

HIV/AIDS-related Knowledge, Attitudes, and Practices among Managuan Secondary School Students¹

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In 1990, the AIDS-related knowledge, attitudes, and practices of fifth year (final year) students at four Managuan high schools were assessed. This was done by means of a self-administered questionnaire completed by 451 students (155 males, 296 females) whose mean age was 18 years. Eighty-six percent of the subjects knew AIDS was transmitted sexually, but the percentages aware of other transmission pathways and effective preventive measures were much lower.

Use of condoms was cited as a preventive measure by 41% of the students, but by significantly more male respondents than female respondents (55% of the males versus 33% of the females, $p = 0.0001$). Sixty-four percent of all the survey subjects (90% of the males, 50% of the females) reported experiencing sexual intercourse. Sixty percent of the respondents were "very much" worried about AIDS, but only 23% considered themselves at risk of contracting the disease. Among the sexually active students, 29% of the respondents (38% of the males but only 7% of the females, $p = 0.001$) indicated a change in sexual behavior because of AIDS. Reported behavior change was strongly associated with concern about AIDS, but the association between reported behavior change and perception of personal risk was weak.

Overall, the survey indicated that knowledge about transmission and prevention of AIDS among Managuan high school students was insufficient, especially among females, indicating a need for health education including interventions specifically targeted at female youth.

Nicaragua, with an estimated population of 4 million, has been relatively unaffected thus far by human immunodeficiency virus (HIV) infections and by the acquired immunodeficiency syndrome (AIDS). As of September 1992, the Ministry of Health had reported 31 people with AIDS and another 52 seropositive for HIV; many of these people were

infected abroad (1). Two people with AIDS and one seropositive for HIV were adolescents 15–19 years old, and another eight of those with AIDS seem likely to have been infected in adolescence. These figures contrast sharply with those for neighboring Honduras and Costa Rica, where respective totals of 1 595 and 315

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AIDS cases had been reported as of 1 December 1991 (1).

The reasons for the low prevalences of AIDS cases and HIV infections in Nicaragua are a matter for debate, but the country's isolation caused by war and an economic embargo in the 1980s, its self-sufficiency for blood products, and its low prevalence of intravenous drug users may have contributed to this situation.

The end of the war in 1990 was accompanied by the return of troops and refugees from Honduras and many Nicaraguan citizens from the United States of America. These influxes may fuel an increase in the number of HIV infections in Nicaragua in the near future (1, 2).

The male to female ratio among all seropositive persons is 2.5:1, but is 0.9:1 among those probably infected within the country. These figures indicate that within Nicaragua, HIV is likely to spread predominantly by heterosexual transmission. Since condom use is low and sexually transmitted diseases (STDs) are common, the potential exists for a severe HIV epidemic.

A high prevalence of sexual and drug-related high-risk behaviors (and therefore a potential for HIV infection) has been found among adolescents of many countries, including Nicaragua (3, 4). Many youths perceive themselves invulnerable to harm, which makes them less likely to adopt preventive behavior patterns. For these reasons, national AIDS prevention strategies give high priority to development and implementation of HIV education programs for adolescents (5).

Knowledge, attitudes, and practices (KAP) studies assessing the prevalent knowledge about AIDS and HIV infection and the frequency of high-risk behaviors in a target population can provide information that is useful in designing and evaluating education campaigns (6). This article reports the results of one such KAP study that was conducted in 1990

among students attending four Managua high schools.

MATERIALS AND METHODS

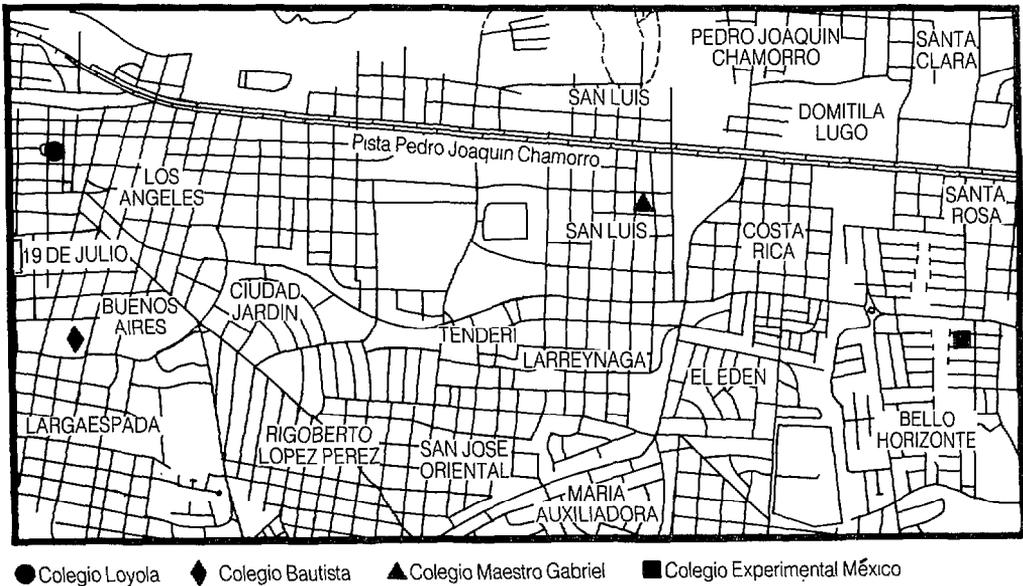
An anonymous, voluntary survey was conducted in four secondary schools located in Managua's District IV (Figure 1). Two public schools (Maestro Gabriel and Experimental México), one private Catholic school (Colegio Loyola), and one private Evangelical school (Colegio Bautista) were included. The two public schools serve mainly the children of families in lower socioeconomic strata, while the private schools include students from middle class families.

All students in the last (fifth) year of study at each school who were present on the day of the research team's visit were invited to participate. The purpose and the anonymous nature of the survey were explained. The survey instrument, a self-administered questionnaire, was filled out during a single 40-minute classroom period. The questionnaire contained both open-ended and closed questions regarding the students' demographic characteristics, knowledge and attitudes about AIDS, and sexual behavior patterns including condom use. The term "AIDS" was used in lieu of "HIV infection," because it was felt that the latter concept was not well understood by the study population at the time of the survey.

The wording of questionnaire items was pretested on students from a school not included in the study, and a number of changes were made as a result.

Response categories were developed to facilitate coding of open-ended responses. A response could fall into more than one category (for example, when a student mentioned more than one route of HIV transmission). Data were analyzed using the statistical packages PC-SAS and EGRET. The proportions and statistical test results shown for each

Figure 1. A map of Managua indicating the location of the four District IV secondary schools at which the survey was conducted.



questionnaire item are based on the number of students giving valid answers to that item. Percentage response rates to each item were determined by dividing the number of valid responses by the total number of participants ($n = 451$) and multiplying by a hundred. Scores for "right" or "wrong" perceptions of AIDS transmission and prevention were derived by adding the number of answers considered "right" or "wrong" by accepted conventional wisdom.

Associations between variables were evaluated by simple cross-tabulations and by multiple logistic regression analyses (7). Chi-square tests (with continuity correction where appropriate) were used to assess significance. Between-group comparisons of continuous variables were made using unpaired Student's *t*-tests or Wilcoxon rank sum tests. Subgroup analyses were performed on that 64% of the participating students who said they had experienced sexual intercourse.

RESULTS

All 451 students asked agreed to participate. Accordingly, a total of 451 subjects (104 at Maestro Gabriel, 112 at Experimental México, 139 at Colegio Bautista, and 96 at Colegio Loyola) were included in the survey. Questionnaire responses at the different schools agreed closely enough for presentation of pooled results. Response rates were 100% for items regarding knowledge about HIV transmission and prevention, but were generally lower (and notably lower among females than males) for other items. Overall, the mean male response rate was 91% (with a range of 80% to 100%), while the mean female response rate was 69% (with a range of 17% to 100%). In a multiple logistic model, apart from female gender, nonresponse was associated with younger age, no sexual experience, and less knowledge about HIV transmission and prevention.

One hundred and fifty-five (34%) of the participating students were male. In all four schools the mean age of these male students was greater than the mean age of participating female students (the overall means being 18.4 years for males versus 17.9 years for females, $p = 0.004$). Survey subjects attending the two public schools were older, on the average, than those attending the private schools (18.4 years versus 17.8 years, $p = 0.0001$), despite a slightly higher percentage of participating male students (38% versus 31%) at the private schools. The great majority of the subjects (96%) said they were single.

Knowledge about AIDS Transmission and Prevention

The survey participants were relatively well aware of HIV's sexual transmission, 86% of them citing this route (Table 1). In contrast, less than half cited transmission via blood transfusion or the sharing of piercing objects. Small percentages (8% of the males and 10% of the females) indicated they had at least one misconception or did not know how HIV is transmitted.

Knowledge about prevention was considerably less developed, with only 41% of the subjects indicating that HIV transmission could be prevented by using condoms (Table 1). Male students were significantly ($p = 0.0001$) more aware of the importance of condoms than female students. Prevention by carefully selecting one's sexual partner, a concept of questionable value, was mentioned by 25% of the males and 33% of the females (regarding this difference, $p = 0.09$). Prevention of HIV transmission in the population through education was cited by 13% of the males and 11% of the females. Other ways to prevent sexual transmission, such as abstinence or monogamy, were infrequently mentioned. Abstinence from drugs was cited by only 1%

Table 1. Knowledge about HIV transmission and prevention among the 451 high school students in the survey population, as indicated by their answers to two open-ended questions (response rate = 100%).

	Males (N = 155)	Females (N = 296)
<i>How is HIV transmitted?</i>		
Sexual contact	88%	84%
Blood transfusion	42%	41%
Sharing piercing objects	37%	41%
Kisses, sweat	4%	6%
Sharing any object	3%	2%
Public toilets	0%	1%
Don't know	1%	1%
<i>How can transmission of HIV be prevented?</i>		
Use of condom	55%	33% ^a
Selection of sexual partner	25%	33% ^b
Education	13%	11%
Taking care with piercing objects	9%	11%
Monogamy	4%	3%
Abstinence from sexual intercourse	2%	2%
Seeing a specialist	3%	4%
Taking a blood test	1%	2%
Isolating sick people	1%	2%
Abstinence from drugs	1%	1%
Vaccination	1%	1%
Don't know	3%	4%

^a $p = 0.0001$ for gender difference by Yates corrected Chi-square test.

^b $p = 0.088$ for gender difference by Yates corrected Chi-square test.

of the participants. However, clearly incorrect answers, such as being tested or vaccinated, were provided by only a small minority.

Attitudes toward Condoms

All students had heard about condoms. When asked in what situation they should be used, the most frequent answer by males was "with prostitutes" and by females was "for contraception" (Table 2). The great majority of males (84%) but only 26% of the females claimed that they knew how to use condoms. Some stu-

Table 2. Attitudes toward condoms reported by those of the 451 survey subjects who responded to the open-ended questions shown. Response rates $\geq 80\%$ except for female respondents to the third question (in brackets), of whom 17% responded.

	Males (N = 155)	Females (N = 296)
<i>When should one use condoms?</i>		
With prostitutes	39%	22% ^a
For contraception	32%	39%
Always	29%	33%
To avoid STDs	11%	7%
To avoid AIDS	1%	1%
Never, they reduce sexual pleasure	4%	1%
<i>Do you know how to use condoms?</i>		
Yes	84%	26% ^b
No	16%	74%
<i>Do you have difficulty obtaining condoms?</i>		
Yes	21%	[16%]
No	79%	[84%]

^a $p < 0.001$ for gender difference by Yates corrected Chi-square test.

^b $p < 0.0001$ for gender difference by Yates corrected Chi-square test.

dents indicated difficulty in obtaining condoms, but it should be noted that this question about procurement difficulty was answered by only 17% of the female subjects.

Sexual Behavior and Condom Use

Sixty-four percent of the subjects (90% of the men as compared to 50% of the women, $p < 0.0001$) reported having had sexual intercourse. The self-reported nonvirgins were 5 months older, on the average, than the virgins (18.3 years versus 17.8 years, $p = 0.003$) and were more likely to mention condoms as a measure to prevent HIV infection (odds ratio adjusted for sex and age 1.6, $p = 0.036$).

Among those reporting sexual intercourse, the male subjects' mean reported

age at the first encounter was significantly lower ($p = 0.0001$) than that of the female subjects (Table 3). However, here again the response rate to this question was very low among females.

The mean number of reported sexual partners during the year preceding the survey was higher for males than for females (Table 3). Indeed, 60% of the males but only 3% of the females reported more than one sexual partner within the last year ($p < 0.0001$); and 47% of the males versus 2% of the females said they had more than one sex partner at the time of the survey ($p < 0.0001$).

Condom use was more prevalent among males than females. Overall, 49% of the sexually experienced males but only 10% of the females said they had used a condom at least once ($p < 0.0001$). Eleven percent of the experienced males and 1% of the females said that they always used a condom (see Table 3).

Within the entire sexually experienced study population, use of condoms was positively associated with the number of sexual partners over the last year (the odds ratio for every additional sexual partner, adjusted for sex, was 1.3, $p = 0.014$). No association was found between condom use and the subjects' knowledge scores for HIV transmission or prevention, or between condom use and the proportion of subjects mentioning condom use as a way to protect against HIV infection.

Overall, the most frequent reason put forward by the sexually experienced for using condoms was contraception (51%), followed by prevention of STD (46%). Sexually experienced female subjects mentioned contraception more often than experienced males (86% versus 45%, $p = 0.011$), whereas experienced males tended to mention prevention of STD more frequently. Using condoms specifically to prevent AIDS was cited by only 5% of the sexually experienced subjects. A sim-

Table 3. Sexual behavior and condom use reported by the 288 subjects who said they had experienced sexual intercourse and who responded to the various questions. Response rates $\geq 70\%$ except for numbers in brackets, where the response rates were as follows: age at first intercourse 29%, number of sexual partners in preceding year 59%, and number of current sexual partners 66%.

	Males (N = 140)	Females (N = 148)
<i>Age at first sexual intercourse:</i>		
Mean age (age range) in years	15.0 (10–21)	[17.4 (15–21)] ^a
<i>Number of sexual partners last year:</i>		
Mean number (number range)	2.7 (0–22)	[0.5 (0–3)] ^b
<i>Number of current sexual partners:</i>		
0–1	53%	[98%] ^c
>1	47%	[2%]
<i>Condom use:</i>		
Never	51%	90% ^c
Once	10%	3%
Sometimes	28%	6%
Always	11%	1%

^ap = 0.0001 with Student's t-test.

^bp = 0.0001 with Wilcoxon rank sum test.

^cp < 0.0001 with Yates corrected Chi-square test.

ilar proportion of experienced male and female subjects reported difficulty obtaining condoms.

Concern, Perception of Risk, and Behavior Changes

A majority of both male and female respondents indicated that they were "very much" or "more or less" concerned about AIDS (Table 4). Only small percentages of the males (10%) and females (5%) said they were "not at all" worried about AIDS. Sexually active students who said that they were "not at all" worried about AIDS reported lower levels of behavioral change because of AIDS (13% versus 35% of all other sex-

ually experienced subjects), lower knowledge scores (1.9 versus 2.4), but a higher number of sexual partners over the last year (3.2 versus 1.6), although these differences reached conventional levels of significance only for knowledge scores ($p = 0.049$).

When asked specifically whether they considered themselves at risk of getting AIDS, only a minority, 28% of the males and 21% of the females (Table 4), said they perceived themselves at risk. In a multiple logistic model, perception of risk was associated with age (odds ratio 1.3 per year, $p = 0.042$), the present number of sexual partners (odds ratio 2.9 for more than one sexual partner, $p = 0.007$), and with concern about AIDS (odds ratio 2.2

Table 4. Worry about AIDS, perception of personal risk of getting AIDS, and AIDS-prompted changes in behavior reported by those of the 451 study subjects who responded. Response rate $\geq 80\%$ except for female respondents to the third question (in brackets), of whom 34% responded.

	Males (N = 155)	Females (N = 296)
<i>Are you worried about AIDS?</i>		
Very much	58%	61%
More or less	23%	23%
A little	8%	11%
Not at all	10%	5%
<i>Do you consider yourself at risk of getting AIDS?</i>		
Yes	28%	21%
No	72%	79%
<i>Did you change your sexual practices because of AIDS?^a</i>		
Yes	38%	[7%] ^b
No	62%	[93%]

^aQuestion asked to the 288 subjects reporting sexual experience.

^b $p = 0.001$ with Yates corrected Chi-square test.

for "very much concerned," $p = 0.042$). No significant associations were found between perception of risk and knowledge scores or condom use.

The subjects who said they did not consider themselves at risk of getting AIDS were asked why. The most frequent answer, given by 30%, was "because I choose my sexual partner;" this was followed by "no sexual relations so far" (28%), "because it is preventable" (16%), and "because I know about AIDS" (11%).

Students were also asked how AIDS had affected their sexual behavior. Thirty-eight percent of the nonvirgin males but only 7% of the nonvirgin females said they had changed their sexual practices ($p = 0.001$). The changes most frequently cited were a more careful selection of sexual partners and use of condoms.

Reported behavior change was strongly associated with nonvirgins' worries about AIDS (odds ratio adjusted for sex 3.8 for "very much concerned," $p = 0.0005$), whereas the association between behavior change and the subject's perception of his or her own risk was weaker and not statistically significant (adjusted odds ratio 1.8, $p = 0.14$). Again, no associations were found between behavior change and knowledge or misconception scores regarding HIV transmission or prevention.

DISCUSSION AND CONCLUSIONS

The survey reported here had a number of limitations. The student participants were not a random sample and therefore may not have been representative of Managua fifth-form secondary students. However, only small and statistically insignificant differences were observed between the four schools, despite different school characteristics and a reasonably large sample size. This lends some credence to the idea that the sample was representative. Also, the questionnaire had been carefully pretested, so it is unlikely that comprehension difficulties introduced bias. All in all, therefore, the results seem reasonably likely to reflect levels of knowledge about HIV/AIDS possessed by Managua high school students in their fifth and final year at the time of the survey.

The validity of self-reported sexual behavior, however, a matter of concern in adult survey populations, is of even greater concern in adolescent groups (8). When perceived as a threat, questions about sexual behavior are often answered inaccurately or refused (8). This was underscored in our survey by frequent refusal to answer the more sensitive questions on the part of females, less in-

formed subjects, and sexually inexperienced subjects. Among adults in the United States of America, the average refusal rate for assessment of the number of sexual partners over the past year is about 6% (9). In our sample, the same question was refused by 15% of the males and 41% of the females.

Within this context, it should be noted that premarital sex is socially unacceptable for females in Latin cultures, whereas for males "machismo" values encourage early sexual initiation and multiple sexual conquests (10). The sex differences observed—both in question refusal rates and in reported sexual behavior—may thus partly reflect sociocultural values attached to respective male and female behavior patterns.

The high level of our survey subjects' awareness regarding the sexual transmission of HIV is reassuring. However, the results also showed important knowledge gaps regarding other routes of transmission and preventive measures. Only a minority of the students even mentioned that condoms protect against infection, and misconceptions about AIDS prevention were rife. Over a quarter of the students believed that infection could be prevented through careful selection of their sexual partner. (This suggests that many were not aware of the asymptomatic latency period typical for HIV-related disease, or believed HIV infection to be largely limited to people obviously engaged in high-risk practices.)

Levels of knowledge were found to be similar in the study populations at all four schools, despite those populations' different characteristics; but female subjects knew considerably less and held more misconceptions than their male counterparts. Lack of a school-based AIDS education program and differential access to alternative sources of information about AIDS may have contributed to this circumstance.

Comparison of our results with those of a 1988 survey of three Managua districts (6) indicates that our survey subjects had fewer misconceptions about HIV transmission and prevention than did the general 1988 Managua population. Although the methodologies used in the two studies were different, this is consistent with a finding of the latter study that misconceptions were much less frequent among the educated than among the uneducated (6).

Conversely, comparisons of our survey results with surveys of U.S. adolescents and students clearly indicate lower levels of knowledge in our sample. For instance, one U.S. survey indicates that in 1986 over 90% of the high school students in San Francisco knew about the sexual transmission of HIV, and 60% knew that condoms could prevent infection (11). In 1988, 85% of inner-city adolescents surveyed in New York City (12) and 91% of the New Jersey high school students responding to another survey (13) mentioned condoms. It is also noteworthy that in the United States, Hispanic adolescents are less knowledgeable than their white counterparts (14), and that the risk of AIDS among people of Hispanic descent in the U.S. is almost three times as great as among whites (15).

Among the sexually experienced students in our survey, 49% of the males but only 10% of the females reported ever having used a condom. In the U.S., a majority of both male and female adolescents report experience with condoms (16). In Nicaragua and other Latin American countries, condoms are mainly used outside stable sexual relationships (6, 17), and public opinion of the condom is ambivalent. These circumstances were reflected in the attitudes of our students, males commonly saying that condoms should be used with prostitutes, while females believed they were used for contraception. Frequent refusal by females

to answer the question dealing with the difficulty of obtaining condoms indicates that buying condoms was totally unacceptable to a majority of our female subjects. (In a broader context, preliminary evidence suggests that condom promotion in Managuan motels may be successful—18.)

The great majority of our male subjects (90%) and 50% of the females reported having had sexual intercourse, but only a minority considered themselves at risk of contracting HIV and had changed their sexual behavior. While behavior change was associated with concern about AIDS, a minority of the respondents (who tended to know less about transmission and prevention of HIV) reported no concern about the threat of AIDS. In general, behavior change was not associated with levels of knowledge about AIDS.

Overall, the results reported here showed that levels of knowledge about HIV/AIDS among Managuan high school students were inadequate and pointed up an urgent need for a school-based program capable of addressing this problem. They also indicated that, to the extent possible, such a program should not merely seek to increase students' knowledge about AIDS but should include an explicit demonstration of the correct use of the condom, should address broader issues of sexuality, and should give special attention to the female role in sexual relations in terms of empowerment and equality. In this vein, it is noteworthy that a nationwide STD/AIDS education program developed by the Ministry of Health and targeted at the estimated 75 000 secondary school students in Nicaragua is now under way (19). It also appears likely, however, that the impact of school-based health promotion programs may be limited (20), and so a dual strategy for reaching adolescents both in school and out of school is recommended (5).

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Report on Sexually Transmitted Diseases

As many as 1 in every 10 people of reproductive age—or more than 250 million worldwide—will contract a sexually transmitted disease (STD) this year, according to a new report from the Johns Hopkins School of Public Health. In addition to the suffering they cause, STDs may increase the risk of sexual transmission of HIV by two to nine times. Left untreated, STDs can be devastating and even life-threatening. Yet many can be cured.

The June 1993 issue of *Population Reports*, published by the Population Information Program at the Hopkins School of Public Health's Center for Communication Programs, is entitled "Controlling Sexually Transmitted Diseases." It gives basic information about STD prevention and management, as well as how to bring services to people and people to services. Offering STD services in primary health care centers helps reach people in need of treatment, but since these sites often lack diagnostic equipment or tests, providers must be able to diagnose patients on the basis of groups of symptoms (syndromes). The World Health Organization, working with STD experts, has developed step-by-step guides to diagnosis and treatment based on syndromes. A wall chart showing this syndromic approach is included with the report.

For further information, contact the Population Information Program, Johns Hopkins School of Public Health, 527 St. Paul Place, Baltimore, MD 21202; fax (410) 659-6266.