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20 Years Later and Still at Risk

College Students' Knowledge, Attitudes, and Behaviors About HIV/AIDS

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Abstract: Human immunodeficiency virus (HIV) infection rates in the United States continue unabated among some groups, with young adults of color at greater risk than others. This study sought to determine college students' knowledge, perceptions, and behaviors related to HIV/AIDS. Undergraduate students (N = 443) at a large, urban Hispanic-serving institution in south Texas were surveyed. Participants' self-reported knowledge of HIV transmission was moderate; significant differences exist between age and ethnic groups for some items. Implications for education and prevention campaigns are discussed.

Resumen: El porcentaje de casos de infección de virus de deficiencia inmune humana (HIV) en los Estados Unidos de América continúa creciendo en ciertos grupos, y los adultos jóvenes de color presentan un riesgo mayor. Este estudio buscó determinar el conocimiento, percepciones, y conductas de estudiantes universitarios relacionados con el HIV/SIDA. Se investigó las respuestas de estudiantes de pre-grado (N = 443) en una institución de servicio para Hispanos grande y urbana ubicada en el sur de Texas. Los participantes reportaron tener conocimiento moderado de la transmisión del HIV; en algunas preguntas se obtuvieron diferencias significativas entre grupos de diferentes edades y nacionalidad. Se discuten implicaciones para campañas de prevención y educación.

Keywords: *college students; HIV/AIDS; sexual behaviors; Hispanic-serving institution*

In the United States, the HIV/AIDS epidemic has been devastating communities for 20 years and the number of those directly infected is almost 1 million. Since 1983, more than 920,000 people have been diagnosed with HIV infection and more than 524,000 have died from HIV/AIDS complications (Centers for Disease Control and Prevention [CDC], 2004b). Because of advancements in treatment and medication, many individuals now consider AIDS a chronic condition rather than a life-threatening illness. Survival rates for those diagnosed with AIDS have increased since 1995; however, the number of AIDS cases and new HIV infections has also increased (CDC, 2004b).

One of the most at-risk populations is today's youth, including teenagers and those of college age. Although this study focuses on college students, understanding the pervasive vulnerability of youth in general and specifically youth of color is critical to the foundation of HIV prevention in college students. Of those diagnosed with HIV/AIDS in 2003, 12% were 13 to 24 years of age (CDC, 2004b). Between 1998 and 2003, the rate of AIDS cases among youth rose from 1,775 to 2,182 (CDC, 2005c) and the increase of HIV infection among youth is similar to the overall increase. Youth of color are disproportionately affected. In 2003, 66% of the youth cases in the United States were reported in Black adolescents (13 to 19 years old) although they comprised only 15% of the adolescent population. Likewise, Hispanic youth accounted for only 16% of the adolescent population yet 21% of the reported youth HIV/AIDS cases were in this group (CDC, 2005c).

Whereas the high rate of HIV/AIDS among young adults 13 to 24 years old is clearly identified from the surveillance data, individuals at colleges and universities are sometimes thought to be less at risk than the general population. The CDC and American College Health Association (ACHA) estimated that 1 in 500 college students were HIV positive (Gayle et al., 1990) at the same time that the rate among the general population was approximately 1 in 250 (CDC, 1994). However, a 2002 outbreak among African American male college students in North Carolina led to a re-examining of possible infection rates for this population. For the group in North Carolina, an investigation showed little difference in risk behaviors between the HIV-positive college students in this outbreak and other HIV-positive individuals not in college (CDC, 2004a), thereby dispelling the idea that college somehow provides a protective factor against HIV infection.

The outbreak in North Carolina and high rates of HIV among youth should not be surprising. Many studies indicate a high rate of sexual activity and multiple sexual partners with only moderate rates of condom use among college students. A 2005 national survey of almost 17,000 college students showed that in the previous month, 43.9% of students had engaged in oral sex, 49.1% reported engaging in vaginal sex, and 5.6% reported engaging in anal sex (ACHA, 2006). Of those who engaged in vaginal sex, only 48.1% used a condom the last time they engaged in vaginal sex. Similarly, of those who had anal sex, only 23.4% reported using a condom they last time they engaged in anal sex. And although HIV transmission through oral sex is minimal, even fewer students practice safer sex behaviors for this activity with only 3.6% using a condom the last time they engaged in oral sex. For some, alcohol is a contributing factor; of those college students who drink alcohol, 15.8% had engaged in unprotected sex after drinking in the past year. In addition to not using protection, almost 1 in 11 college students (8.9%) reported having four or more sexual partners in the past year (American College Health Association, 2006).

Because of these high risk factors, one wonders about the knowledge level of HIV/AIDS among these young adults. Some studies have found that college students are knowledgeable about HIV/AIDS but still practice high-risk behaviors (Keller, 1993; Lance, 2001; Lance, Morgan, & Columbus, 1998; Opt & Loffredo,

2004; Prince & Bernard, 1998; Ratliff-Crain, Donald, & Dalton, 1999). Other studies have shown high levels of general knowledge but limited understanding of disease transmission and low practice of safer sex behaviors (Lewis & Mallow, 1997; McCormack, 1997). Most of these studies, however, are more than 5 years old.

As the United States enters the second decade of this crisis, college students' knowledge, perceptions, and behaviors related to HIV need to be re-examined to better understand where the knowledge breakdown occurs and why high-risk behaviors continue. Lewis & Mallow (1997) advocated identifying the knowledge, behaviors, and perceptions of college students from a variety of institutional types to better understand this epidemic. This study partially addresses this need by surveying students at a type of university not often included in studies about HIV/AIDS and college students—a large urban, commuter, Hispanic-serving institution (HSI). Research questions for the study were as follows:

- What are the knowledge levels of undergraduate students about HIV/AIDS with respect to the transmission and prevention of the disease?
- What are students' perceptions about HIV/AIDS?
- What are the self-reported sexual practices of students?
- How are student behaviors related to their knowledge about HIV/AIDS?
- What differences, if any, exist between age, ethnic, and gender groups?

Method

Participants

Participants were undergraduate students at a large, urban HSI in south Texas. From a convenience sample of intact classrooms, 443 usable surveys were collected. The total number of students enrolled in these classes was 632, resulting in a response rate of 68.7%. More women (61%) than men (39%) participated in this study. A majority of the participants were between the ages of 18 and 25 and were either Caucasian or Hispanic individuals. More freshmen (33.4%) participated in this study than did members of any other class but overall there was a fairly even distribution among class standings (sophomore = 17.6%, junior = 25.7%, senior = 23.0%). Table 1 contains more detailed demographic information of the participants and a comparison to university demographics.

Instrument

A questionnaire was constructed by the second author to gather information to answer the research questions. The questionnaire consisted of 20 items. Five demographic questions addressed age, gender, ethnicity, classification (freshman, sophomore, etc.), and if the participant was a student.

Table 1
Participant Demographics

	Number	Percentage of Sample	Percentage of University
Male	173	39.0	46.0
Female	269	61.0	53.0
Aged 18-20	228	51.5	52.0
Aged 21-25	144	32.5	28.0
Aged 26-49	62	14.2	20.0
Caucasian	190	42.9	40.8
Hispanic	177	40.0	45.5
African American	31	7.0	5.5
Asian	19	4.3	4.6
American Indian	2	0.5	0.5
Other	12	2.8	N/A
Freshman	148	33.4	29.0
Sophomore	78	17.6	17.0
Junior	114	25.7	19.0
Senior	102	23.0	30.0

Note: University age groups represent slightly different age ranges: 18 to 22, 23 to 29, and older than 30 years of age.

Seven questions assessed students' knowledge about HIV/AIDS transmission and prevention. Four of these knowledge questions addressed self-reported knowledge and had yes/no responses: Are you aware of HIV/AIDS? Does HIV cause AIDS? Do you know how to prevent HIV/AIDS? and Do you know how HIV/AIDS is transmitted? Another question addressing self-reported knowledge asked the participants to rate their own knowledge about HIV/AIDS on a 3-point scale: *very knowledgeable*, *somewhat knowledgeable*, or *knowledgeable*. Two follow-up questions, which allowed for multiple responses, asked about specific knowledge related to prevention and transmission: What prevents the transmission of HIV/AIDS? and In your knowledge, what transmits HIV/AIDS?

Three questions addressed perceived attitudes. Participants were asked to rate their perception of personal risk for HIV and their perception of risk for other university students. Participants were also asked to indicate whether they considered HIV/AIDS a health problem of the past, present, or future (respondents could choose more than one time period).

Five questions related to behavior were taken from the National Health and Nutrition Examination Survey (CDC, 2002a) and Youth Risk Behavior Survey (CDC, 2002b). One item asked if the respondent had been tested for HIV (yes/no response). The remaining items addressed sexual behavior. Participants were initially asked if they had any form of sexual intercourse ever (yes/no response). If the

respondent replied yes, then three follow-up items queried the number of sexual partners, the percentage of time the individual protected himself or herself from HIV/AIDS during intercourse (100%, 75%, 50%, 25%, or never), and what methods the individuals used to protect themselves (an open-ended question).

Except for age and how the participants protected themselves (both open-ended), responses for all items were closed (e.g., yes/no) or ordinal scales. The items were analyzed individually, not as scales; therefore, reliability coefficients were not determined. However, a panel of three research experts reviewed the entire instrument and determined that the items were suitable and appropriate for this study and study participants. In addition, the questions taken from existing surveys (Youth Risk Behavior Survey and National Health and Nutrition Examination Survey) have been deemed valid and reliable (Brener, Collins, Kann, Warren, & Williams, 1995; Brener et al., 2002).

Data Collection

This study was conducted at a south Texas HSI of approximately 22,000 students. Undergraduate students ($N = 632$) who were currently enrolled in a variety of classes across a range of disciplines and class levels voluntarily completed the questionnaire. Professors were contacted prior to data collection for permission to distribute the questionnaire in their classes. Surveys were administered in those classes in which the professors agreed to allow it. These professors were selected either by personal experience or acquaintance or they volunteered when asked. This methodology provided a convenience sample but the participant demographics are similar to overall university demographics. Professors were not present and were not involved in any data collection. Surveys were distributed to all students in the classroom and participants completed the survey at that time. Students were informed that the questionnaire sought sensitive data and their participation was voluntary and would have no bearing on their class grade. The questionnaires contained no personally identifying information. When the participants turned in the completed questionnaires, the signed consent forms were detached to ensure confidentiality. Approval from the Institutional Review Board for the use of human participants was obtained before any work on the project began.

Data Analysis

SPSS 13 was used for analyses. Descriptive data were summarized as percentages; where possible, survey responses were analyzed for trends and associations using χ^2 for age, gender, and ethnicity. Age was examined by category: 18- to 20-year-olds, 21- to 25-year-olds, and 26- to 49-year-olds. Ethnicity was examined using three categories: Caucasian, Hispanic, and Other. Because of the small number of participants from some ethnic groups, these were collapsed into the group labeled

Other. The authors sought to determine if there were any associations between the students' knowledge, perceived risk of HIV (perceptions), and reported behaviors (safer sex practices, number of partners, condom use). Alpha was set at .05. Missing data for individual items were not included in those specific analyses; therefore, the participant number is reported for each analysis.

Results

A total of 443 surveys were analyzed. Descriptive results are presented first, followed by the comparative analyses. There were several significant differences for age, gender, and ethnicity.

Knowledge About HIV/AIDS

In general, participants believed that they had moderate knowledge about HIV/AIDS. Only one participant stated that he or she was not aware of HIV/AIDS. When asked to rate their knowledge, most participants considered themselves knowledgeable as opposed to very knowledgeable or somewhat knowledgeable about HIV/AIDS (see Table 2 for responses). There was a significant difference between age groups ($\chi^2 = 15.42$, $df = 4$, $p < .01$), with those in the younger age group more frequently considering themselves somewhat knowledgeable. For this item there were no differences between gender and ethnic groups.

Knowledge about prevention and transmission of HIV/AIDS was variable. Overall, 97% ($n = 429$) of participants stated that they knew how to prevent HIV transmission; however, 13% ($n = 58$) believed that diaphragms prevented HIV transmission, 6% ($n = 27$) believed that hand washing prevented HIV, and 4% ($n = 18$) believed that birth control pills or the hormonal patch prevented HIV transmission. Most participants (93%) identified abstinence ($n = 412$) as a prevention method for HIV/AIDS.

Similarly, the participants' knowledge about modes of transmission was different from their perceived knowledge. Of the participants, 96% ($n = 425$) believed that they knew how HIV was transmitted; however, some falsely believed that HIV is transmitted through saliva (21%, $n = 93$), kissing (6%, $n = 27$), sweat (3%, $n = 13$), and tears (1%, $n = 4$). Many participants did not identify other correct modes of transmission. For example, only 30% ($n = 133$) identified breast-feeding as a possible mode of transmission, whereas 95% ($n = 421$) identified blood transfusions as a route of transmission. Other modes also had low responses with 60% ($n = 266$) identifying oral sex as a transmission route, 86% ($n = 381$) identifying vaginal fluids, 88% ($n = 390$) identifying semen, and 89% ($n = 394$) identifying needles. Most of the participants (96%, $n = 425$) identified sexual intercourse as a transmission route for HIV.

Participant responses were examined by age, gender, and ethnicity. For the three age groups, there were no significant differences on knowledge questions. However,

Table 2
Responses to Perceived Knowledge About and Perceived Threat of HIV/AIDS by Age Group

	Response	18 to 20	21 to 25	26 to 49
How would you rate your knowledge about HIV/AIDS?*	Very knowledgeable	28 (12.3%)	20 (14.1%)	19 (30.6%)
	Knowledgeable	125 (55.51%)	86 (60.6%)	31 (50.0%)
	Somewhat knowledgeable	74 (32.6%)	36 (25.4%)	12 (19.4%)
In your opinion, how threatened are you in regards to the dangers of HIV/AIDS?**	Very threatened	4 (1.8%)	6 (4.2%)	3 (4.9%)
	Threatened	27 (12.2%)	21 (14.7%)	4 (6.6%)
	Somewhat threatened	87 (39.2%)	70 (49.0%)	18 (29.5%)
	Not threatened at all	104 (46.8%)	46 (32.2%)	36 (59.0%)

Note: Because not all participants responded to every question, *n*s for age groups differ by question. For the question "How would you rate your knowledge about HIV/AIDS?" 18 to 20, $n = 227$; 21 to 25, $n = 142$; 26 to 49, $n = 62$. For the question "In your opinion, how threatened are you in regards to the dangers of HIV/AIDS?" 18 to 20, $n = 222$; 21 to 25, $n = 143$; 26 to 49, $n = 61$.
*$\chi^2 = 15.42$; $df = 4$; $p < .01$. **$\chi^2 = 17.24$; $df = 6$; $p < .01$.

for ethnicity, there were several differences. Participants from the Other ethnic group were more likely to believe that birth control pills prevented HIV infection (10.9%, $n = 7$) than were Caucasian (2.7%, $n = 5$) or Hispanic participants (2.3%, $n = 4$; $\chi^2 = 10.73$, $df = 2$, $p < .01$). Likewise, Hispanics were less likely to report they knew how HIV is transmitted (94.8%, $n = 163$) than were Caucasians (99.5%, $n = 186$) and participants of Other ethnicities (98.4%, $n = 62$; $\chi^2 = 8.09$, $df = 2$, $p < .05$). There were also a few significant differences between gender. Men were significantly more likely to believe that tears transmitted HIV (2.9% vs. 0.4%; $\chi^2 = 4.94$, $df = 1$, $p < .05$) and significantly less likely to believe that HIV can be transmitted through breastfeeding (23.1% vs. 35.2%; $\chi^2 = 7.24$, $df = 2$, $p < .01$).

Perceptions About HIV/AIDS

Regarding individual risk, most students perceived that they were not threatened by the dangers of HIV/AIDS or only somewhat threatened (84.5%, $n = 368$). Only 12% ($n = 52$) believed themselves to be threatened by HIV/AIDS and 3.4% ($n = 15$) to be very threatened by HIV/AIDS. More participants perceived themselves not at risk for HIV/AIDS than those who perceived themselves at risk. Significant differences between age groups ($\chi^2 = 17.24$, $df = 6$, $p < .01$) were determined for individual risk for HIV/AIDS (Table 2). Participants aged 18 to 20 had the lowest percentage of perceived risk. There were no significant differences based on gender or ethnicity for this item.

Regarding the level of risk for other students, in general participants perceived other students were at risk with 41% ($n = 182$) feeling that university students were

very threatened or threatened by the dangers of HIV. Almost half (48%, $n = 213$) believed that students were somewhat threatened, and 9% ($n = 40$) believed that university students were not threatened at all. There were no significant differences for this item with regard to age, ethnicity, or gender.

In addition, participants were asked if HIV/AIDS was a problem of the past, is a problem of the present, or will be a problem of the future. Most individuals tended to believe that HIV/AIDS is more of a problem of the present (90%, $n = 399$) than of the past (62%, $n = 275$) or future (82%, $n = 363$). There were no significant differences between age groups or gender, but Hispanic students were less likely to view HIV/AIDS as a problem of the present or future. Regarding HIV as a problem of the present, 96.8% ($n = 185$) of Caucasians and 96.8% ($n = 60$) of respondents from the Other ethnic group believed that HIV is a problem of the present compared to 88.6% ($n = 155$) of Hispanic respondents ($\chi^2 = 11.41$, $df = 2$, $p < .01$). Thinking about the future, 89.4% ($n = 168$) of Caucasians and 82.3% ($n = 51$) of respondents in the Other ethnic group believed HIV/AIDS to be a future problem compared to 76.6% ($n = 134$) of Hispanic respondents ($\chi^2 = 10.57$, $df = 2$, $p < .01$).

Sexual Behaviors

A majority of the participants (80.9 %, $n = 355$) reported ever having had some form of sexual intercourse. Four individuals did not respond to this question and are not included in the analyses. In the 18-to-20 age group, 71% ($n = 163$) reported having had some form of sexual intercourse, compared to 85% ($n = 126$) of participants in the 21-to-25 age group and 96.7% ($n = 59$) in the 26-to-49 age group. There were significant differences between age groups ($\chi^2 = 25.99$, $df = 2$, $p < .001$) and ethnicity for this item. More Caucasian (87.3%, $n = 165$) and Hispanic (80.6%, $n = 141$) participants answered yes to this question than did those in the Other ethnic category (61.9%, $n = 39$; $\chi^2 = 19.65$, $df = 2$, $p < .001$). There was not a significant difference between men and women reporting ever having some form of sexual intercourse.

Of those individuals who reported having had some form of sexual intercourse, most (57.3%; $n = 201$) reported having fewer than four partners in their lifetime, with significant differences between age groups ($\chi^2 = 76.28$, $df = 10$, $p < .001$) and gender ($\chi^2 = 16.77$, $df = 5$, $p < .01$). Frequencies for both age and gender are reported in Tables 3 and 4. There were no significant differences regarding ethnicity.

Of the participants who had ever had sexual intercourse, slightly more than one fourth (27.8%, $n = 98$) reported that they protected themselves from HIV/AIDS at all times. Most participants reported protecting themselves 50% to 75% of the time (54.6%, $n = 190$). A little more than one tenth (10.5%, $n = 37$) reported using protection 25% of the time and 7.1% ($n = 25$) reported never using protection. Differences between age groups were significant ($\chi^2 = 29.02$, $df = 8$, $p < .001$). Of the 18- to 20-year-old participants, 38% ($n = 63$) reported using protection 100% of the time compared to 15.9% ($n = 20$) of the 21- to 25-year-old participants and

Table 3
Number of Lifetime Sexual Partners by Age Group

	Age Group*			
Number of Partners	18 to 20 (n = 161)	21 to 25 (n = 126)	26 to 49 (n = 59)	Total (N = 346)
1-2	90 (55.9%)	31 (24.6%)	6 (10.2%)	127 (36.7%)
3-4	32 (19.9%)	30 (23.8%)	10 (16.9%)	72 (20.8%)
5-6	19 (11.8%)	18 (14.3%)	13 (22.0%)	50 (14.5%)
7-8	12 (7.5%)	14 (11.1%)	6 (10.2%)	32 (9.2%)
9 or more	4 (2.5%)	27 (21.4%)	16 (27.1%)	47 (13.6)
Do not know	4 (2.5%)	6 (4.8%)	8 (13.6%)	18 (5.2%)

Note: These data exclude those who have not engaged in sexual intercourse.
*$\chi^2 = 76.28$; $df = 10$; $p < .001$.

Table 4
Number of Lifetime Sexual Partners by Gender

	Gender*		
Number of Partners	Male (n = 146)	Female (n = 206)	Total (N = 352)
1-2	54 (37.0%)	74 (35.9%)	128 (36.4%)
3-4	20 (13.7%)	53 (25.7%)	73 (20.7%)
5-6	19 (13.0%)	31 (15.0%)	50 (14.2%)
7-8	12 (8.2%)	21 (10.2%)	33 (9.4%)
9 or more	28 (19.2%)	20 (9.7%)	48 (13.6%)
Do not know	13 (8.9%)	7 (3.4%)	20 (5.7%)

Note: These data exclude those who have not engaged in sexual intercourse.
*$\chi^2 = 16.77$; $df = 5$, $p < .01$.

22.4% of the 26- to 49-year-old participants. More participants in the 21-to-25 age group (53.2%, n = 67) reported using protection 75% of the time than did those in the other age groups: 29.6% (n = 48) for 18- to 20-year-olds and 41.4% (n = 24) for 26- to 49-year-olds. There were no differences between ethnic groups or gender regarding percentage of time protection was used.

An open-ended question asked participants how they protect themselves from HIV/AIDS transmission. Individuals could list more than one way they protect themselves. Of those who answered the question (68.8%, n = 305), condoms were the most reported method of protection (94.3%, n = 281). Other methods listed were abstinence (2.0%, n = 6), monogamy (1.0%, n = 3), contraception (0.7%, n = 2), oral contraceptives (0.7%, n = 2), marriage (0.7%, n = 2), protected sex (0.3%, n = 1), and pulling out (withdrawal) (0.3%, n = 1).

Participants were also asked about testing practices; only 37.8% (n = 161) of the total participant group had been tested for HIV; however, 46% of those who indicated they had been sexually active had been tested for HIV. The majority of students (79%) in the 18-to-20 age group had not been tested, whereas 46.1% (n = 65) of participants in the 21-to-25 age group and 80.3% (n = 49) of those in the 26-to-49 age group had been tested. This difference was significant ($\chi^2 = 78.01$, $df = 2$, $p < .01$). There were no differences between ethnic groups and gender related to HIV testing practices.

To examine connections between behavior and perceived knowledge, a χ^2 analysis of self-reported transmission knowledge and use of protection was conducted. This analysis was not significant for the overall sample or for gender, age, or ethnic group.

Discussion

In the 20 years since the first reported AIDS case, many education and prevention programs have been developed and implemented. With the supposed saturation of information in the environment (Morris, 1998), one would expect high rates of knowledge and preventive behaviors. Although the data collected in this study were from a convenience sample, the results suggest that the occurrence of risk-taking behaviors as well as knowledge and attitudes are not optimum among college students.

Knowledge

The findings of this study reveal that undergraduate students still harbor some myths about HIV/AIDS transmission. Some participants incorrectly stated that saliva, sweat, and kissing were modes of transmission but these fluids do not transmit HIV. Additionally, some participants did not identify breast-feeding, oral sex, and vaginal fluids as capable of transmission. This may reflect a societal emphasis on sexual intercourse as the primary mode of transmission for HIV/AIDS. In most school-based HIV/AIDS education programs, sexual intercourse and injected drug use are the only modes of transmission discussed (Texas Department of Health, 2002). When 96% of the respondents identify sexual intercourse as a mode of transmission for HIV infection, one wonders what the other 4% believe.

Participants in the 18- to 20-year-old group considered themselves to be less knowledgeable about HIV/AIDS than the other age groups. This result may reflect the fact that Texas promotes abstinence-only policies in its secondary schools (Texas Department of Health, 2002). These younger individuals have attended school health programs that did not include information about prevention of sexually transmitted infections or contraception beyond abstinence. As our findings and others (American College Health Association, 2006) indicate, most college students are sexually active. Without the necessary information or skills to protect themselves, these students are at greater risk for negative consequences from their sexual behavior, such as contracting HIV or another sexually transmitted infection or experiencing an unwanted pregnancy.

Likewise, fewer Hispanic participants reported that they knew how HIV was transmitted. Similar to previous research (Driscoll, Biggs, Brindis, & Yankah, 2001), this finding is a concern because rates of infection in Hispanic individuals are increasing. This study did not obtain country of birth but previous research has shown that less acculturated Hispanic individuals often lack important health knowledge such as information about their own bodies, contraceptive options, and health care resources as well as negotiation skills (Minnis & Padian, 2001; Office of Research on Women's Health, 1998). This variable could be a factor in the lower rates of knowledge reported by Hispanic participants. Another factor could be the Hispanic culture, which discourages communication about sexuality and limits what parents say to their children (Cepeda, 2006; Sable, Campbell, Schwarz, Brandt, & Dannerbeck, 2006). Unfortunately for Hispanic parents who do talk to their children, there is disconnection between their perception and their children's. A recent survey indicated that whereas 82% of Hispanic parents believe they have had a meaningful conversation about sexuality issues with their children, only 55% of the youth surveyed reported having a helpful conversation with their parents about sexual issues (National Campaign to Prevent Teen Pregnancy, 2006). This disconnect reinforces the idea that Hispanic college students may lack the information they need to make the best sexual decisions.

Perceptions

More 18- to 20-year-olds saw themselves and other students as being at no risk of contracting HIV/AIDS. This may reflect the lack of knowledge regarding transmission in the younger group. Interestingly, the group overall did not perceive themselves at risk for HIV/AIDS but identified a greater risk for other university students. If individuals do not perceive themselves at risk, they are less likely to practice safer sex methods because they do not believe they need it.

Many participants identified HIV/AIDS as a present-day problem; however, fewer Hispanic participants identified HIV/AIDS as a present or future problem. As the rate of HIV disproportionately affects groups of color, this finding is disconcerting. All individuals but especially those who may be more affected need to understand the importance and the impact that HIV can have, and is having, on the country and in their communities. The lack of awareness of HIV as a present-day problem coincides with findings that Hispanic individuals are less likely to know they are HIV positive until there are visible symptoms of AIDS (Driscoll et al., 2001). Individuals may not perceive HIV as a problem until there are severe consequences. Unfortunately, later detection of HIV will lead to greater AIDS mortality rates because of a lack of treatment. This increased rate of death has already been documented among Hispanic individuals when considering mortality rates from AIDS since 2000 (CDC, 2005d).

Overall, fewer individuals considered HIV/AIDS a future concern. This finding may indicate that many of today's college students are not aware of the global HIV/AIDS issues that threaten the social, economic, and political structures in some areas of Africa, the Caribbean, and Asia (Joint United Nations Programme on HIV/AIDS & World Health Organization, 2005).

Behavior

Only one fourth of those sexually active protected themselves 100% of the time during sexual intercourse. Fewer 21- to 25-year-olds protected themselves 100% of the time than did those in the 18-to-20 age group or the 26-to-49 age group. Interestingly, the middle age group had lower rates of protection and higher rates of perceived risk. The oldest group had lower perceived risk for themselves. Although not specifically asked, it is possible that risk wasn't perceived because participants were in monogamous relationships. However, only three participants provided *monogamy* as a response to the question "How do you protect yourself from HIV/AIDS?" Although fewer Hispanic participants felt knowledgeable and identified HIV as a future and present concern, there were no differences between the ethnic groups regarding sexual behavior and frequency of protective behaviors. This indicates that participants in this study may be at equal risk for HIV/AIDS regardless of ethnicity but it does not diminish the need for more education about HIV/AIDS transmission and prevention. In fact, the overall low percentage of individuals protecting themselves only reinforces the need for more education about transmission and prevention programs that include condom use for all groups.

Interestingly, there was no difference in protective sexual behaviors for individuals with higher knowledge versus others. Lewis & Mallow (1997) also found that HIV knowledge and sexual behaviors were not related; that is, participants who were knowledgeable about HIV/AIDS were no more likely to practice safe sex than were those less knowledgeable. As intervention programs are designed to prevent HIV/AIDS, addressing the gap between knowledge about HIV transmission and actual risk behaviors is critical.

With respect to HIV testing practices, less than half of those who reported being sexually active had been tested for HIV. Because of the increasing rates of HIV infection among youth (CDC, 2005c), this moderate level of testing is a serious concern. Knowledge of HIV status is essential to sexual decision making and other life choices. Individuals who are negative can engage in practices to remain so and those who are seropositive can make informed decisions about treatment, prevention of HIV transmission to others, and risk of transmission to a child in utero. There are initiatives to increase the rate of individuals who know their status through easier access to testing. Incorporating testing in routine medical exams and increasing availability of rapid testing are critical components of this initiative (CDC, 2005a). University settings need to examine current testing availability on campus and ensure that students have easy access to low-cost, rapid HIV testing.

Limitations

There are several limitations to the study. First, there was no definition of abstinence in the questionnaire. The assumption was made that college students would know the

meaning of this term; however, adolescents and young adults reportedly include oral and anal sex as abstinent behaviors (Bogart, Cecil, Wagstaff, Pinkerton, & Abramson, 2000; Prinstein, Meade, & Cohen, 2003; Remez, 2000). Therefore, this assumption may have confounded the results. In addition, the survey asked the participants to report sexual intercourse behaviors but did not specify vaginal sex, oral sex, or anal sex. More specific listing of behaviors would better identify the level of risk for the participants.

The research was based on participants' self-reports of their own knowledge, perceptions, and behaviors, which means that the findings depend largely on the participants' honesty. The survey addressed a sensitive subject, so individuals may have been hesitant to provide factual answers if they believed someone may connect their response to them. The surveys were administered in classrooms and professors were not part of the data collection process; however, students may still have been uncomfortable answering questions in this setting. This limitation could account for some of the missing data.

Because the study was based on a convenience sample, drawing conclusions from these data should be done with caution. However, the sample was not significantly different from the university population by gender, age, or ethnicity. Additionally, the similarity of these findings with others (Bruce & Walker, 2001; Keller, 1993; Lance, 2001; Lance et al., 1998; Lewis & Mallow, 1997; McCormack, 1997; Prince & Bernard, 1998) lends credence to them.

Future Research

The study was conducted to ascertain students' knowledge, perceptions, and behaviors regarding HIV/AIDS. Results are similar to those of other researchers (Bruce & Walker, 2001; Keller, 1993; Lance, 2001; Lance et al., 1998; Lewis & Mallow, 1997; McCormack, 1997; Prince & Bernard, 1998), who found that general knowledge was high and risk behaviors were also high. Further research is needed with evidence-based programs to determine successful methods for reducing risk behaviors in college students.

In addition, random samples of college students would provide results that may be more generalizable. Similarly, inclusion of more individuals from other ethnic groups would provide additional valuable information.

Implications for Practice

College students are at risk for many health issues; HIV/AIDS is one most paramount. The results of this study indicate that some college students do not have accurate knowledge about HIV/AIDS, nor do they consider themselves threatened by HIV/AIDS. As many individuals are successfully living with HIV because of advances

in medicine, the focus on HIV/AIDS has lessened. One of the authors concedes that her own efforts have developed the attitude of "If I can prevent them from getting herpes, I can prevent them from getting HIV." This approach may be effective in reducing overall risk, but not including detailed information about HIV/AIDS in classrooms and health presentations diminishes the students' knowledge about HIV/AIDS, reinforces the idea that HIV/AIDS is not a concern for college students, and minimizes their awareness of the impact that HIV/AIDS has on our communities. Likewise, it prevents students from understanding the global impact of HIV/AIDS.

Sexuality educators and other health professionals on college campuses need to consider what emphasis is currently put on HIV infection and what emphasis this infection deserves. Specific education that addresses knowledge and prevention is critically important to help those students who do not have this information and to increase effective prevention techniques for all students. At the same time, institutions should revisit educational interventions that increase perceived susceptibility to and severity of HIV infection. This becomes especially important when dealing with students of color because these results indicate that Hispanic students consider themselves less knowledgeable about HIV and believe that HIV/AIDS is less a present or future problem than do other ethnicities. Culturally competent approaches are applicable and should focus on increasing knowledge about the transmission and protective factors while increasing access to testing and treatment services. Others (Villarruel, Jemmott, & Jemmott, 2006) have found that culturally competent prevention education programs may decrease sexual activity, unprotected sexual behaviors, and number of partners among Hispanic youth. At HSIs, these programs could be linked with student health services, providing students with not only prevention information and skills but also access to testing and treatment services. As ethnic minorities tend to lack knowledge, health insurance, and access to health care (CDC 2005b; Driscoll et al., 2001; Remez, 2000), this service could be invaluable in decreasing rates of infection and increasing testing rates.

Many college students perceive an invisible wall between the community and the university. This is not so for any institution but especially an urban HSI such as this one. Being a college student itself does not provide immunity or protection from the community health practices and risk of HIV. As educators, we need to help students understand their risk for HIV infection as well as how the AIDS epidemic affects us all.

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