

# Perceptions and knowledge about the acquired immunodeficiency syndrome among students in university residences

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## Summary

Using an anonymous questionnaire to obtain baseline data on sexual behaviour and knowledge of the acquired immunodeficiency syndrome (AIDS) among students in university residences, the following information was obtained: Knowledge of AIDS was found to be high, although misconceptions regarding transmission of the virus were prevalent. Mosquito bites (15%) and the donating of blood (31%) were incorrectly identified as methods of transmission of the virus. Deep kissing was recognised by only 27% of the students as a possible method of transmission while 22% and 13% of the students, respectively, failed to identify the sharing of razor blades and blood transfusions as possible means of contracting HIV infection. The students' knowledge had not greatly affected sexual behaviour. Two-thirds of the respondents had previously had sexual contact; 38% were sexually active at the time of the study, and of these 74% had engaged in unprotected intercourse with casual partners in the previous 6 months. There was a negative attitude towards condom use and over 80% of sexually active students did not perceive themselves to be at risk of contracting AIDS. Campus Health (82%), State health services (51%), and public advertisements (60%) were preferred sources of AIDS information. Newspapers/magazines (80%) and leaflets (69%) were identified as the preferred media. In reality, significantly fewer students obtained their information from Campus Health (15%;  $P < 0,05$ ), State health services (19%;  $P < 0,05$ ) and leaflets (44%;  $P < 0,05$ ). It can be concluded that education programmes should be developed by credible organisations to ensure that an awareness of AIDS results in appropriate sexual behaviour.

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The acquired immunodeficiency syndrome (AIDS) is becoming a major health care priority and a threat to all South Africans. Since the diagnosis of the first case of AIDS in South Africa in March 1982<sup>1</sup> over 430 cases have been reported to 21 June 1990 (information courtesy the AIDS Advisory Group). At least 50% of these cases have occurred within the Greater Johannesburg area.<sup>2</sup> However, a true indication of the severity

of the epidemic may be found in the number of human immunodeficiency virus (HIV)-infected individuals. A recent study<sup>3</sup> estimated that the number of HIV-infected black South Africans will rise from the present level of 45 000 - 63 000 to 317 000 - 446 000 by the end of 1991.

The major thrust of health care campaigns has had to be aimed at prevention of HIV transmission, since no effective treatment has been discovered. After extensive research worldwide, scientists have concluded that 'education is the central activity on which the comprehensive strategy against AIDS and HIV infection must be based'.<sup>4</sup> However, it is not clear how effective education campaigns using mass media are in conveying explicit sexual information.<sup>4</sup>

Epidemiologists and psychologists recognise that individuals respond differently to the same information about health matters, and that changes in attitudes and improved knowledge do not necessarily lead to behavioural changes.<sup>5,6</sup>

There are at present no published baseline data available on the sexual behaviour and practices of university students in South Africa.

A study of the sexual behaviour of college women in New York found that there had been little change in sexual practices in response to new epidemics of sexually transmitted diseases (STDs)<sup>7</sup>. A survey in southern California<sup>8</sup> reported similar findings but included the fact that many university students would willingly, or had already, lied about their sexual history to obtain sex from a prospective partner. This attitude was prevalent despite a good knowledge about AIDS and its associated risk factors. These results are particularly disconcerting, since the university student community is generally considered to be prone to acquiring STDs because experimentation with sex and drugs are common.<sup>5,9,10</sup>

A study was undertaken to obtain baseline data on sexual activity, behaviour and practices of university students; to evaluate their knowledge, perceptions and attitudes regarding HIV infections, to determine whether this had led to changes in sexual behaviour, and to assess the impact and efficacy of current AIDS education campaigns.

## Subjects and methods

A cross-sectional study was conducted among 120 randomly selected students living in the residences of the University of Witwatersrand. The students were requested to complete a self-administered questionnaire. The study was completed on a single evening in February 1990.

## Sampling frame and technique

The sampling frame consisted of a list of room numbers (total 1973) for each of the 11 residences. A proportionate sample of 120 students was randomly selected using computer-generated random numbers. If selected rooms were not occupied on the night of the survey, the rooms nearest to the right were selected.

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**Questionnaire**

A 52-question, self-administered anonymous questionnaire was used. Students were allowed 30 minutes to complete the questionnaires, after which they were placed in envelopes, sealed and deposited into sealed collection boxes.

The questionnaire was divided into five broad sections: demographic; knowledge and perception of transmission, prevention and consequences of AIDS; sexual practices; attitudes to condoms; and the educational campaign against AIDS.

The internal validity of the study was tested by design within the questionnaire, with specific reference to students' knowledge of the transmission of AIDS and behavioural changes related to safer sexual practices.

The questionnaire was pre-tested and piloted on 12 subjects.

**Statistics and measurements**

Percentages and 95% confidence intervals are presented for categorical data.<sup>11</sup> The chi-square test was used to reveal any significant differences between the responses of males and females. It was also used to test for significant associations between various questions. Means and standard deviations were calculated for continuous variables. Student's *t*-test was also employed to test for any significant differences between various groups. Probabilities (*P* values) less than 0,05 were seen as an indication of significance.

Kappa statistics were calculated to assess the internal validity of certain questions. A 'Z' value was calculated and tables of the standard normal distribution were used as a reference to reveal the significance of the kappa statistics.<sup>11</sup>

Data were analysed separately for men and women, and also sexually active and inactive individuals. The sample was again divided into high-risk (more than 2 sexual partners), moderate-risk (1 partner) and low-risk (no partner) categories. Within the latter groups, owing to small numbers, no sub-analysis was possible.

**Ethical approval**

Ethical approval was obtained from the authorities of the

University of the Witwatersrand, including the Ethics Committee. Approval was also received from the various student house committees and the Student Affairs Committee. Informed consent was obtained from the selected students, without coercion.

**Results**

**Response rate**

A response rate of 90% (*N* = 108) was obtained. Four students (3,3%) declined to participate and 8 students (6,7%) had to be excluded, since entrance to one of the residences was refused.

**Internal validity**

A good degree of agreement beyond chance was found to exist between the questions concerning blood transfusions as a mode of transmission of AIDS ( $\kappa = 0,2176$ ;  $P = 0,0124$ ). Questions concerning changes in sexual behaviour as a result of AIDS also showed a good degree of agreement beyond chance ( $\kappa = 0,1031$ ;  $P = 0,0001$ ).

**Demographic data**

The mean age of the students in the sample was 21 years. The 56 male respondents (52%) ranged in age from 17 years to 30 years (mean 21 years) (95% confidence interval (CI) 20 - 22). The 48 female respondents (44%) ranged from 17 years to 27 years of age (mean 20 years) (95% CI 19 - 21). The gender of students was unknown. One hundred and three subjects in the sample were single (96,2%), 2 students were married, and 2 were living together.

**Perceptions and knowledge of AIDS**

Students' perceptions of the severity and risk of AIDS demonstrated that 17,7% of sexually active students (12 subjects; 95% CI 8,6 - 26,8), and 4,6% of non-sexually active

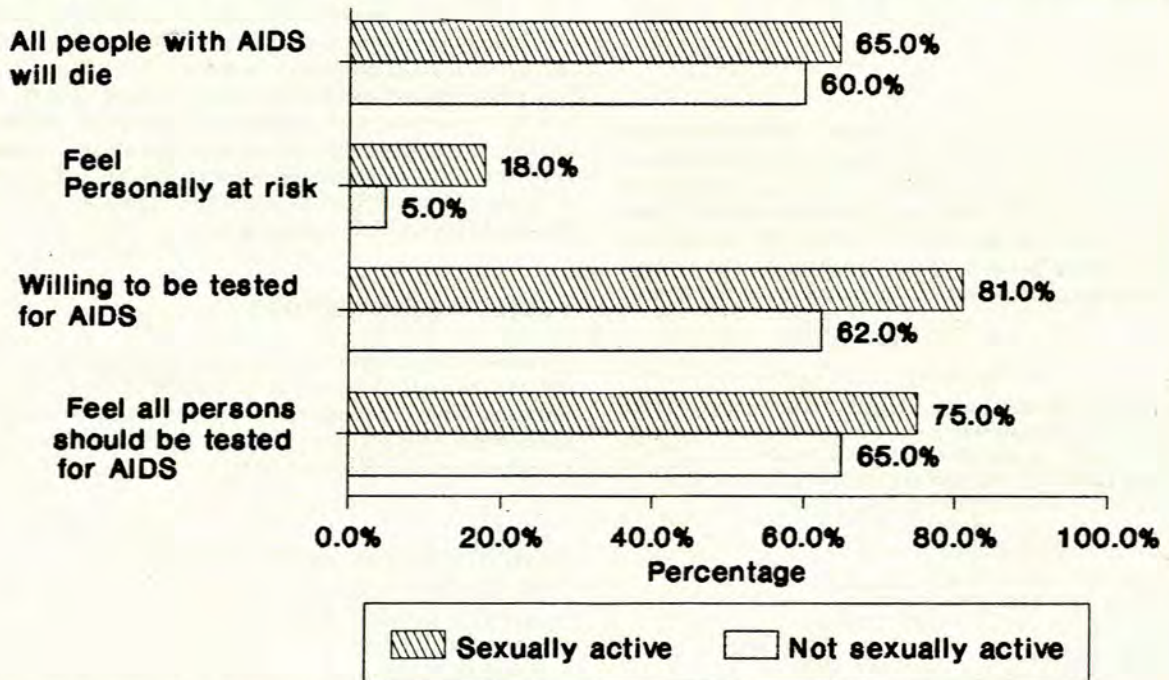


Fig. 1. Perceptions and knowledge of AIDS.

students (5 subjects; 95% CI 1,0 - 8,6) thought that they were personally at risk of contracting AIDS (Fig. 1).

Of the entire sample, 81,3% of subjects (87 subjects; 95% CI 73,9 - 88,7) were willing to inform their partners if they had AIDS. Of the students who were not sexually active, 65% (26 subjects; 95% CI 50,2 - 79,8) felt that everyone should be tested for AIDS and 62,2% (23 subjects; 95% CI 47,2 - 77,2) were willing to be tested for AIDS; whereas 75% of the sexually active students (51 subjects; 95% CI: 64,7 - 85,3) felt that everyone should be tested for AIDS and 80,9% (55 subjects; 95% CI 71,5 - 90,2) were willing to be tested themselves. There was no significant difference between the proportion of students willing to be tested and those who felt they were most at risk of contracting AIDS ( $P = 0,524$ ).

### Knowledge of transmission

Students' knowledge concerning modes of transmission of AIDS is summarised in Table I. Only 58,8% of sexually active (40 subjects; 95% CI 47,1 - 70,5) and 60% of non-sexually active students (24 subjects; 95% CI 44,8 - 75,2) were aware

that mosquito bites did not transmit AIDS. Deep kissing was perceived as a possible mode of transmission of AIDS by only 25,7% sexually active (17 subjects; 95% CI 15,2 - 36,2) and 28,2% of non-sexually active students (11 subjects; 95% CI 14,1 - 42,3).

### Sexual behaviour and beliefs

Of the male respondents, 71,4% had previously had a sexual partner (40 subjects; 95% CI 59,6 - 93,3), of whom 53,1% ( $N = 21$ ) presently had a regular sexual partner (Fig. 2(a)). Fifty-four per cent of the women (26 subjects; 95% CI 47,0 - 61,4) had had a sexual partner; of these, 76% had a regular sexual partner (Fig. 2(b)). Sixteen per cent of students (17 subjects; 95% CI 9,1 - 22,9) had had 2 or more sexual partners in the previous 6 months and 45% (49 subjects; 95% CI 35,4 - 54,4) had had 1 sexual partner. All the female respondents said they were heterosexual, 92,5% of the men said they were heterosexual, 5% homosexual and 2,5% bisexual.

TABLE I. MEANS OF TRANSMISSION (95% CONFIDENCE INTERVAL)

Statement: AIDS can be contracted by:	Sexually active				Not sexually active			
	Agree		Disagree		Agree		Disagree	
	%	No.	%	No.	%	No.	%	No.
<b>Touching the body of an AIDS victim</b>			95,5	64 (90,5 - 99,9)			89,7	35 (80,2 - 99,2)
<b>Deep kissing with an AIDS victim</b>	25,8 (15,2 - 36,2)	17	37,9 (26,2 - 49,6)	25	28,2 (14,1 - 42,3)	11	48,7 (33,0 - 64,4)	19
<b>Sharing food/cup with an AIDS victim</b>	6 (0 - 11,2)	4	73,1 (62,5 - 83,7)	49	7,5 (0 - 15,7)	3	70,0 (55,8 - 84,2)	28
<b>Sharing needles with an AIDS victim</b>	94,1 (88,5 - 99,7)	64	2,9 (0 - 6,9)	2	97,5 (92,6 - 99,9)	34		
<b>Having sex with prostitutes</b>	91,2 (84,5 - 97,9)	62	2,9 (0 - 6,9)	2	97,5 (92,6 - 99,9)	39	2,5 (0 - 7,3)	1
<b>Having sex with many people</b>	92,5 (86,2 - 98,8)	62	1,5 (0 - 4,4)	1	97,5 (92,6 - 99,9)	39		
<b>From mosquito bites</b>	14,7 (6,3 - 23,1)	10	58,8 (47,1 - 70,5)	40	15,0 (3,9 - 26,1)	6	60,0 (44,8 - 75,2)	24
<b>Having sex with male AIDS victims</b>	97,1 (93,1 - 99,9)	66	1,5 (0 - 4,4)	1	100	40		
<b>Having sex with female AIDS victims</b>	95,6 (90,7 - 99,9)	65	2,9 (0 - 6,9)	2	100	40		
<b>Donating blood</b>	27,9 (17,2 - 38,6)	19	58,8 (47,1 - 70,5)	40	37,5 (22,5 - 52,5)	15	55,6 (39,6 - 70,4)	22
<b>Wearing an AIDS victim's clothes</b>	1,5 (0 - 4,4)	1	86,7 (78,6 - 94,8)	59			85,5 (70,7 - 94,3)	33
<b>From toilet seats</b>	5,9 (0 - 11,5)	4	73,5 (66,0 - 87,0)	50	5,0 (0 - 10,9)	2	67,5 (53,0 - 82,0)	27
<b>Receiving blood transfusions</b>	76,5 (66,4 - 86,6)	52	8,8 (2,1 - 15,5)	4	69,2 (54,9 - 83,5)	27	20,5 (8,0 - 33,0)	8
<b>Sharing razor blades</b>	51,5 (39,4 - 63,6)	35	23,5 (13,2 - 33,8)	16	60,0 (44,8 - 75,2)	24	20,0 (7,3 - 32,7)	8

\* Total of percentages do not equal 100% because the 'Unsure' category is not included.

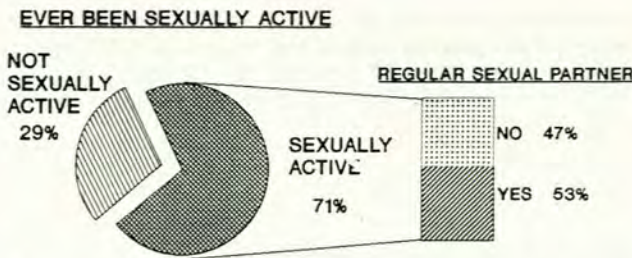


Fig. 2(a). Sexual behaviour and beliefs of men.

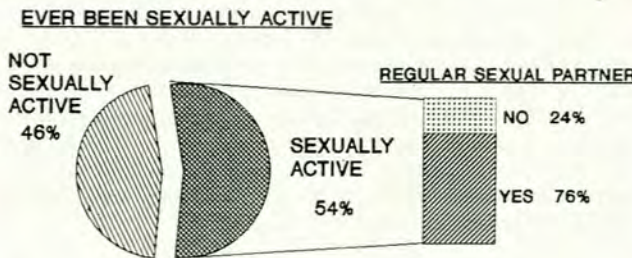


Fig. 2(b). Sexual behaviour and beliefs of women.

**Attitudes towards condoms**

Twenty-six per cent of the sexually active students (17 subjects; 95% CI 15,4 - 36,2) had used a condom in the past 6 months and 51,5% (35 subjects; 95% CI 39,6 - 63,4) had made changes in their sexual behaviour since the advent of AIDS. These changes are summarised in Fig. 3.

Attitudes towards condom usage were tested by several questions, the answers to which are summarised in Table II. Seventy-one per cent (40 subjects; 95% CI 59,6 - 83,2) and 51,1% (23 subjects; 95% CI 36,5 - 65,7) of men and women, respectively, were willing to use condoms if they were widely available. Condom usage was against the religion of 3,1% of sexually active (2 subjects; 95% CI 1,1 - 6,0) and 16,2% of non-sexually active students (6 subjects; 95% CI: 4,3 - 28,1).

Of the sexually active students 47,1% (32 subjects; 95% CI 35,2 - 59,0) found that condoms made sex less enjoyable, 26,1% (17 subjects; 95% CI 15,4 - 36,8) said that condoms made them feel embarrassed or uncomfortable and 19,7% (13 subjects; 95% CI 10,1 - 29,3) felt that condoms were offensive to their partners.

**Impact of education campaigns**

Several questions were posed to determine the most effective media and organisations to convey information about AIDS. Students were asked in what form and from whom they would like to receive their information. The results are shown in Table III. No significant difference was found between responses from men and women.

**Discussion**

The sample size represented approximately 6% of the residence population and, coupled with a high response rate, lack of coercion and adequate checks for internal validity, we feel that the study was representative of current knowledge, attitudes and behaviour among residence students. However, the sample size was too small to allow sub-analysis of various categories and risk profiles for statistically significant levels to be determined.

Overall sexual activity of the students sampled paralleled that found in similar populations world-wide.<sup>5,7,10</sup> Two-thirds of the students admitted to previous sexual contact, while 38% were sexually active at the time of the study. The frequency of homosexual and bisexual relationships of 5% and 2,5%, respectively, among male respondents appeared to be within parameters found in other studies.<sup>12</sup>

Ninety-three per cent of the sexually active students felt that condoms were effective in preventing STDs. Despite this, only 1:4 students admitted to using them. Similar discrepancies between knowledge, beliefs and behaviours have been found among Australian, American and Irish university students.<sup>5,12</sup>

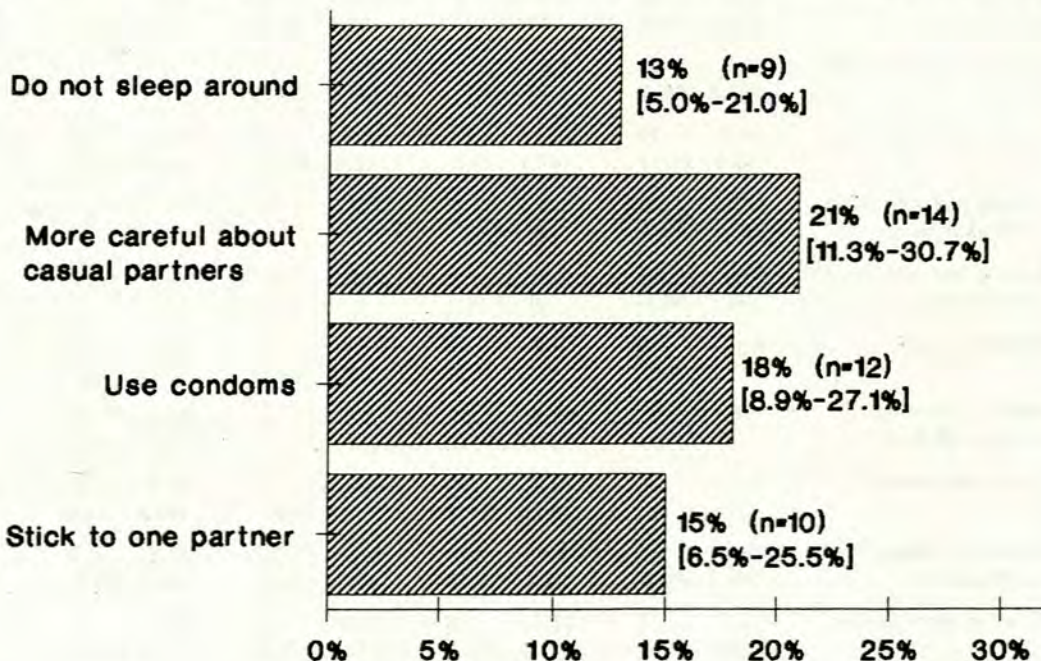


Fig. 3. Changes made by sexually active students in their sexual behaviour since the advent of AIDS ([ ] = 95% confidence interval).

TABLE II. STUDENTS' ATTITUDES TO CONDOMS (95% CI)

Attitude	Men (N = 66)						Women (N = 48)					
	Sexually active		Sexually inactive		All		Sexually active		Sexually inactive		All	
	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
Getting condoms is embarrassing	33,3	13	40,6		35,2	19	19,2	5	26,3	5	22,2	10
					(22,5 - 47,9)						(10,1 - 34,3)	
Condoms make sex less enjoyable	52,5	21	18,8	3	42,9	24	42,3	11	4,8	1	25,5	12
					(29,9 - 55,9)						(13,0 - 38,0)	
Condoms are appropriate for use with casual partners	75,0	30	42,9	6	66,7	36	80,0	20	52,3	11	67,4	31
					(54,0 - 79,3)						(53,9 - 80,9)	
Condoms are used against religion	2,6	1	13,3	2	7,5	3	—		19,1	4	10,5	4
					(0,0 - 15,7)						(0,8 - 20,2)	
Condoms are too expensive	20,0	8	12,5	2	21,7	10	8,0	2	—		6,1	2
					(9,8 - 33,6)						(2,1 - 14,3)	
Condoms are offensive to my sexual partner	5,8	6	9,1	1	14,3	7	23,1	6	5,3	1	15,6	7
					(4,5 - 24,1)						(5,0 - 26,2)	
Condoms can prevent pregnancy	84,6	33	81,3	13	83,6	46	76,9	20	52,4	11	66,0	33
					(73,8 - 97,3)						(72,3 - 93,7)	
Condoms can prevent venereal diseases	92,3	36	81,3	13	89,1	49	92,3	24	71,4	15	83,0	39
					(80,9 - 97,3)						(72,3 - 93,7)	
Condoms are appropriate for use with husband	25,0	5	18,2	2	22,6	7	27,3	6	28,7	6	27,9	12
					(7,9 - 37,3)						(14,5 - 41,3)	
Condoms are appropriate for use with wife	33,5	15	21,4	3	32,5	13	23,8	5	21,1	4	22,5	9
					(18,0 - 47,0)						(9,5 - 35,4)	
Condoms are appropriate with a regular partner	71,9	23	41,7	5	63,6	28	42,3	11	47,6	10	44,7	21
					(49,8 - 77,3)						(30,5 - 58,9)	
Condoms make my partner think I don't trust him/her	38,5	15	25,0	4	34,5	19	26,9	7	14,3	3	21,3	10
					(12,9 - 47,1)						(9,6 - 33,0)	
Condoms make me feel uncomfortable and embarrassed	25,6	10	—		20,0	10	25,0	6	5,3	1	16,3	7
					(8,9 - 31,1)						(5,3 - 27,3)	

95% CI = 95% confidence interval.

Although 73% of students would use condoms if they were freely available, the attitude towards condoms was generally negative. Possible explanations for this attitude include the connotations associated with condoms. Among the most prevalent were that condoms make sex less enjoyable (50%), were embarrassing to use (26%) and were offensive to and indicated distrust of their partners (20%). The cost and ease of obtaining condoms were not deterring factors. Ethnic differences in condom usage were not directly assessed and religious objection was minimal. Surveys completed in New York,<sup>9</sup> Australia<sup>10</sup> and London<sup>13</sup> noted similar reasons for the limited use of condoms.

In a recent survey among black mineworkers in Johannesburg, condom usage rate was 36%.<sup>14</sup> De Buono *et al.*<sup>7</sup> reported a condom usage rate of 41% in 1989 among American college women.

The survey demonstrated a substantial knowledge about AIDS, mechanisms of its transmission, prevention and consequences. This compares favourably with similar studies done in the USA and France.<sup>15,16</sup> The lack of a feeling of personal susceptibility in spite of a high level of knowledge was also found in a study in London.<sup>13</sup> Only 20% of students perceived

themselves to be personally at risk for contracting AIDS despite high-risk behaviour.

The misconceptions regarding donating blood (31%) and mosquito bites (15%) as means of spreading AIDS has similarly been found in other international studies.<sup>15,16</sup>

Students failed to identify deep kissing (42%), razor blades (22%) and blood transfusions (13%) as possible means of contracting AIDS. This was less than that found in studies done at Belfast University and Ulster University (deep kissing = 87,6%).<sup>10</sup>

Most students prefer to receive their information about AIDS from Campus Health (82%), State health services (57%) and public advertisements (60%). Students also identified newspapers/magazines (80%) and leaflets (69%) as the preferred media. However, significantly fewer students actually obtained their information from Campus Health (15%;  $P < 0,05$ ), State health (19%;  $P < 0,05$ ) and leaflets (44%;  $P < 0,05$ ). These statistically significant differences possibly demonstrate that Campus Health and State health have been ineffective in relaying the AIDS message and that leaflets may have been under utilised.

**TABLE III. COMPARISON OF ACTUAL SOURCE OF INFORMATION REGARDING AIDS AND PREFERRED SOURCE (95% CI)**

Source of information	Prefer information from		Obtained information from		Significance
	%	No.	%	No.	
<b>Campus Health</b>	<b>82,4</b>	<b>89</b>	<b>14,8</b>	<b>16</b>	<b>P &lt; 0,05</b>
	(75,2 - 89,6)		(8,1 - 21,5)		
<b>Religious groups</b>	<b>28,7</b>	<b>31</b>	<b>5,6</b>	<b>6</b>	<b>P &lt; 0,05</b>
	(20,2 - 37,2)		(1,3 - 9,9)		
<b>Clinic/hospital/doctor</b>	<b>73,2</b>	<b>79</b>	<b>26,9</b>	<b>29</b>	<b>P &lt; 0,05</b>
	(64,8 - 81,5)		(18,5 - 35,3)		
<b>Family members</b>	<b>35,2</b>	<b>38</b>	<b>21,3</b>	<b>23</b>	
	(26,2 - 44,2)		(13,6 - 29,0)		
<b>Friends and colleagues</b>	<b>42,6</b>	<b>46</b>	<b>36,1</b>	<b>39</b>	
	(33,3 - 51,9)		(27,0 - 45,1)		
<b>Student Representative Council</b>	<b>25,0</b>	<b>27</b>	<b>2,8</b>	<b>3</b>	<b>P &lt; 0,05</b>
	(16,8 - 33,2)		(0 - 5,9)		
<b>Public advertisements</b>	<b>60,2</b>	<b>65</b>	<b>57,4</b>	<b>62</b>	
	(51,0 - 69,4)		(48,1 - 66,7)		
<b>Community organisations</b>	<b>49,1</b>	<b>53</b>	<b>11,1</b>	<b>12</b>	<b>P &lt; 0,05</b>
	(39,7 - 58,5)		(5,2 - 17,0)		
<b>State health</b>	<b>55,6</b>	<b>60</b>	<b>18,5</b>	<b>20</b>	<b>P &lt; 0,05</b>
	(46,2 - 65,0)		(11,2 - 25,8)		
<b>Radio</b>	<b>49,1</b>	<b>53</b>	<b>22,2</b>	<b>24</b>	<b>P &lt; 0,05</b>
	(39,7 - 58,5)		(14,4 - 30,0)		
<b>Television</b>	<b>67,6</b>	<b>73</b>	<b>47,2</b>	<b>51</b>	<b>P &lt; 0,05</b>
	(58,8 - 76,4)		(37,8 - 56,6)		
<b>Newspapers/magazines</b>	<b>79,6</b>	<b>86</b>	<b>63,9</b>	<b>69</b>	<b>P &lt; 0,05</b>
	(72,0 - 87,2)		(54,8 - 73,0)		
<b>Leaflets</b>	<b>69,4</b>	<b>47</b>	<b>43,5</b>	<b>47</b>	<b>P &lt; 0,05</b>
	(60,7 - 78,1)		(34,1 - 52,9)		

\* Significance from comparing the proportion that prefer their information and the proportion who obtained their information from the relevant source.  
95% CI = 95% confidence interval.

## Conclusion

Clearly the level of knowledge and awareness of AIDS among students is high. This is not, however, matched by a corresponding degree of risk perception. Nor has attitudinal change and a good knowledge led to adequate behavioural change, especially with regard to the use of condoms.

We recommend that credible organisations, such as those mentioned in the study, develop educational programmes to address the misconceptions regarding the transmission of AIDS; to create a conducive environment in which current knowledge regarding AIDS may lead to safer sexual behaviour; and to exploit fully the many campus-controlled and public communications media.

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## REFERENCES

- Sher R. HIV infection in South Africa, 1982 - 1988 — a review. *S Afr Med J* 1989; **76**: 314-318.
- Padayachee N, IJsselmuiden C, Hurwitz HS. Johannesburg strategy for control of AIDS. *Community Health* 1989; November/December: 34-36.
- Padayachee GN, Schall R. Short-term predictions of the prevalence of human immunodeficiency virus infection among the black population in South Africa. *S Afr Med J* 1990; **77**: 329-333.
- IJsselmuiden CB, Steinberg MH, Padayachee GN *et al*. AIDS and South Africa — towards a comprehensive strategy: Part III. The role of education. *S Afr Med J* 1988; **73**: 465-467.
- Turtle AM, Ford B, Habgood R *et al*. AIDS-related beliefs and behaviours of Australian university students. *Med J Aust* 1989; **150**: 371-376.
- Erbas R. Future development of health promotion for the prevention of AIDS (Editorial). *AIDS Health Promotion Exchange* 1989; **4**: 1-6.
- DeBuono BA, Zinner SH, Daamen M, McCormack WM. Sexual behavior of college women in 1975, 1986 and 1989. *N Engl J Med* 1990; **322**: 821-825.
- Cochran SD, Mays VM. Sex, lies and HIV. *N Engl J Med* 1990; **322**: 774-775.
- Goodman E, Cohall AT. Acquired immunodeficiency syndrome and adolescents: knowledge, attitudes, beliefs and behaviors in a New York City adolescent minority population. *Pediatrics* 1989; **84**: 36-42.
- Brown JS, Irwin WG, Steeze K, Harland RW. Students' awareness of and attitudes to AIDS. *J R Coll Gen Pract* 1987; **37**: 457-458.
- Fleiss JL. *Statistical Methods for Rates and Proportions*. 2nd ed. New York: John Wiley, 1981: 15-218.
- Landefeld CS, Chren M, Shega J *et al*. Students sexual behaviour knowledge and attitudes relating to acquired immune deficiency syndrome. *J Gen Intern Med* 1988; **3**: 161-165.
- Watney S. People's perceptions of the risk of AIDS and the role of the mass media. *Health Educ J* 1987; **46**: 62-65.
- IJsselmuiden CB, Padayachee GN, Mashaba W, Martiny O, Van Staden HP. Knowledge, beliefs and practices among black goldminers relating to the transmission of the human immunodeficiency virus and other sexually transmitted diseases. *S Afr Med J* 1990 (in press).
- Rich R, Haskin J, Bradley B *et al*. HIV-related beliefs, knowledge, and behaviors among high school students. *MMWR* 1988; **37**: 717-727.
- Moatti YP, Manesse L, Le Gales Z *et al*. Social perception of AIDS in the general public: a French study. *Health Policy* 1988; **9**: 1-8.