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An Analytical Comparison of Knowledge, Attitudes, and Practices Regarding HIV/AIDS Among Medical and Non-Medical Students in Iran

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Background and Objectives: Young people are the main group at risk of HIV/AIDS due to factors such as curiosity, peer pressure, lack of knowledge and skills, unsafe sexual behaviors, and drug abuse. The present study was conducted to compare the knowledge, attitudes, and practices regarding HIV/AIDS among medical and non-medical students in Iran.

Methods: This cross-sectional descriptive-analytical study was conducted on a population consisting of the students of Shahid Beheshti University (SBU) and Shahid Beheshti University of Medical Sciences (SBMU). A total of 303 students were randomly selected from the two universities. Data were collected using a researcher-made HIV/AIDS knowledge, attitude, and practice questionnaire. Data were then analyzed using the independent *t*-test, Mann–Whitney's *U*-test, the ANOVA, and the Kruskal–Wallis test in SPSS-18. P<0.05 was set as the level of significance for all the tests.

Findings: The frequencies of marital status, education, smoking, alcohol and psychotropic substance use, employment status, and source of information differed significantly between the medical and non-medical students. There was a significant difference between the two groups regarding knowledge (P<0.001) and practice (P=0.019) regarding HIV/AIDS. Meanwhile, there was no significant difference between the two groups in terms of their attitude toward HIV/AIDS (P=0.503). The results of the ANOVA revealed a significant correlation between marital status and practice (P=0.022), education and attitude (P=0.004), and smoking and knowledge (P=0.008) among the medical students. Meanwhile, there was no significant difference between the demographic variables and knowledge, attitudes and practices regarding HIV/AIDS among the non-medical students (P>0.005).

Conclusion: The present findings showed that designing and developing appropriate educational programs, offered through group media, scientific seminars, courses, lectures, and group discussions, can be effective in enhancing the students' knowledge and changing their attitudes and should be incorporated into healthcare programs.

Keywords: knowledge, attitude, practice, students, HIV/AIDS

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Introduction

Despite the extensive efforts made by governments and international organizations to prevent new HIV/AIDS infections and reduce sexually-transmitted infections (STIs) by 2015, evidence indicates that harmful infections continue to grow, with an increasing number of people dying in developing countries.[1–3] One of the most important global health challenges is HIV/AIDS, which affects millions of active

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people in societies every year; is considered the second leading cause of disease and death in Africa, the fourth leading cause of death among all diseases, and the fifth cause of death due to infectious diseases worldwide.[4,5] Currently, 6800 people are infected with HIV and 5700 die on a daily basis due to this disease.[5,6] Existing studies indicate that HIV/AIDS is a major health problem and its dimensions are rapidly growing in Eastern Mediterranean and Middle East countries, such as Iran.[7] The incidence of the disease is significantly higher among young people, with approximately 40% of the new cases occurring in people aged 15–25 years.[8] Young people are the main group at risk of HIV/AIDS throughout the world due to factors such as curiosity, peer pressure, lack of knowledge and skills, unprotected sex, sex with multiple partners, traveling to high-risk zones, and drug abuse. Currently, education and prevention are the best methods to fight HIV/AIDS.[9–11]

This reemerging disease is one of the most important health problems around the world due to the series of mental, behavioral, emotional, and physical problems it causes.[12] It affects all body organs and systems, as it involves the immune system,[12,13] and reduces the quality of life and life satisfaction.[14] HIV/AIDS is transmitted through a number of ways, including sex, condensed coagulants, contaminated blood components, and multiple non-sterile injections. HIV/AIDS can be isolated from certain body fluids such as blood, saliva, semen, urine, cerebrospinal fluid.[11] Since the incubation period is long and may last five to ten years or longer, HIV/AIDS infection is likely to persist for life, and carriers can transmit the virus to others during this period.[15]

In addition to disrupting all the aspects of the patient's life, HIV/AIDS also causes problems at the social level by affecting the active age groups of the society, having a high lethality rate and the high costs of disease care and control, which impose a heavy burden on the society.[7] Once diagnosed and after learning of their disease, people face countless problems, especially in their social relationships, including stigmatization and social exclusion as their major unpleasant social experiences.[16] Furthermore, the disease is associated with significant job changes and financial pressures in such a way that it changes the patients' lifestyles, reduces their self-confidence, and makes them more vulnerable.[8,17]

Recently, there has been an increase in the incidence of new HIV/AIDS infections in the 15–24-year age group compared to other population segments in many countries.[8,18] Many domestic studies have shown that the Iranian youth are less informed about HIV/AIDS, especially its transmission routes, due to the cultural, religious, and social conditions prevailing in the country.[7] In addition, considering the particular circumstances of the population pyramid of Iran, approximately 61% of the country's population is in the 15–64-year age group, which demands special attention to HIV/AIDS education.[16,19] In Iran, education on high-risk sexual behaviors, including HIV/AIDS, is not provided at the primary and secondary school levels. Any information will be provided in post-secondary schools, ie at the university. Medical students are familiar with the subject because of the nature of their courses, but non-medical students do not receive any training when in college or university. The present study was conducted based on the assumption that there are differences between medical and non-medical students in terms of their knowledge, attitudes, and practices regarding HIV/AIDS.

Methods

This cross-sectional descriptive-analytical study was conducted at a research setting including the non-medical students of Shahid Beheshti University (SBU) (n=4), and medical students of Shahid Beheshti University of Medical Sciences (SBMU) (n=11) in Tehran city in 2019. The study population consisted of medical and non-medical students. The medical students were students studying medicine, nursing, midwifery, health, pharmacy, etc., at the Faculty of Medical Sciences. The non-medical students were students studying toward degrees in literature, engineering, law, social sciences and economics, etc. in non-medical universities. The sample size was calculated as 132 per group using the sample size formula used in similar studies and taking into account the following: The probability of type-1 error being α=1.96, the probability of type-2 error being β=1.28, test power being 0.90, and observed effect size of the mean difference being d=0.40.[7] To take account of a potential attrition of 15% in the follow-up, 155 medical students and 148 non-medical students studying in the covered faculties were selected and a total of 303 students entered the study. Each faculty was taken as a category. Considering the proportion of students in the faculties, 13 samples were selected from each of the medical faculties and 37 samples from each of the non-medical faculties. The samples were randomly selected based on their national ID number being odd or even. The inclusion criteria were informed consent to participate in the research and being a university student. The exclusion criterion was returning incomplete questionnaires.

The questionnaires were completed through face-to-face interviews. The research objectives were explained to the participants and they were ensured of their information being kept confidential and the data being used solely for research purposes and eventually be published in general. The participants signed written consent forms and were guided in the case of any ambiguities.

$$n \geq 2\frac{\left(z_{\alpha/2}+z_{\beta}\right)^2\sigma^2}{\left(\mu_1-\mu_2\right)^2}$$

Data Collection Tools

The data collection tool included four questionnaires: Demographic, knowledge, attitude, and practice questionnaires.

The demographic questionnaire inquired about variables including gender, marital status, education, smoking status, psychotropic substance and alcohol use, employment status, beliefs, and sources of information.

The knowledge assessment was performed using a researcher-made questionnaire taken from several validated questionnaires assessing medical and non-medical students' level of knowledge.[6,14,20-23] The initial questionnaire consisted of 35 items examining the students' knowledge in areas such as public information, transmission and prevention methods regarding HIV/AIDS. A 10-member expert panel consisting of infectious disease specialists (n=3), midwifery professors (n=2), and community health nursing experts (n=5) assisted in determining the validity of the questionnaire. According to the panel's opinion, two items of the questionnaire were omitted, and the modified 33-item questionnaire was used. The reliability of the questionnaire was calculated and confirmed based on the internal consistency (Cronbach's alpha coefficient=0.84). The items were responded with "Yes" (2), "No" (1), and "Do Not Know" (0) and scored from 0 to 66. Some items were scored in reverse. An example of the items was: "Infected person at early stages of disease not diagnosed by tests.

Attitude was measured using a researcher-made questionnaire as well. The initial attitude questionnaire, which was taken from valid questionnaires utilized to assess the attitudes of medical and non-medical students about public information, transmission and prevention methods regarding HIV/AIDS,[6,14,20-23] consisted of 17 items. A 10-member expert panel consisting of infectious disease specialists (n=3), midwifery professors (n=2), and community health nursing experts (n=5) was employed to determine the validity of the questionnaire. According to the panel's opinion, the initial 17 items were all confirmed. The reliability of the questionnaire was calculated and confirmed based on the internal consistency (Cronbach's alpha coefficient= 0.79). The response options for each item were designed based on a 5-point Likert scale ["Strongly Agree" (5), "Agree" (4), "No Comments" (3), "Disagree" (2), "Strongly Disagree" (1)]. The score range was 17–85. Some items were scored in reverse. An example of the items was: "If a member of a family such as a spouse gets AIDS, must leave".

Practice was measured using a researcher-made questionnaire. The initial questionnaire was derived from the questionnaires used to measure medical and non-medical students' practice about public information, transmission and prevention methods regarding HIV/AIDS (6,14, [20–23]) and included nine items. A 10-member expert panel consisting of infectious disease specialists (n=3), midwifery professors (n=2) and community health nursing experts (n=5) was consulted to determine the validity of the questionnaire. Three items were omitted and six were approved. The reliability of the questionnaire was calculated and confirmed via the internal consistency (Cronbach's alpha coefficient=0.82). Each correct answer received 1 point and wrong answers received 0 points. The score range was 0–6. An example of the items was:

Which of the following do you choose for AIDS counseling and treatment? Referring to Health Centers - Referring to available clinics and hospitals - Getting advice from a private doctor - I don't do anything special.

After data collection, data were entered into SPSS-18. Initially, the normal distribution of the variables was investigated using the Kolmogorov–Smirnov test. In the case of the normal distribution of the data, the independent *t*-test was used to compare the mean knowledge, attitude, and practice scores between the two groups, and its non-parametric equivalent (Mann–Whitney *U*-test) was used in the case of non-normal data distribution. The Chi-squared test was employed to compare the demographic variables between the two groups. The ANOVA was applied to measure the relationship between the demographic variables and knowledge, attitude as well as practice in both groups while its non-parametric equivalent (Kruskal–Wallis) was used in the case of non-normal distribution. $P<0.05$ was taken as the level of statistical significance.

Findings

According to the findings of the study, the mean ± SD of age was 25.25 ± 7.48 years in the medical and 22.12 ± 2.8

years in the non-medical students. The proportion of men and women was 66.5% and 33.5% among the medical students and 35.8% and 64.2% among the non-medical students. Text-books and courses were noted as the sources of information by 58.1% of the medical students and 21.6% of the non-medical students. Table 1 presents the mean ± standard deviation of the other demographic information. A comparison of the demographic variables between the two groups of medical and non-medical students revealed a significant difference in terms of marital status (P<0.001), education (P<0.001), and smoking status (P=0.003), alcohol consumption (P=0.012), employment status (P<0.001), and information source (P<0.001), as shown in Table 1.

The comparison of knowledge, attitudes, and practices regarding HIV/AIDS among the medical and non-medical students showed a significant difference between the two groups in terms of their knowledge regarding HIV/AIDS (P<0.001). There was no significant difference between the two groups in terms of their attitude regarding HIV/AIDS (P=0.503). Nonetheless, there was a significant difference between the two groups in terms of their practice regarding HIV/AIDS (P=0.019), as shown in Table 2.

Examining the relationship of knowledge, attitude and practice regarding HIV/AIDS among the medical students with the demographic variables using the ANOVA showed a correlation between smoking and knowledge (P=0.008), attitude and education (P=0.004), and practice and marital status (P=0.022), as in Table 3. Nevertheless, there was no relationship between knowledge, attitude and practice regarding HIV/AIDS and the demographic variables among the non-medical students (Table 4).

Table 1 Comparison of the Demographic Variables Between the Two Groups of Medical and Non-Medical Students

		Medical (%)	Non-Medical (%)	P
Gender	Female	103 (66.5%)	53 (35.8%)	0.679
	Male	52 (33.5%)	95 (64.2%)	
Marital status	Single	118 (76.1%)	138 (93.2%)	<0.001*
	Married	37 (23.9%)	10 (6.8%)	
Education	Bachelor's	66 (42.6%)	98 (66.2%)	<0.001*
	Master's	22 (14.2%)	44 (29.7%)	
	PhD	67 (43.2%)	6 (4.1%)	
Smoking	Yes	8 (5.2%)	23 (15.5%)	0.003*
	No	147 (94.8%)	125 (48.5%)	
Alcohol and psychotropic substance use	Yes	6 (3.9%)	17 (11.5%)	0.012*
	No	149 (96.1%)	131 (88.5%)	
Employment status	Employed	54 (34.8%)	24 (16.2%)	<0.001*
	Unemployed	101 (65.2%)	124 (83.8%)	
Religious beliefs	Not mentioned	7 (4.5%)	7 (4.7%)	0.142
	Not at all	6 (3.9%)	10 (6.8%)	
	Somewhat	14 (9%)	24 (16.2%)	
	Moderate	44 (28.4%)	48 (32.4%)	
	Believing	75 (48.4%)	51 (34.5%)	
	Religious	9 (5.8%)	8 (5.4%)	
Source of information	Friends	3 (1.9%)	2 (1.4%)	<0.001*
	Newspapers and magazines	3 (1.9%)	2 (1.4%)	
	Radio and TV	9 (5.8%)	45 (30.4%)	
	Books and university courses	90 (58.1%)	32 (21.6%)	
	Internet	47 (30.3%)	63 (42.6%)	
	Pamphlets and posters	3 (1.9%)	4 (2.7%)	

Note: *P<0.05 is taken as the level of statistical significance.

Discussion

The young generation, including university students, are a valuable human and scientific resource, the basis of the country's future, and future parents, and their health plays an important role in the general health of communities.[7,18] Since HIV/AIDS is recognized as a major public health concern worldwide, and the prevention and control of high-risk behaviors are the only way to prevent this disease,[24,25] investigating the knowledge, attitudes, and practices of medical and non-medical students regarding this disease can be a prelude to designing systematic programs for providing the essential training.[26] The present study revealed a significant difference between the medical and non-medical students in terms of their HIV/AIDS knowledge, as the medical students had higher knowledge about HIV/AIDS compared to their non-medical peers. The present findings are consistent with the results of previous studies in Iran.[16,27] Medical students become familiar with HIV/AIDS, its symptoms, transmission routes, and treatments from the very beginning of their

Table 2 Comparison of HIV/AIDS Knowledge, Attitude and Practice Among the Medical and Non-Medical Students

	Medical	Non-Medical	P
	Mean (SD)	Mean (SD)	
Knowledge	20.68±4.59	17.34±5.32	P<0.001* Z=5.700
Attitude	65.13±6.88	65.71±6.67	P=0.503 Z=0.669
Practice	12.87±1.69	12.44±1.56	P=0.019* Z=2.349

Note: *P<0.05 is taken as the level of statistical significance.

education because of the nature of their discipline and courses; they thus acquire a good knowledge of this disease. This knowledge also helps them achieve a more positive attitude toward the various aspects of the disease. Nonetheless, prior to stepping into this field of study, they are not very familiar with the nature of STIs, especially HIV/AIDS, and have almost the same level of knowledge as others, given the cultural conditions and cultural taboos in the Iranian society.[16] Furthermore, medical students are at the forefront of health care and play a key role in promoting the health status of different classes and groups of the society and global health; acquiring a deeper understanding of their knowledge, attitudes, and practices about people with HIV/AIDS is therefore mandatory.[14,20,28] This deeper knowledge can help encourage medical students to be more supportive of people with HIV/AIDS.[27] Previous measurements in different societies indicate that young people have different levels of knowledge about HIV/AIDS as a result of several factors, such as socio-cultural factors, religion, political orientation, and parental knowledge. HIV/AIDS awareness-raising activities are therefore recommended to be included in students' curricula in the form of short tutorials, discussions, conferences, workshops, and symposiums.[29]

Table 3 Relationship of Knowledge, Attitude and Practice with Demographic Variables in the Medical Students

		Knowledge			Attitude			Practice		
		Mean (SD)	Maximum Minimum	P	Mean (SD)	Maximum Minimum	P	Mean (SD)	Maximum Minimum	P
Marital status	Single	20.64±4.5	3–29	0.848	65.61±5.9	48–80	0.126	12.70±1.6	8–16	0.022*
	Married	20.81±4.1	9–26		63.62±9.2	17–77		13.43±1.7	9–16	
Education	Bachelor's	20.33±4.5	3–29	0.221	64.78±5.9	48–76	0.004*	12.75±1.5	8–16	0.470
	Master's	19.63±4.5	9–26		61.27±10.6	17–74		13.27±1.8	9–16	
	PhD	20.68±4.5	7–29		66.74±5.7	53–80		12.75±1.5	9–16	
Smoking	Yes	20.45±4.5	3–29	0.008*	65.06±6.9	17–80	0.567	12.91±1.7	8–16	0.258
	No	24.87±2.9	20–29		66.50±4.7	57–73		12.25±1.5	10–15	
Alcohol and psychotropic substances use	Yes	20.65±4.3	7–29	0.725	64.95±6.9	17–80	0.100	12.91±1.6	8–16	0.198
	No	21.33±9.5	3–29		69.66±4.1	65–76		12.0±1.7	10–15	
Source of information	Friends	20.0±4.5	16–25	0.325	64.66±4.0	61–69	0.982	12.66±0.5	12–13	0.410
	Newspapers and magazines	17.33±6.4	10–22		64.0±4.3	61–69		11.66±1.1	11–13	
	Radio and TV	19.0±4.0	13–23		66.88±3.1	63–73		12.55±1.7	10–15	
	Books and university courses	20.75±4.6	3–29		65.08±7.8	17–80		13.07+1.7	8–16	
	Internet	21.36±4.2	13–29		65.04±5.8	48–75		12.59+1.5	8–16	
	Pamphlets and posters	17.0±8.0	9–25		64.33±6.5	58–71		13.66+2.0	12–16	

Note: *P<0.05 is taken as the level of statistical significance.

Table 4 Relationship of Knowledge, Attitude and Practice with the Demographic Variables in the Non-Medical Students

		Knowledge			Attitude			Practice		
		Mean (SD)	Maximum Minimum	P	Mean (SD)	Maximum Minimum	P	Mean (SD)	Maximum Minimum	P
Marital status	Single	17.34±5.2	3–29	0.978	65.78±6.6	45–81	0.655	12.39±1.5	9–17	0.114
	Married	17.30±6.6	5–25		64.70±7.02	51–74		13.20±1.8	10–16	
Education	Bachelor's	17.70±5.4	5–25	0.417	65.71±6.5	48–79	0.865	12.25±1.5	9–17	0.114
	Master's	16.45±5.2	3–25		65.90±6.8	45–81		12.81±1.4	9–15	
	PhD	18.0±3.7	13–23		64.33±8.2	56–74		12.83±1.9	11–16	
Smoking	Yes	17.31±5.1	3–29	0.954	65.59±6.3	45–79	0.599	12.50±1.5	9–17	0.293
	No	17.39±6.2	5–28		66.39±8.5	48–81		12.13±1.5	9–15	
Alcohol and psychotropic substances use	Yes	17.58±5.2	3–29	0.139	65.65±6.6	45–81	0.764	12.48±1.5	9–17	0.451
	No	15.52±5.6	5–26		66.17±7.0	51–78		12.17±1.5	9–14	
Source of information	Friends	16.0±4.2	13–19	0.780	72.50±3.5	70–75	0.602	12.50±2.1	11–14	0.613
	Newspapers and magazines	14.00±1.4	13–15		61.0±0.0	61–61		13.0±0.0	13–13	
	Radio and TV	16.66±5.6	5–28		66.17±7.2	45–78		12.68±1.3	9–15	
	Books and university courses	18.12±5.6	5–25		65.28±6.6	51–81		12.03±1.6	9–16	
	Internet	17.52±5.0	3–29		65.65±6.5	48–79		12.46±1.6	9–17	
	Pamphlets and posters	18.25±5.1	12–23		64.00±4.0	58–67		12.50±0.5	12–13	

Note: P<0.05 is taken as the level of statistical significance.

Examining the relationship between the demographic variables and the HIV/AIDS knowledge showed a significant difference only between knowledge and smoking among the medical students. Students with high a HIV/AIDS knowledge smoked less frequently. The results of the present study are consistent with the findings of previous studies in Iran[7] as well as in other countries.[4] The present study found no statistically significant relationship between gender and knowledge, which is consistent with the results of other studies.[30,31] This consistency could be attributed to the fact that both boys and girls have the same access to information sources and education.

A comparison of the mean attitude scores of the medical and non-medical students revealed no significant differences between them in terms of their attitude toward HIV/AIDS. Both groups had the same mean score of attitude toward HIV/AIDS. In addition, although medical students had a good knowledge about HIV/AIDS, they had the same perceptions as the non-medical students toward this disease. Meanwhile, other studies have shown that medical students have a more optimal attitude toward HIV/AIDS. This discrepancy may be attributed to the cultural context of the study population.[8,32] The attitude of medical students is important, because it can lead to social stigma, exclusion, denial, avoidance of care, negligence and distancing from people with HIV/AIDS, which may in turn lead to discrimination in service delivery, poor quality of patient care, and increased treatment costs for these patients. Medical students receive sufficient training and face different cases of this disease throughout their studies, which may provide an opportunity to project a positive attitude toward all patients regardless of the nature of their infection. Non-optimal attitudes can lead to discrimination against HIV/AIDS patients and are the most important barrier to preventing further spread of the virus and providing optimal care and support to the infected people and their families.[31,33] The period of residency is an opportunity for medical students to identify

and correct their negative attitudes that cause discrimination against HIV/AIDS patients.[34] The present study revealed a statistically significant difference between the attitude toward HIV/AIDS and education in the medical students. Nonetheless, as revealed in other studies, there were very low negative attitudes toward HIV/AIDS-infected people, as students and the educated class show a positive attitude toward these people.[17] The present findings are consistent with the results of other studies.[6,35] It can be noted that, as students become more familiar with HIV/AIDS at higher levels of education, they experience a change in their attitudes toward the disease.

The present study also showed that medical and non-medical students had different levels of practice about HIV/AIDS, as the medical students showed better mean practices. Since medical students are more familiar with HIV/AIDS and are also exposed to blood and its products or HIV/AIDS patients due to their work conditions, they are more likely to be at risk of infection. Therefore, medical students are more likely to adhere to safety precautions and prevention guidelines compared to non-medical students.[27,34] The present study also revealed a significant difference between marital status and practice in the medical students. The married medical students felt more responsible, considering their HIV/AIDS knowledge, and showed greater appreciation of loyalty to the family. The present findings are consistent with the results of some other studies as well.[34] This study revealed no significant correlation between knowledge, attitude, and practice and demographic variables among the non-medical students (Table 4). It should be noted that the non-medical students had poorer knowledge, attitude, and practice regarding HIV/AIDS due to the circumstances of their education in non-medical faculties and course types. Furthermore, considering the prevailing cultural conditions of the Iranian society, in which there is no training on STIs at the pre-university level, and since no information on HIV/AIDS and other STIs is provided later in universities either, a large portion of the country's young generation have insufficient knowledge about HIV/AIDS. This inadequate knowledge puts this group at risk of diseases as a result of their unsafe activities during late adolescence, including increased prevalence of high-risk sexual behaviors. Educational materials are therefore recommended to be incorporated into the courses of non-medical students. Weaknesses in spiritual beliefs, poor skills for dealing with sexual emotions, poor training and performance, and the absence of effective interactions in the family are among the main factors leading some young people toward risky behaviors. As such, it is necessary to place a greater emphasis on sexual health education to empower people to discern sexual risks, adopt healthy attitudes toward sex and gender, build self-confidence and the ability to say "no", and gain the ability to analyze sexual issues to control the most important STD targeting young people worldwide.

Concerning the sources of information, the medical students received most of their HIV/AIDS information from university textbooks and courses, while the non-medical students received the bulk of their HIV/AIDS information from the internet and cyberspace. The majority of previous studies on university students' HIV/AIDS knowledge have also confirmed that university textbooks are the best and most important source of information for medical students,[7,34] while the internet and cyberspace are the most important source of information for non-medical students.[11,27,31,36] Nevertheless, academic resources play a very weak role in notifying students about the risk of HIV/AIDS, as only a small percentage of the students stated that they used university textbooks to access information on HIV/AIDS. Students who do not have access to academic medical content may receive wrong and inaccurate information, since the information obtained from other sources is not verified in terms of either quality or quantity. In the meantime, the mass media and cyberspace play a significant role in promoting knowledge and the right attitude toward HIV/AIDS, since the general public, especially young people, have access to the internet throughout most of the day. The limitations of this study included the significant differences in demographic variables between the medical and non-medical groups. One of the strengths of the study was the fact that sampling was carried out in first-class universities of Iran that had all the possible faculties. The lack of control over the effects of the self-report nature of the questionnaires, the students' mental state, and individual differences were the weaknesses of this study. It is recommended that future studies focus more on psychological, social, and cultural factors.

Conclusion

HIV/AIDS imposes a heavy cost on the healthcare system of the country; however, it is among the most preventable chronic diseases; therefore, HIV/AIDS prevention should be one of the major goals of the healthcare system in all countries. Young people are at a greater risk and are more vulnerable due to their conditions and needs at this stage of life. The youth, especially the students, need to increase their knowledge of this disease, particularly regarding transmission routes, control, and prevention. The enhancement of their knowledge enables them to make informed decisions

about their behaviors and avoid risky behaviors. Since one of the most important prevention measures and methods is to increase the level of knowledge, training programs are recommended to be designed based on the needs of the students and offered through mass media, scientific seminars, and group discussions.

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Disclosure

The authors report no conflicts of interest in this work.

References

1. Cunha GH, Galvao MT, Pinheiro PN, Vieira NF. Health literacy for people living with HIV/HIV/AIDS: an integrative review. *Rev Bras Enferm*. 2017;70(1):180–188. doi:10.1590/0034-7167-2015-0052
2. Kimera E, Vindevogel S, De Maeyer J, et al. Challenges and support for quality of life of youths living with HIV/AIDS in schools and larger community in East Africa: a systematic review. *Syst Rev*. 2019;8(1):64. doi:10.1186/s13643-019-0980-1
3. Li Q, Akbari M, Akbari M, et al. Prevalence of HIV/AIDSamong Iranian prisoners: a review article. *BMC Psychiatry*. 2016;8(3):195–206.
4. Ali MHM, Osman OB, Ibrahim MAM, Ahmed WAM. The effect of HIV/AIDS peer health education on knowledge, attitudes, and practices of secondary school students in Khartoum, Sudan. *AIMS Public Health*. 2015;2(4):718–726. doi:10.3934/publichealth.2015.4.718
5. Bandyopadhyay R, Biswas R. Students' perception and attitude on methods of anatomy teaching in a medical college of West Bengal, India. *J Clin Diagn Res*. 2017;11(9):Ac10–ac4. doi:10.7860/JCDR/2017/26112.10666
6. Ali A, Ali NS, Nasir U, et al. Comparison of knowledge and attitudes of medical and dental students towards HIV/AIDS in Pakistan. *Cureus*. 2018;10(4):e2426.
7. Dzah SM, Tarkang EE, Lutala PM. Knowledge, attitudes and practices regarding HIV/AIDSamong senior high school students in Sekondi-Takoradi metropolis, Ghana. *Afr J Prim Health Care Fam Med*. 2019;11(1):e1–e11. doi:10.4102/phcfm.v11i1.1875
8. Mouodi S, Seyedi Andi SJ, Javanian M, et al. Health education still needs the knowledge level and attitude of male students about HIV/HIV/AIDS. *Caspian J Internal Med*. 2014;5(1):54–55.
9. Jafari A, Yazdani R, Khami MR, Mohammadi M, Hajiabdolbaghi M. Effect of an educational course at an iranian dental school on students' knowledge of and attitudes about HIV/HIV/AIDS. *J Dent Educ*. 2012;76(6):792–799.
10. Doda A, Negi G, Gaur DS, Harsh M. Human immunodeficiency virus/acquired immune deficiency syndrome: a survey on the knowledge, attitude, and practice among medical professionals at a tertiary health-care institution in Uttarakhand, India. *Asian J Transfus Sci*. 2018;12(1):21–26. doi:10.4103/ajts.AJTS_147_16
11. Kara WSK, Benedicto M, Mao J. Knowledge, attitude, and practice of contraception methods among female undergraduates in Dodoma, Tanzania. *Cureus*. 2019;11(4):e4362.
12. Suominen T, Laakkonen L, Lioznov D, et al. Russian nursing students' knowledge level and attitudes in the context of human immunodeficiency virus (HIV/HIV/AIDS) - a descriptive study. *BMC Nurs*. 2015;14(1):1. doi:10.1186/s12912-014-0053-7
13. Albrektsson M, Alm L, Tan X, Andersson R. HIV/AIDSawareness, attitudes and risk behavior among university students in Wuhan, China. *Open HIV/AIDS J*. 2009;3:55–62.
14. Menna T, Ali A. Worku A. Prevalence of "HIV/AIDS related" parental death and its association with sexual behavior of secondary school youth in Addis Ababa, Ethiopia: a cross sectional study. *BMC Public Health*. 2014;14:1120. doi:10.1186/1471-2458-14-1120
15. Farahani FK, Shah I, Cleland J, Mohammadi MR. Adolescent males and young females in tehran: differing perspectives, behaviors and needs for reproductive health and implications for gender sensitive interventions. *J Reprod Infertil*. 2012;13(2):101–110.
16. Ellepola AN, Sundaram DB, Jayathilake S, Joseph BK, Sharma PN. Knowledge and attitudes about HIV/AIDSof dental students from Kuwait and Sri Lanka. *J Dent Educ*. 2011;75(4):574–581.
17. Ryalat ST, Sawair FA, Shayyab MH, Amin WM. The knowledge and attitude about HIV/AIDSamong Jordanian dental students: (Clinical versus pre clinical students) at the University of Jordan. *BMC Res Notes*. 2011;4:191. doi:10.1186/1756-0500-4-191
18. Azodo CC, Ehigiator O, Oboro HO, et al. Nigerian dental students' willingness to treat HIV/HIV/AIDS-positive patients. *J Dent Educ*. 2010;74(4):446–452.
19. Alhasawi A, Grover SB, Sadek A, Ashoor I, Alkhabbaz I, Almasri S. Assessing HIV/AIDS knowledge, awareness and attitudes among senior high school students in kuwait. *Med Princ Pract*. 2019;28(5):470–476. doi:10.1159/000500307
20. Kumar R, Goyal A, Singh P, Bhardwaj A, Mittal A, Yadav SS. Knowledge attitude and perception of sex education among school going adolescents in Ambala District, Haryana, India: a Cross-Sectional study. *J Clin Diagn Res*. 2017;11(3):Lc01–lc4.
21. Rukundo A, Muwonge MM, Mugisha D, Aturwanaho D, Kasangaki A, Bbosa GS. Knowledge, attitudes and perceptions of secondary school teenagers towards HIV/AIDSTransmission and prevention in rural and urban areas of Central Uganda. *Health (Irvine Calif)*. 2016;8(10).
22. Nubed CK, Akoachere JTK. Knowledge, attitudes and practices regarding HIV/AIDSamong senior secondary school students in Fako Division, South West Region, Cameroon. *BMC Public Health*. 2016;16(1):847. doi:10.1186/s12889-016-3516-9
23. Al-Rabeei NA, Dallak AM, Al-Awadi FG. Knowledge, attitude and beliefs towards HIV/AIDSamong students of health institutes in Sana'a city. *East Mediterr Health J*. 2012;18(3):221–226. doi:10.26719/2012.18.3.221
24. Farotimi AA, Nwozichi CU, Ojediran TD. Knowledge, attitude, and practice of HIV/HIV/AIDS-related stigma and discrimination reduction among nursing students in southwest Nigeria. *Iran J Nurs Midwifery Res*. 2015;20(6):705–711. doi:10.4103/1735-9066.170011
25. Li R, Dong W, He W, Liu Y. Chinese dental students' knowledge and attitudes toward HIV/HIV/AIDS. *J Dent Sci*. 2016;11(1):72–78. doi:10.1016/j.jds.2015.09.001
26. Kuete M, Huang Q, Rashid A, et al. Differences in knowledge, attitude, and behavior towards HIV/AIDS and sexually transmitted infections between sexually active foreign and Chinese Medical Students. *Biomed Res Int*. 2016;2016:4524862. doi:10.1155/2016/4524862

27. Kaushal P, Singh T, Padda AS, et al. Impact of health education on the knowledge, attitude and practices of teachers regarding reproductive health of adolescents of Amritsar, Punjab. *J Clin Diagn Res*. 2015;9(5):Lc18–21.
28. Hamid Albujeer AN, Shamshiri AR, Taher A. HIV/AIDSawareness among Iraqi medical and dental students. *J Int Soc Prev Community Dent*. 2015;5(5):372–376. doi:10.4103/2231-0762.164788
29. Jahanfar S, Sann LM, Rampal L. *Sexual Behavior, Knowledge and Attitude of Non-Medical University Students Towards HIV/AIDS in Malaysia*. 2010.
30. Singh VP, Osman IS, Rahmat NA, Bakar NAA, Razak N, Nettem S. Knowledge and attitude of dental students towards HIV/AIDS patients in Melaka, Malaysia. *Malays J Med Sci*. 2017;24(3):73–82. doi:10.33883/jms.v20i2.21
31. Lotfipour SM, Ravari A, Akbarinasab J. Attitude and Behavior of nonmedical students towards transmission and prevention of HIV/AIDS in Rafsanjan. *Zahedan J Res Med Sci*. 2014;16(5)83–85.
32. Mutha AS, Mutha SA, Baghel PJ, et al. A knowledge, attitudes and practices survey regarding sex, contraception and sexually transmitted diseases among commerce college students in Mumbai. *J Clin Diagn Res*. 2014;8(8):Hc14–Hc18. doi:10.7860/JCDR/2014/9967.4684
33. Chen M, Liao Y, Liu J, et al. Comparison of sexual knowledge, attitude, and behavior between female Chinese college students from urban areas and rural areas: a hidden challenge for HIV/AIDS control in China. *BioMed Res Int*. 2016;2016:8175921.
34. Mtengezo J, Lee H, Ngoma J, et al. Knowledge and attitudes toward HIV/HIV/AIDS, hepatitis B virus, and hepatitis C virus infection among health-care workers in Malawi. *Biomed Res Int*. 2016;3(4):344–351.
35. Idoko CA, Omotowo B, Anyaka C, et al. Opinion and use of contraceptives among medical students of the University of Nigeria, Enugu campus. *BMC Public Health*. 2018;18(3):637–644. doi:10.1186/s12889-018-5512-8
36. Subbarao NT, Akhilesh A. Knowledge and attitude about sexually transmitted infections other than HIV/AIDSamong college students. *Indian J Sex Transm Dis HIV/AIDS*. 2017;38(1):10–14. doi:10.4103/0253-7184.196888