

## Students' Knowledge Base and Attitudes on Safer Sex, Condoms and AIDS: A Study of Three Colleges of Pharmacy

Saleem E. Noormohamed<sup>a</sup>, Kristi J. Ferguson<sup>b</sup>, Ali Baghaie<sup>c</sup> and Louise G. Cohen<sup>d</sup>

<sup>a</sup>College of Pharmacy, The University of Iowa, 2263 Quadrangle Building, Iowa City IA 52242; <sup>b</sup>College of Medicine, The University of Iowa, Iowa City IA 52242; <sup>c</sup>College of Pharmacy and Health Sciences, Texas Southern University, Houston TX 77004; <sup>d</sup>Bouve College of Pharmacy and Health Sciences, Northeastern University, Boston MA 02115

Pharmacy students as future pharmacists will have to counsel and educate patients on AIDS prevention. Students at colleges of pharmacy at the University of Iowa (UI), Texas Southern University (TSU), and Massachusetts College of Pharmacy (MCP), were surveyed to assess their knowledge and attitudes regarding safer sex and Acquired Immunodeficiency Syndrome (AIDS). A total of 848 (49 percent) students responded; 194 (63 percent), 307 (93 percent) and 347 (32 percent) from TSU, UI, and MCP, respectively. Though a majority of students reported having adequate knowledge on AIDS or were willing to learn, knowledge of proper condom use was lacking. Colleges were an important source for AIDS-related information. Most students reported that pharmacists can play an important role in AIDS prevention. Though most students had a favorable attitude towards the issue, a small number of students reported that they would not associate with or serve human immunodeficiency virus (HIV)-infected individuals. Pharmacy students as future health care professionals lack knowledge on AIDS transmission and prevention. Measures to adequately educate students and provide continuing education to all pharmacists on AIDS should be undertaken.

### INTRODUCTION

Acquired Immunodeficiency Syndrome (AIDS) has truly become a global epidemic(1). The number of AIDS cases and human immunodeficiency virus (HIV) infections is increasing rapidly in the United States of America(2). Transmission of HIV is epidemiologically linked to unprotected sexual contact with an HIV-infected individual. The majority of AIDS cases reported thus far have been due to sexually acquired HIV. To date, there is no vaccine or cure for HIV-infection. The only method of halting the AIDS epidemic is by preventing the transmission of HIV through education. Pharmacists are the most respected health care providers and can play an important role in slowing the spread of the AIDS virus(3). However, pharmacists have not been involved in AIDS education(4). Studies describing pharmacists' lack of knowledge regarding the differences between latex and natural membrane condoms and the importance of the spermicide nonoxynol-9 in the prevention of HIV transmission have also been reported(5,6). Pharmacists' not providing information on condom use is also known(5). It has been about 12 years since the first description of AIDS as a clinical entity(7). It may be speculated that pharmacists licensed prior to the advent of the AIDS epidemic may not have been educated on the issue compared to those that were licensed in more recent times. Consequently, pharmacy students as recent graduates may have adequate knowledge regarding AIDS prevention. However, the knowledge base of pharmacists licensed before 1981 compared to those licensed after 1981 was not different(8).

There are data to suggest that an increased number of individuals get tested for HIV after the announcements by well-known celebrities. The death of Rock Hudson in October 1985, or the announcements of HIV sero-status by Paul Gann in June 1987, Earvin (Magic) Johnson in November

1991, and Arthur Ashe in April 1992 increased the number of individuals being anonymously tested for HIV(9). No other announcement of one's HIV sero-status has evoked emotions as did the announcement by Earvin (Magic) Johnson. Earvin (Magic) Johnson a super star was idealized by many individuals especially the youth. The announcement of his HIV sero-status probably indicated to many of those who idealized him that everyone is at risk. One would hope that such announcements would not only encourage HIV testing, but also reduce risk taking behaviors and increase acceptance and empathy towards HIV-infected individuals. These events probably increase AIDS awareness of many young individuals including pharmacy students, however, data on their impact on the attitudes towards and acceptance of HIV-infected individuals are lacking.

Issues related to pharmacists' unwillingness to serve patients with AIDS have been debated, despite the very low risk of transmission of the virus from an HIV-infected individual to a pharmacist(10). Pharmacists who do not provide care to HIV-infected patients, especially preventive care, could need additional knowledge and skills, or they may need education to change their attitudes(11). The status of AIDS-related knowledge base and attitudes of pharmacy students has not been evaluated. It is essential that pharmacy students, as future health care professionals, and accessible health promoters, have adequate knowledge and appropriate attitudes to prevent the transmission of HIV, and colleges of pharmacy should adequately prepare students for such a task.

Though approved by American Council of Pharmacy Education, Colleges of pharmacy may differ in student demographics, faculty composition, and curricula. Geographic location and racial composition of the college of pharmacy may affect knowledge base and attitudes of phar-

**Table I. Demographic information on pharmacy students responding to questionnaire**

	College of Pharmacy <sup>a</sup>		
	TSU	UI	MCP
Respondents (31.9%)	194 (62.5%)		347
Females	57%	70%	67%
Mean Age (yrs)	26.8 (19-46)	21.9 (19-40)	22.8 (17-41)
Additional degrees	33%	13%	27%
Marital Status			
Married	30%	11%	12%
Single	65%	89%	86%
Divorced	5%	—	2%

<sup>a</sup>TSU = Texas Southern University; UI = University of Iowa; MCP = Massachusetts College of Pharmacy.

macy students. Three colleges of pharmacy were included in this study. The University of Iowa (UI), primarily a Midwest university consisting of students of European origin. Texas Southern University (TSU) located in southern part of the United States with relatively high HIV sero-prevalence, consists of mostly African-American students, and Massachusetts College of Pharmacy (MCP) located on the East Coast also in relatively high HIV sero-prevalence area consists of students of European origin and many foreign students. UI and TSU are state funded institutions, but MCP is a private college. The pharmacy programs differed, UI has 1/4 year program (year pre-pharmacy/years in college of pharmacy), TSU has 2/3 and MCP has 0/5. However, AIDS-related curricula were similar at these three colleges of pharmacy, and emphasized therapeutic management. Information on preventive measures and pharmacist's role in AIDS prevention was lacking.

The objectives of this study were to assess pharmacy students' knowledge base and attitudes regarding safer sex, condom use, and AIDS at three different colleges of pharmacy. The study also evaluated the differences in the attitudes and knowledge base within and among the colleges. Three months after the initial administration of the survey, Earvin (Magic) Johnson announced his HIV sero-status. Shortly after the announcement, the instrument was readministered to some students to assess its effect on students' attitudes towards HIV-infected individuals.

## METHODS

An instrument approved by the Committee on the Use of Human Subjects in Research at UI and appropriate offices at TSU and MCP, was administered to all professional pharmacy (undergraduate) students. The questionnaire, a cover letter explaining their rights not to participate and an envelope were handed out in class to each student. Students were allowed some time to fill out the questionnaire in class or were free to take it with them and return the completed questionnaire later. The survey solicited information on demographics: age, sex and year of high school graduation, and the number of years in pharmacy school.

The questionnaire was divided into multiple sections. One section focused on the students' knowledge base on AIDS as it relates to modes of transmission and prevention. These questions included the differences between latex and natural membrane condoms and the additional protection

**Table II. Percent response by students in colleges pharmacy on reported sources of AIDS information**

	College of Pharmacy <sup>a</sup>		
	TSU N=194	UI (N=307)	MCP (N=347)
Television	73	85	80
Magazines	77	82	80
Radio	48	30	39
Parents	17	21	23
High-School	14	40	44
College	76	75	68

<sup>a</sup>TSU=Texas Southern University. UI = University of Iowa. MCP= Massachusetts College of Pharmacy.

offered by the spermicide nonoxynol-9 in preventing the transmission of HIV. Questions on the spread of HIV through heterosexual contact and oral sex were also included. Information on the sources of AIDS information for pharmacy students was solicited.

Information, on pharmacy students' attitudes on serving patients with AIDS and on issues of discussing AIDS and sex at home rather than in public, was also solicited. Information on students knowing and associating with HIV-infected individuals was also obtained.

Issues that pharmacy students wanted addressed in class was requested. In addition, demographic data on sex, race, and the number of students enrolled at each institution were obtained from the student affairs offices at each institution. Reliability of the instrument was assessed using Cronbach's alpha(12). Five-point (1-5) scales with labeled end-points (strongly agree to strongly disagree) assessed attitudes. Analyses included frequency distributions for appropriate questions (*e.g.*, distribution by age and sex for different pharmacy schools), chi-square tests for categorical data, *t*-tests and for differences among means (*e.g.*, differences in attitudes between males and females at a given institution and between institutions). Tests were only conducted when a significant relationship was hypothesized. A significance level of 0.05 was used for all statistical tests.

## RESULTS

Initial information obtained from the students' affairs office at each college showed the following enrollment at the time of study: 1728 students (330 (60 percent female) at UI, 310 (50 percent female) at TSU and 1088 at MCP (69 percent female)). African-American and Hispanic students made up 67 percent and 9.1 percent of all students at TSU and MCP, respectively. The student population was homogeneous for Caucasian and American at UI with only two percent international students (Asians). Thirty percent and 15 percent were international students at TSU and MCP, respectively.

Though the instrument included questions on AIDS-related risk-taking behaviors, we report here only the information on pharmacy students' knowledge base and attitudes. A total of 848 (49 percent) students responded 194 (63 percent), 307 (93 percent) and 347 (32 percent) from TSU, UI, and MCP, respectively (Table I). Students at TSU were likely to be older with mean [range] 26.8 [19-46] years, and 21.9 [19-40] and 22.8 [17-41] years at UI and MCP, respectively. Students at MCP and TSU were also more likely to

**Table III. Percent response of pharmacy students' self-reported knowledge base**

	College of Pharmacy <sup>a</sup>					
	TSU		UI		MCP	
	Male n=79	Female n=104	Male n=93	Female n=217	Male n=109	Female n=237
Have adequate knowledge of proper condom use	89	88	95	88	90	78 <sup>b</sup>
Could explain it to someone else	83	79	84	73 <sup>b</sup>	88	67 <sup>b</sup>
Willing to learn about AIDS	96	96	96	98	97	97
Willing to educate family and friends	not asked		93	99	97	97

<sup>a</sup>TSU = UI = University of Iowa; Texas Southern University; MCP = Massachusetts College of Pharmacy.

<sup>b</sup> $P < 0.05$ .

**Table IV. Percent responses of pharmacy students' knowledge base on HIV transmission and prevention**

	College of Pharmacy <sup>a</sup>			
	TSU	UI	MCP	$P <^b$
Risk of natural membrane condoms	61	53	68	0.001
Benefits of Nonoxynol-9	53	57	64	0.03
Condoms prevent transmission of HIV	96	98	99	ns <sup>c</sup>
Adverse effect of Vaseline®	62	75	77	0.001
HIV transmission by oral sex	79	66	69	0.005
HIV Transmission by Heterosexual sex	66	92	94	0.0001

<sup>a</sup>TSU=Texas Southern University; UI = University of Iowa; MCP = Massachusetts College of Pharmacy.

<sup>b</sup>Chi square.

<sup>c</sup>Not significant.

have additional degrees (other than pharmacy) than those at UI.

Students at all three colleges of pharmacy reported that they had heard of AIDS and felt they had adequate knowledge regarding the issue. Up to 85 percent of students reported college and television as major sources of AIDS-related information (Table II). High school as a source of AIDS-related information was reported by up to 40 percent of all students.

Male pharmacy students were more likely to report that they had adequate knowledge on proper condom use and could explain the proper use of condoms to someone else. Pharmacy students were willing to learn about AIDS and teach their friends and family members (Table III). A majority of students knew of the use of condoms to prevent the transmission of HIV, but were not aware of the risks of natural membrane condoms, adverse effects of the use of Vaseline® or the beneficial effects of nonoxynol-9.

Fewer students at TSU knew that HIV could be transmitted through a heterosexual "straight" contact (chi-square,  $P < 0.0001$ ). Twenty-one to thirty-four percent of students did not know of the potential for transmitting HIV through fellatio (Table IV). Male pharmacy students were more likely than females, at TSU (69 vs 53 percent) and MCP (73 vs 60 percent), to know about the risks of natural membrane condoms and the benefits of nonoxynol-9, respectively.<sup>1</sup> Otherwise no significant differences in knowledge base between male and female students were observed.

Most pharmacy students agreed that pharmacists can play role in the prevention of AIDS with a mean value of less than 2 on a five-point scale, 1 being strongly agree and 5

being strongly disagree. Students at all colleges also disagreed on the question related to pharmacists need not serve AIDS patients.<sup>2</sup>

More males than female pharmacy students at UI were likely to agree with the statement that pharmacists need not serve AIDS patients and not discuss sex and AIDS in public (Table V). Students at UI were less likely to know someone with AIDS compared with students at TSU and MCP, however, students at TSU were less likely to want to associate with a person who has AIDS.

Cross-sectional evaluation of the impact of pharmacy education on pharmacy students' knowledge base and attitudes showed that there was increase in the knowledge base with more advanced standing students (Figure 1). However, students' attitudes did not appear to differ based on the year in pharmacy college (Figure 2).

Most requested issues that pharmacy students wanted addressed in class, besides therapeutic management of HIV-infected individuals, included: sex education, counseling, and AIDS prevention.

The number of negative responses with the statement "I would not associate with a person who has AIDS" increased at both TSU and UI after the announcement of HIV serostatus by Earvin (Magic) Johnson, however, increase failed to statistical significance ( $P > 0.05$ , paired student's *t*-test).

<sup>1</sup> An alpha reliability coefficient for a subscale of the knowledge items showed moderate internal consistency (alpha = 0.67).

<sup>2</sup> An alpha reliability coefficient for a subscale of the attitude items showed also moderate internal consistency (alpha = 0.59).

**Table V. Pharmacy students' attitudes towards AIDS prevention**

	College of Pharmacy <sup>a</sup>				
	TSU	UI	MCP	F <sup>b</sup>	P<
Pharmacists can play a role in AIDS	1.9 <sup>c</sup>	1.7	1.8	2.68	0.07
Pharmacist need not serve AIDS patients	4.2 <sup>c,d,e</sup>	4.6 <sup>c</sup>	4.7	20.27	0.0001
Information on AIDS not discussed in public	4.2 <sup>c,d</sup>	4.6 <sup>c</sup>	4.6	13.27	0.0001
Information on sex not discussed in public	4.1 <sup>c,d</sup>	4.5 <sup>c</sup>	4.4	9.08	0.0001
Patients not interested in discussing condoms with pharmacists	3.4 <sup>c,f</sup>	3.2	3.0	5.91 <sup>c</sup>	0.0028
Associate with a person who has AIDS	38%	56%	63%	32.4 <sup>g</sup>	0.0001
Know someone with AIDS	32%	12%	29%	35.2 <sup>g</sup>	0.0001

<sup>a</sup>TSU = Texas Southern University; UI = University of Iowa; MCP = Massachusetts College of Pharmacy.

<sup>b</sup>ANOVA prob F.

<sup>c</sup>Five-point scale 1 = strongly agree, 5 = strongly disagree.

<sup>d</sup>TSU significantly different from other chi square.

<sup>e</sup>Male students were more likely agree with the statement.

<sup>f</sup>TSU significantly different from MCP but not from Iowa.

<sup>g</sup>Chi square

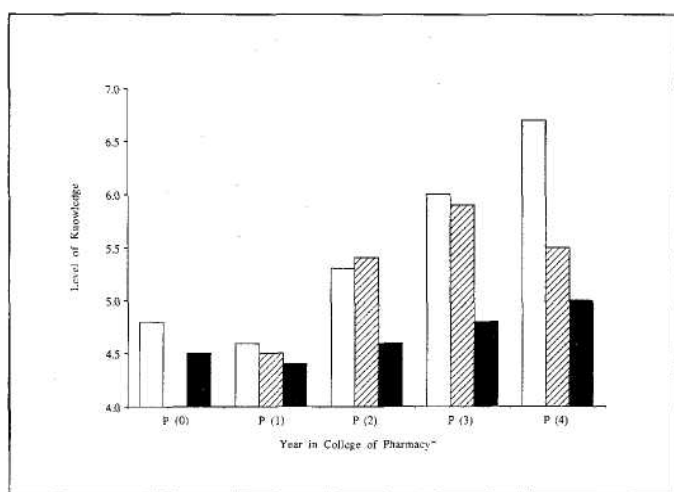


Fig. 1. Pharmacy students' knowledge base regarding safer sex and AIDS by year in professional program.

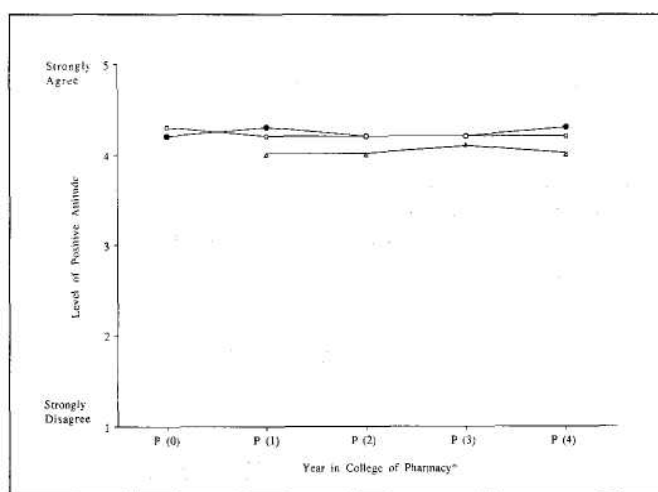


Fig. 2. Pharmacy students' attitudes regarding safer sex and AIDS: by year in professional program.

**DISCUSSION/CONCLUSIONS**

The limitations of the survey include self-reporting of the information and possible self selection by those interested in knowing more about AIDS and related issues. The data may not be representative of all pharmacy students especially those at TSU and MCP given 63 percent and 32 percent response rates, respectively. However, the data obtained provide an important information on pharmacy students' knowledge base and attitudes. This information can be used to re-evaluate the contents of AIDS related information in pharmacy curricula.

Pharmacy students' AIDS-related knowledge base, regardless of gender, is lacking given the substantial information public campaigns. Between 8-34 percent of students were not aware of HIV transmission by heterosexual contact. This situation would be unacceptable given that these students are future health care professionals. However, pharmacy students were willing to learn and teach others about AIDS. Pharmacy students reported colleges of pharmacy as an important source for AIDS-related information. Changes in pharmacy curricula need to take place to edu

cate the students on AIDS prevention measures.

Although attitudes of pharmacy students at all three colleges of pharmacy differed statistically, the actual difference between the groups is small. However, students at TSU were more likely to know an HIV-infected individual, but were less likely to report that they would associate with one, compared with students at the other colleges. Though male students were less likely than female students to report that pharmacists can play an important role in the prevention of AIDS, should serve patients with AIDS, and discuss sex and AIDS-related issues in public, the actual differences were also minimal (Table V).

The questionnaire was re-administered to professional year one and four students at UI and all students at TSU, after the announcement by Earvin (Magic) Johnson. Approximately three months has elapsed from the time of the initial survey. More individuals reported that they would associate with a person who has AIDS after the announcement compared with that reported before the announcement. Though the differences were not statistically different, it would appear that the revelation of sero-status by

well-known celebrities could potentially increase the awareness of AIDS and possibly empathy towards HIV-infected individuals.

In summary, the spread of HIV is epidemiologically linked to unprotected sexual contact with an HIV-infected individual. Safer-sex behaviors and the proper use of condoms are the key factors in the prevention of AIDS. Pharmacy students as future health care professionals will sell and will have to provide information on proper condom use to their patients. To effectively promote AIDS prevention measures, pharmacists will need to have an adequate knowledge base. Though most pharmacy students are willing to learn about the issue, the lack of information is apparent. Pharmacy students for the most part rely on colleges to provide AIDS-related information. College faculty will not only have to provide information on the therapeutic management of HIV-infected individuals, but also include AIDS prevention measures and counseling. In addition, the faculty will also have to address the issues of morality, ethics, and compassion. Colleges of pharmacy, state and local pharmacy organizations should organize AIDS-related programs and workshops to provide continual updates on AIDS-related information after the students graduate. State Boards of Pharmacy may have to require compulsory AIDS-related continuing education units for re-licensure given increasing number of HIV-infected individuals and incredible generation of new information.

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