

Although the overwhelming majority of the sample knew that condoms can protect against HIV infection, about one-third (29%) were unaware that condoms are not 100% effective in preventing HIV. This is similar to the finding of Scott-Jones et al. (2004) that 20% of adolescent mothers were unaware that condoms sometimes fail to

protect against HIV. This has implications for adolescents who may believe they are invulnerable to HIV infection because they consistently use condoms during sexual intercourse. Adolescents may not realize that sexual transmission of HIV can occur in any sexually active individual.

An area of HIV transmission in which adolescents were not knowledgeable was mother-to-child transmission. About half of the adolescents in the sample were not aware that mothers can pass the HIV virus to their babies through childbirth and through breast feeding. A possible explanation for this finding is that mother-to-child transmission is less directly relevant to adolescents than other modes of transmission (e.g., sexual transmission). However, as they advance from high school into the adult world, and approach the time when they will begin to build their own families, it will become increasingly important for adolescents to be knowledgeable about HIV transmission from mother to child. This is an area of discussion which, if included in HIV/AIDS education programs, could benefit adolescents' future decisions.

An important misconception that existed among some adolescents (22%) was that HIV infection can be prevented by using birth control pills. This is similar to a finding by Anderson et al. (1990), who reported that 12% of high school students in a national sample believed birth control pills protect against HIV. This has dangerous implications because the belief that birth control pills prevent HIV or even decrease HIV risk can lead to sexual behaviors in which only pregnancy, and not HIV, is prevented.

A pertinent finding was that one fifth of the adolescents in this sample did not know whether or not there is a cure for AIDS; one participant expressed the belief that there is a cure. This is related to the finding by Boone et al. (2003) in which 66% of

Latina adolescents believed that AIDS can be cured if it is detected early enough. That one fifth of the present sample was uninformed about whether there is a cure for AIDS has implications for sexually active adolescents who may decide not to use condoms during intercourse based on imprecise information about the existence of a cure for AIDS.

The three most common sources of HIV knowledge were school (86%), television (51%), and parents or other adult relatives (20%). It is interesting that although only one school from the sample currently provides sexual and HIV education, most adolescents indicated that they received HIV information from school. Perhaps adolescents learned facts about HIV and AIDS in their academic classes, or perhaps previous schools provided sexual and HIV education.

That half of the sample reported receiving HIV information from television is consistent with Strasburger's report that television is a main source of sexual education for adolescents. It should be noted that information received from school, television, and parents or other adult relatives may not be equivalent. Information received from adult relatives is likely to be qualitatively different from information received in a school setting, in which adult health professionals usually deliver the information. Adult professionals may feel more comfortable than adult family members when discussing with adolescents issues surrounding HIV/AIDS. Furthermore, professionals are likely to have more accurate knowledge than adult family members. This idea has implications for adolescents who do not receive HIV/AIDS education in school but do obtain information from parents. HIV knowledge of such adolescents may be less accurate than that of adolescents who receive HIV/AIDS education in school.

A small group (n = 5) of adolescents who cited television as a source of HIV information specifically referred to MTV (Music Television) or BET (Black Entertainment Television) as television stations on which programs about HIV/AIDS have aired. These and other television stations have recently been taking part in a nationwide campaign to spread awareness and knowledge about HIV to adolescents through television shows, public service advertisements, and Internet websites (Rideout, 2003). According to Arnett (1995), watching television allows adolescents to engage in self-socialization, a process in which they are free to choose media sources (in this case, television shows) that best fit their personal interests. The process of self-socialization through the media, in which adolescents choose whether or not to receive HIV information from television, contrasts to the way adolescents receive information in school, specifically, HIV/AIDS education or health classes, where few choices are available regarding the information presented.

The majority of the adolescents in the sample reported that they did not feel vulnerable to HIV infection. Most believed there was little or no chance of their becoming infected with HIV and most rarely, if ever, worried or thought about the possibility of getting HIV. At the same time, most adolescents expressed the belief that HIV is a serious threat to society and believed it was important to protect themselves against infection. It is alarming that despite valuing protection against HIV, only half of the adolescents always protected themselves by using condoms during intercourse. This is indicative of the knowledge-to-behavior gap that has been reported in many studies of adolescent sexual behavior (Goh et al., 1996).

In the present study, no relationship was found between knowledge of HIV medical technologies and self-protective behavior. One of the major research questions was whether adolescents who knew about medical technologies for the treatment of HIV would decrease their protective measures against the virus; this phenomenon has been documented in some samples of homosexual males (Dilley et al., 1997). In general, knowledge about medical technologies for HIV was low. Only about one fourth of the participants seemed to be aware of the presence of HIV treatment medications, and one fifth did not know whether or not there is a cure for AIDS. Perhaps due to low knowledge about medical technologies, no differences among three sexual behavior groups (abstinent, use condoms always, and use condoms inconsistently or never) were found in beliefs about HIV medications and the development of a cure or vaccine for HIV/AIDS. Further research examining the self-protective behaviors of adolescents who are knowledgeable about HIV medical technologies may lead to more conclusive findings on the relationship between knowledge about medical technologies and self-protective behaviors among adolescents.

Limitations of this study are as follows: The results of this study may not be generalizeable to other samples of high school students, since levels of HIV education not only varied across schools in this sample, but also vary across the country. Results may not be generalizeable across ethnic groups or to non-heterosexual adolescents. Results may not be generalizeable to adolescents who do not attend high school or who do not reach their senior year of high school. Appropriateness of statistical analyses was limited by the relatively small sample size. This study could be improved by replication on a

larger scale and by using a sample that is more ethnically diverse and that includes more homosexual and bisexual participants.

This study contributes to our understanding of adolescents' perceptions of HIV and AIDS. Knowledge about transmission and prevention is high, but consistent condom use among sexually active adolescents is low. Although adolescents experience low levels of personal vulnerability to HIV, they greatly value self-protection from the HIV virus. Unlike some samples of homosexual men, adolescents were not knowledgeable about medical technologies for the treatment of HIV/AIDS. Perhaps due to low knowledge about medical technologies, no relationship could be found between knowledge of HIV-related medical technologies and self-protection against HIV.

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Appendix

Student Questionnaire

1. Age _____

2. Circle one: Male Female

3. Do you consider yourself to be… (circle one)

1----------2----------3----------4----------5

Completely Heterosexual	Bisexual	Completely Homosexual

4. Have you ever had sexual intercourse? (check one)

□Yes → If Yes, how old were you when you had sex for the first time? ____ yrs.

□No → If No, how old do you think you will be when you have sex for the first time?_____yrs.

5. Since the first time you had sex, how often do you have sex? (check one)

□ a few times a week
□ about once a week
□ about once a month
□ a few times a year
□ I have only had sex once before

6. When you have sex, do you use protective methods? (check one)

1----------2----------3----------4----------5

Never	Almost Never	Sometimes	Almost Always	Always

7. When you have sex, is alcohol or any other drug involved? (circle one number)

1----------2----------3----------4----------5

Never	Almost Never	Sometimes	Almost Always	Always

8. Which method(s) of prevention do you use? (check as many as apply)

□ condom
□ birth control pills
□ morning after pill
□ birth control patch
□ foams, sponges, or other spermicides
□ withdrawal ("pulling out")
□ diaphragm
□ female condom
□ methods that can be injected such as Depo-Provera or Norplant
□ rhythm method (using female cycle)
□ none

9. Hospitals and blood donation centers are required to test blood supplies for the HIV/AIDS virus.

True False Don't Know

10. You can get HIV/AIDS by sharing drug needles with an infected person.

True False Don't Know

11. An infected mother can give HIV/AIDS to her baby . . .

<u>During pregnancy</u> True False Don't Know

<u>While the baby is being born</u> True False Don't Know

<u>Through breast feeding</u> True False Don't Know

12. The HIV/AIDS virus can live in the human body for years before symptoms appear.

True False Don't Know

13. There is a cure for HIV/AIDS.

True False Don't Know

14. AZT is a drug that can be used to treat HIV/AIDS.

True False Don't Know

15. You can get HIV/AIDS by having sexual intercourse with an infected person.

True False Don't Know

16. You can tell if a person has HIV/AIDS by looking at them.

True False Don't Know

17. You can prevent sexual transmission of HIV/AIDS by . . . (circle one number)

Using a condom

1----------2----------3----------4
Never Sometimes Almost always Always

Using the "pulling out" method

1----------2----------3----------4
Never Sometimes Almost always Always

Not having sex

1----------2----------3----------4
Never Sometimes Almost always Always

Using birth control pills

1----------2----------3----------4
Never Sometimes Almost always Always

18. Do you ever think about the possibility of getting HIV/AIDS? (circle one number)

1----------2----------3----------4----------5
Never Almost Never Sometimes Often Very Often

19. Do you worry about getting HIV/AIDS? (circle one number)

1----------2----------3----------4----------5
Never Almost Never Sometimes Often Very Often

20. Do you believe there will soon be a cure or a vaccine for HIVAIDS? (circle one number)

1----------2----------3
No, Definitely Not Maybe Yes, Definitely

21. Is it important for you to plan how you will protect yourself from HIV/AIDS? (circle one number)

1	2	3
Not at all Important	Somewhat Important	Very Important

22. Is HIV/AIDS a serious threat in our society? (circle one number)

1	2	3
No, not at all	Small threat	Yes, Definitely

23. Would any of your friends or family be likely to get HIV/AIDS? (circle one number)

1	2	3
No, not at all	Maybe	Yes, Definitely

24. Is HIV/AIDS something you would discuss with your sexual partner, now or in the future? (circle one number)

1	2	3
No	Not Sure	Yes

25. Is there a chance that you could get HIV/AIDS? (circle one number)

1	2	3
Not at All	Small chance	Yes, Definitely

26. Do you believe that people who follow traditional moral values will **not** get HIV/AIDS? (circle one number)

1	2	3
No	Not Sure	Yes

27. If you become infected with HIV/AIDS, are there any medications that will keep you from getting sick? (circle one number)

1	2	3
No	Not Sure	Yes

28. Have you ever been tested for HIV/AIDS? (check one)

□ Yes

□ No

29. When were you tested for HIV/AIDS? (check one)

□ In the last month

□ In the last 6 months

□ In the last year

□ Over a year ago

□ I have never been tested