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Determining and Improving Healthcare Students' Knowledge and Attitudes About HIV/AIDS: A Pretest-Posttest Quasi-Experimental Study

Sağlık Öğrencilerinin HIV/AIDS Konusundaki Bilgi ve Tutumlarının Tespiti ve Geliştirilmesi: Ön Test-Son Test Yarı Deneysel Çalışma

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The study id partially presented as a summary orally in International Health Services Congress in November 21-22, 2023, Toros University, Mersin, Türkiye.

ABSTRACT Objective: This study aimed to assess and enhance the knowledge and attitudes of healthcare students regarding Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS) and, evaluate the impact of educational interventions on these variables. **Material and Methods:** This quasi-experimental study, conducted from January to July 2023, followed a pretest-posttest design, with 126 students enrolled in a university's vocational school of health services Data were collected using a "Personal Information Form" and "the AIDS Knowledge and Attitude Scales". The students received in-person training from expert clinicians and were provided with a brochure designed by researchers. Data were collected at 2 points: before training (pretest) and after training (posttest). **Results:** The HIV/AIDS knowledge and attitude levels of healthcare students participating in the study were found to be at an intermediate level prior to the training, with a statistically significant increase observed in these levels following the training ($p<0.001$). Furthermore, a positive, albeit weak and statistically significant correlation was observed between the knowledge and attitude levels before ($p=0.012$) and after ($p=0.010$) the training. **Conclusion:** These findings highlight the need to improve HIV/AIDS-related knowledge and attitudes among healthcare students. The educational intervention proved to be effective, leading to significant improvements in both domains. Moreover, an increase in knowledge positively affected attitudes.

Keywords: Human immunodeficiency virus; acquired immunodeficiency syndrome; health attitudes; student health service; health education

ÖZET Amaç: Bu çalışmanın amacı, sağlık öğrencilerinin İnsan Bağışıklık Yetmezliği Virüsü [Human Immunodeficiency Virus (HIV)]/ Edinilmiş İmmün Yetersizliği Sendromu [Acquired Immunodeficiency Syndrome (AIDS)] ile ilgili bilgi ve tutumlarını değerlendirmek, geliştirmek ve bu değişkenler üzerindeki eğitsel müdahalelerin etkisini incelemektir. **Gereç ve Yöntemler:** Araştırma, Ocak-Temmuz 2023 tarihleri arasında bir üniversitenin sağlık hizmetleri meslek yüksekokulunda öğrenim gören 126 öğrencinin katılımıyla, ön test-son test yarı deneysel modele göre yürütülmüştür. Veri toplamada "Kişisel Bilgi Formu" ile "AIDS Bilgi ve Tutum Ölçekleri" kullanılmıştır. Öğrencilere uzman klinisyenlerle birlikte yüz yüze eğitim ve araştırmacılar tarafından hazırlanan bilgilendirme broşürü verilmiştir. Veriler eğitim öncesi ön test, eğitim sonrası son test olacak şekilde 2 aşamada toplanmıştır. **Bulgular:** Araştırmaya katılan sağlık öğrencilerinin, HIV/AIDS bilgi ve tutum düzeylerinin eğitim öncesi orta seviyede olduğu ve eğitimden sonra bu düzeylerde istatistiksel olarak anlamlı artış olduğu tespit edilmiştir ($p<0,001$). Ayrıca yapılan korelasyonda bilgi ve tutum düzeyleri arasında, eğitim öncesi ($p=0,012$) ile eğitim sonrasında ($p=0,010$) pozitif yönde, zayıf derecede ve istatistiksel olarak anlamlı ilişki tespit edilmiştir. **Sonuç:** Bu bulgular, sağlık öğrencileri arasında HIV/AIDS ile ilgili bilgi ve tutumların geliştirilmesi gerektiğini vurgulamaktadır. Eğitsel müdahale, her iki alanda da önemli iyileşmelere yol açmış ve bilgi artışının tutumları olumlu yönde etkilediği görülmüştür.

Anahtar Kelimeler: İnsan bağışıklık yetmezliği virüsü; edinilmiş immün yetmezlik sendromu; sağlık tutumları; öğrenci sağlık hizmetleri; sağlık eğitimi

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Human Immunodeficiency Virus (HIV), first identified in 1981, is a pathogen that weakens the immune system and leads to opportunistic infections and malignancies.[1] As the disease with HIV as the causative agent, which was first described in immigrants coming to the USA, did not resemble the diseases described in the literature, this new disease was defined as Acquired Immunodeficiency Syndrome (AIDS).[2] Despite the estimated 41 million diagnosed cases worldwide, the disease claimed the lives of 650,000 individuals in 2021 alone.[3] In Türkiye, a total of 30,293 individuals diagnosed with HIV and 2,083 patients diagnosed with AIDS were identified from 1985, the year in which the first case was reported, until December 31, 2021. Of these, 45.6% were estimated to have been transmitted through sexual intercourse.[4] Despite the clinical efficacy of antiretroviral therapy (ART), a cure for HIV infection remains elusive.[5]

Since treatment is not available for this disease, preventing its spread is considered the most important factor. The highest-risk groups include homeless individuals, those who receive blood and blood products, individuals who engage in risky sexual behaviors, substance users, and healthcare workers.[6] Students who will be participating in health services are of critical importance due to their role in protecting themselves and others from contagion. They are also instrumental in preventing the spread of disease within the hospital environment, providing treatment and rehabilitation, and educating patients on their condition and treatment plan.[7,8]

The opinions, knowledge, and attitudes of healthcare professionals have a significant influence on the opinions and health-related behaviors of individuals. A considerable body of research has been conducted to examine the attitudes of healthcare professionals towards patients with HIV/AIDS.[8-12] It has been observed that lack of knowledge about HIV/AIDS has a negative impact both on how patients are care and on the attitudes towards them and their families. Consequently, most studies have suggested that healthcare professionals should be trained in this subject. Concurrently, studies have demonstrated that education can effectively diminish stigma among healthcare professionals.[11,12]

This study aimed to determine the knowledge and attitudes of university healthcare students who will become future health workers regarding HIV/AIDS. Also this study sought to determine whether there was an increase in knowledge and attitudes following training, and to ascertain whether there was a correlation between knowledge and attitudes.

STUDY QUESTIONS

What is the current level of knowledge and attitude of students in healthcare about HIV/AIDS?

Will education about HIV/AIDS affect the current level of knowledge and attitude of students in healthcare?

Is there a relationship between the current level of knowledge and attitude of students in the healthcare regarding HIV/AIDS?

MATERIAL AND METHODS

STUDY DESIGN

The study was a pretest/posttest, one-group, quasi-experimental, and correlational. The study was conducted between January and July 2023 with students from a university's vocational school of health services.

The study population consisted of university students and aimed to reach the whole population in the sample selection. Inclusion criteria required participants to be over 18 years old, willing to participate, and attend training. Students who did not answer all the questions completely and those who had a communication disability were excluded. The final sample comprised 126 students who met the inclusion criteria to get included. The Strengthening the Reporting of Observational Studies in Epidemiology guidelines were followed in the reporting system for this study.

DATA COLLECTION TOOLS

The "Personal Information Form" and "AIDS Knowledge and Attitude Scales" were used to collect data for the study.

Personal Information Form: This instrument, developed by the researcher based on a comprehen-

sive review of pertinent literature, consisted of 11 items. The questionnaire addressed sociodemographic characteristics of the participants, including age, gender, geographical region of residence, and income level. Also, The personal information form included questions that were not included in the AIDS knowledge and attitude scale. To assess their sexuality-related characteristics, the instrument inquired about participants' history of sexual experience, condom use during initial sexual experience, frequency of condom utilization, history of sexually transmitted diseases testing, and history of HIV/AIDS testing. Furthermore, the questionnaire elicited information regarding sexually transmitted diseases with which the participants were familiar and the sources from which they acquired this knowledge.[1,7,13,14]

AIDS Knowledge and Attitude Scales: The AIDS Knowledge Scale is used to measure the level of knowledge about AIDS. The knowledge scale consisted of 3 sub-dimensions: routes of transmission (7 items), prevention and general knowledge (9 items), and treatment (5 items). The knowledge scale has 21 items. In the knowledge scale, participants were asked to choose one of the options "true". "undecided" and "false" for each item. The correct option receives "1 point", while the incorrect and undecided options receive "0 points." For reverse items, the scoring was also reversed, with the correct and undecided options receiving "0" points and the incorrect option receiving "1" point. The scores obtained from the knowledge scale range from 0 to 21, with higher scores indicating a higher level of knowledge. To determine the reliability of the knowledge scale, the Kuder-Richardson-20 (KR-20) coefficient was calculated and the overall reliability was found to be 0.76. The KR-20 coefficient of the first factor of the knowledge scale, transmission routes, was found to be 0.85, the second factor, general knowledge and prevention, was found to be 0.62, and the third factor, treatment knowledge, was found to be 0.63.[1] In this study, the Cronbach's Alpha coefficient of the AIDS knowledge scale was 0.80.

The AIDS Attitude Scale was designed to determine situations related to personal interaction with a person with AIDS, the way they behave toward a person with AIDS, and how they would behave in this situation if they were AIDS-positive. The attitude scale consists of 2 sub-dimensions: negative attitudes towards contact with people with AIDS (12 items) and stigma (5 items). The Attitude Scale contains 17 items. On the attitude scale, participants rated on a 5-point Likert scale and responded according to the options "strongly agree", "agree", "no opinion", "disagree", and "strongly disagree". The categories listed were scored as "1, 2, 3, 4, 5" and the scoring of statements indicating negative attitudes was reversed. The scores obtained from the attitude scale vary between 17 and 85, with higher scores indicating more positive attitudes. Cronbach's Alpha was calculated to determine the internal consistency of the attitude scale. The overall reliability of the attitude scale was found to be 0.90. The reliability of the negative attitude factor of the attitude scale towards people with AIDS was found to be 0.91 and the reliability of the stigma factor was found to be 0.75.[1] In this study, the Cronbach's Alpha coefficient of the AIDS knowledge scale was 0.81.

DATA COLLECTION

After obtaining research-related approval, the experts who participated in the training were identified, and the training date was scheduled. After necessary correspondence with clinicians who were experts in their field, the training topics were determined through a meeting. Invitations to attend the training were sent to all the students via social media and communication tools. The training was held in the university conference room. Data were collected by the researcher by distributing the prepared forms to the students and giving them the necessary time to complete them. Before the training, a personal information form and AIDS knowledge and attitude scales were administered. Then, the students were given face-to-face training with expert clinicians ("Infectious Diseases and Clinical Microbiology Physician", "Non-Governmental Organizations Voluntary Testing and Counseling Center Officer", and "Obstetrics and Gynecology Nurse") and an information booklet prepared by the researchers. The training used audio-visual training techniques and lasted approximately 3 hours. Immediately after training, the AIDS Knowledge and Attitude Scale was re-administered.

Content of the Training: Topics include "What is HIV/AIDS: Definition, differences and development of HIV and AIDS", "History of HIV/AIDS: History and global impact of HIV/AIDS", "Mode of Transmission: Information on how HIV can and cannot be transmitted", "Symptoms and Diagnosis: Early and late symptoms of HIV/AIDS, diagnostic methods", "Treatments: Available treatment options, ART and how the drugs work", "Prevention Strategies: Safe Sex, Condom Use, Prevention Techniques and the Importance of HIV Testing", "Social and Psychological Impact: The impact of HIV/AIDS on individuals and communities, dealing with stigma and discrimination".

STATISTICAL ANALYSIS OF DATA

Data analysis was conducted using the SPSS 24.0 (IBM, Armonk, NY, USA) software. For normally distributed data, the Paired Sample t-test (t-table value) was employed to compare 2 dependent groups. For non-normally distributed data, the Wilcoxon signed rank test (Z-score) was utilized for 2 dependent groups. Spearman's correlation coefficient was applied to assess the relationship between two quantitative variables without normal distribution. A p value of <0.05 was deemed statistically significant.

ETHICAL ASPECTS OF THE STUDY

Permission for the study was secured from the researcher who created the AIDS Knowledge and Attitude Scales. The university where the research took place, along with its Ethics Committee for Non-Interventional Clinical Research (date: January 24, 2023, no: 4), granted the necessary approvals. The study adhered to the principles of the Declaration of Helsinki. Additionally, verbal and written informed consent was obtained from students who agreed to participate, ensuring they were aware of their right to withdraw at any time and that their personal information would remain confidential.

RESULTS

The mean age of the participants was 21.13±4.56 years, with 73 (57.9%) aged ≤20 years. Among the total participants, 94 (74.6%) were female, 80 (63.5%) grew up in the city, and 65 (51.6%) reported having a middle income level (Table 1).

In terms of sexual experience, 101 participants (80.2%) reported that they had never engaged in sexual experience, while 25 (19.8%) indicated that they had. Among those who had engaged in sexual experience, 14 (56%) reported the use of a condom during their initial sexual experience. However, 4 (16%) of the participants with sexual experience reported never using a condom, while 9 (36%) indicated infrequent condom use. Among these participants, 17 (68%) had never undergone testing for sexually transmitted diseases, and 19 (76%) had never undergone testing for HIV/AIDS. The majority of participants (117 respondents, 92.9%) were most familiar with HIV as a sexually transmitted disease. Furthermore, 59 participants (46.8%) indicated that they had obtained information about HIV/AIDS from the internet, 57 participants (45.2%) from conferences, and 56 participants (44.4%) from school education (Table 2).

The distribution and percentages of responses to the AIDS Knowledge and Attitude Scale questions in the pretest and posttest are presented in Table 3.

The distribution of pretest and posttest scores for the AIDS Knowledge and Attitude Scale is provided in Table 4. There was a statistically significant difference between the pretest and posttest knowledge

TABLE 1: Distribution of sociodemographic characteristics related to the study.

Variable (n=126)	n	%
Age [$\bar{X}$±SD→21.13±4.56 (year)]		
≤20	73	57.9
>20	53	42.1
Gender		
Female	94	74.6
Male	32	25.4
Region of residence		
Countryside-village	9	7.1
City	80	63.5
Metropolitan	37	29.4
Income level		
Low (Income is less than expenses)	28	22.2
Middle (Income is equal to expenses)	65	51.6
High (Income is greater than expenses)	33	26.2

SD: Standard deviaton.

TABLE 2: Distribution of sexuality-related characteristics and knowledge of sexually transmitted diseases.

Variable (n=126)	n	%
History of sexual experience		
Yes	25	19.8
No	101	80.2
Condom use during initial sexual experience (n=25)		
Yes	14	56.0
No	11	44.0
Frequency of condom utilization (n=25)		
Nothing	4	16.0
Rarely	9	36.0
Sometimes	5	20.0
Mostly	5	20.0
Always	2	8.0
History of sexually transmitted diseases testing (n=25)		
Yes	8	32.0
No	17	68.0
History of HIV/AIDS testing (n=25)		
Yes	6	24.0
No	19	76.0
The knowledged sexually transmitted diseases*		
Chlamydia	13	10.3
HIV	117	92.9
Fungal infections	44	34.9
Gonorrhoea	16	12.7
Syphilis	24	19.0
Candida	4	3.2
Hepatitis B	65	51.6
Wart	66	52.4
Where knowledged about HIV-AIDS is received*		
TV	43	34.1
Conference	57	45.2
Series/film	30	23.8
Magazine	9	7.1
Radio	1	0.8
Family	10	7.9
Friend	28	22.2
Internet	59	46.8
Book	15	11.9
Poster	5	4.0
Brochure	13	10.3
Newspaper	11	8.7
School	56	44.4
Health programmes broadcast on TV	28	22.2
Health personnel	27	21.4

*More than one answer was given to the question and percentages were determined on a row basis according to the total number of samples. SD: Standard deviation.

scores (Z=-6.103; p<0.001), with posttest scores significantly higher than pretest scores. Similarly, there was a significant improvement in attitude scores after the training (t=-3.712; p<0.001), with posttest attitude scores being higher than those from the pretest (Table 4).

Furthermore, a positive, though weak, statistically significant relationship was found between pretest knowledge and pretest attitude scores (r=0.224; p=0.012). This correlation persisted after the intervention, as posttest knowledge scores were positively correlated with posttest attitude scores (r=0.228; p=0.010), indicating that increased knowledge was associated with more positive attitudes towards HIV/AIDS (Table 5).

DISCUSSION

Adolescence is a time for learning, where making healthy choices is crucial, particularly during the first sexual experience. Condom use at first intercourse is vital for young people, as it reduces the risk of sexually transmitted infections and promotes safer sexual practices.[2,7] In this study, the rate of condom use at the first sexual experience was found to be 56%. In a study conducted by Sayar and Yarar, the rate of condom use during the first sexual intercourse was 73.01%, while in a study conducted by Bakır and Beji, it was 61.8%.[13,14] This behavior may be related to protection from sexually transmitted diseases and unwanted pregnancy.

When analyzing students' knowledge of sexually transmitted diseases, HIV/AIDS was the most commonly known disease (92.9%). However, similar studies in the literature reported lower rates of HIV/AIDS awareness (48.7% and 38.5%).[13,15] In this study, the primary sources of information about sexually transmitted diseases were the Internet (46.8%), conferences (45.2%), and school education (45.2%). These findings may reflect young people's frequent use of online resources and their ongoing engagement with formal education. In a study by Tu et al. in China, 41.5% of students believed sexual health education should begin in middle school, 56.8% in university, and 57.2% suggested increasing the intensity of sex education in schools.[16] Despite high awareness of HIV/AIDS in this study, the rate of HIV testing among students was found to be low (26%). HIV testing, particularly during adolescence, is a critical step

TABLE 3: Distribution of pretest and posttest results of AIDS Knowledge and Attitude Scale .

	Pretest n/(%)			Posttest n/%		
AIDS Knowledge Scale (n=126)	**Correct**	**Undecided**	**Incorrect**	**Correct**	**Undecided**	**Incorrect**
1. AIDS can be slowed down with medication.	71 (56.3%)	46 (36.5%)	9 (7.2%)	95 (75.4%)	23 (18.3%)	8 (6.3%)
2. Avoiding one-night stands helps prevent AIDS.	72 (57.1%)	28 (22.2%)	26 (20.7%)	86 (68.3%)	23 (18.3%)	17 (13.4%)
3. Knowing your partner well helps prevent AIDS.	76 (60.3%)	22 (17.5%)	28 (22.2%)	93 (73.8%)	17 (13.5%)	16 (12.7%)
4. Sharing a plate with an AIDS patient can transmit the disease.	27 (21.4%)	23 (18.3%)	76 (60.3%)	21 (16.7%)	10 (7.9%)	95 (75.4%)
5. Sharing personal items (teacups. towels. clothes. etc.) with an AIDS patient can transmit the disease.	37 (29.4%)	29 (23.0%)	60 (47.6%)	25 (19.8%)	10 (7.9%)	91 (72.3%)
6. AIDS can be transmitted to a baby during pregnancy.	63 (50.0%)	38 (30.2%)	25 (19.8%)	107 (84.9%)	8 (6.3%)	11 (8.8%)
7. Swimming in the same pool as an AIDS patient can transmit the disease.	27 (21.4%)	35 (27.8%)	64 (50.8%)	18 (14.3%)	21 (16.7%)	87 (69.0%)
8. AIDS destroys the immune system.	65 (51.6%)	41 (32.5%)	20 (15.9%)	82 (65.1%)	26 (20.6%)	18 (14.3%)
9. Healthy eating helps prevent AIDS.	40 (31.7%)	33 (26.2%)	53 (42.1%)	34 (27.0%)	36 (28.6%)	56 (44.4%)
10. Kissing an AIDS patient can transmit the disease.	41 (32.5%)	31 (24.6%)	54 (42.9%)	33 (26.2%)	21 (16.7%)	72 (57.1%)
11. There are drugs used in the treatment of AIDS.	75 (59.5%)	41 (32.5%)	10 (8.0%)	93 (73.8%)	17 (13.5%)	16 (12.7%)
12. Coughing by an AIDS patient can transmit the disease.	28 (22.2%)	34 (27.0%)	64 (50.8%)	19 (15.1%)	19 (15.1%)	88 (69.8%)
13. Kissing someone with AIDS can transmit the disease.	43 (34.1%)	36 (28.6%)	47 (37.3%)	27 (21.4%)	22 (17.5%)	77 (61.1%)
14. There is a vaccine for AIDS.	39 (31.0%)	41 (32.5%)	46 (36.5%)	38 (30.2%)	41 (32.5%)	47 (37.3%)
15. Not treating AIDS can lead to infertility.	39 (31.0%)	52 (41.2%)	35 (27.8%)	29 (23.0%)	43 (34.1%)	54 (42.9%)
16. Regular exercise can prevent AIDS.	24 (19.0%)	42 (33.4%)	60 (47.6%)	23 (18.2%)	35 (27.8%)	68 (54.0%)
17. Using the same toilet as an AIDS patient can transmit the disease.	45 (35.7%)	37 (29.4%)	44 (34.9%)	24 (19.0%)	20 (15.9%)	82 (65.1%)
18. Monogamy helps prevent AIDS.	81 (64.3%)	31 (24.6%)	14 (11.1%)	85 (67.5%)	23 (18.2%)	18 (14.3%)
19. A highly stressful life can lead to AIDS.	28 (22.2%)	37 (29.4%)	61 (48.4%)	19 (15.1%)	37 (29.3%)	70 (55.6%)
20. Using condoms helps prevent AIDS.	83 (65.9%)	32 (25.4%)	11 (8.7%)	96 (76.2%)	23 (18.3%)	7 (5.5%)
21. AIDS can be transmitted through unclean tattoo tools.	68 (54.0%)	34 (27.0%)	24 (19.0%)	88 (69.8%)	15 (11.9%)	23 (18.3%)

TABLE 3: Distribution of pretest and posttest results of AIDS Knowledge and Attitude Scale *(contunied)*.

	Pretest n/(%)					Posttest n/(%)				
AIDS Attitude Scale (n=126)	**Not agree at all**	**Disagree**	**No opinion**	**I agree**	**Totally agree**	**Not agree at all**	**Disagree**	**No opinion**	**I agree**	**Totally agree**
1. If I had AIDS. I would hide it from my friends.	49 (38.9%)	28 (22.2%)	27 (21.4%)	13 (10.3%)	9 (7.2%)	68 (54.0%)	26 (20.6%)	17 (13.5%)	10 (7.9%)	5 (4.0%)
2. I would live in the same house with someone who has AIDS.	38 (30.1%)	24 (19.0%)	36 (28.6%)	23 (18.3%)	5 (4.0%)	26 (20.7%)	24 (19.0%)	31 (24.6%)	34 (27.0%)	10 (7.9%)
3. I would marry someone with AIDS.	51 (%40.5)	26 (%20.6)	34 (%27.0)	9 (%7.1)	6 (%4.8)	39 (%31.0)	25 (%19.8)	38 (%30.2)	14 (%11.1)	10 (%7.9)
4. I would oppose my child marrying someone with AIDS.	21 (16.7%)	19 (15.1%)	35 (27.8%)	28 (22.2%)	23 (18.2%)	29 (23.0%)	20 (15.9%)	36 (28.6%)	24 (19.0%)	17 (13.5%)
5. If my partner told me they had AIDS. I would break up with them.	27 (21.5%)	25 (19.8%)	51 (40.5%)	12 (9.5%)	11 (8.7%)	40 (31.7%)	19 (15.1%)	39 (31.0%)	15 (11.9%)	13 (10.3%)
6. I would prefer to stay away from someone who has AIDS.	30 (23.8%)	25 (19.8%)	32 (25.49%)	23 (18.3%)	16 (12.7%)	41 (32.5%)	34 (27.0%)	18 (14.3%)	17 (13.5%)	16 (12.7%)
7. Working with someone who has AIDS would bother me.	37 (29.4%)	27 (21.4%)	31 (24.6%)	19 (15.1%)	12 (9.5%)	51 (40.5%)	32 (25.4%)	19 (15.1%)	13 (10.3%)	11 (8.7%)
8. I would not want to work in the same workplace as someone with AIDS.	40 (31.8%)	27 (21.4%)	33 (26.2%)	13 (10.3%)	13 (10.3%)	52 (41.3%)	31 (24.6%)	23 (18.3%)	9 (7.1%)	11 (8.7%)
9. If a friend of mine had AIDS. I would distance myself from them.	42 (33.4%)	29 (23.0%)	36 (28.6%)	8 (6.3%)	11 (8.7%)	48 (38.2%)	40 (31.7%)	19 (15.1%)	8 (6.3%)	11 (8.7%)
10. If I were an employer. I would hire someone with AIDS.	15 (11.9%)	25 (19.8%)	35 (27.8%)	28 (22.2%)	23 (18.3%)	23 (18.3%)	16 (12.7%)	30 (23.8%)	27 (21.4%)	30 (23.8%)
11. I would date someone who has AIDS.	27 (21.5%)	28 (22.2%)	50 (39.7%)	9 (7.1%)	12 (9.5%)	27 (21.4%)	24 (19.0%)	45 (35.8%)	17 (13.5%)	13 (10.3%)
12. I would be ashamed to go to a doctor for an AIDS test.	53 (42.1%)	30 (23.8%)	21 (16.7%)	11 (8.7%)	11 (8.7%)	64 (50.8%)	29 (23.0%)	21 (16.6%)	5 (4.0%)	7 (5.6%)
13. Being diagnosed with AIDS is something to be ashamed of.	65 (51.6%)	29 (23.0%)	19 (15.1%)	4 (3.2%)	9 (7.1%)	68 (54.0%)	27 (21.4%)	15 (11.9%)	7 (5.6%)	9 (7.1%)
14. I would feel comfortable being around someone with AIDS.	21 (16.7%)	33 (26.2%)	40 (31.7%)	20 (15.9%)	12 (9.5%)	26 (20.6%)	24 (19.0%)	29 (23.0%)	28 (22.2%)	19 (15.2%)
15. If I got an AIDS test. I would hide it from my friends.	45 (35.8%)	29 (23.0%)	35 (27.8%)	9 (7.1%)	8 (6.3%)	48 (38.1%)	32 (25.4%)	27 (21.4%)	12 (9.5%)	7 (5.6%)
16. Social contact with AIDS patients is dangerous.	34 (27.0%)	26 (20.6%)	25 (19.9%)	26 (20.6%)	15 (11.9%)	40 (31.7%)	34 (27.0%)	23 (18.3%)	17 (13.5%)	12 (9.5%)
17. If a family member of mine had AIDS. I would feel ashamed.	64 (50.8%)	28 (22.2%)	19 (15.1%)	8 (6.3%)	7 (5.6%)	67 (53.2%)	26 (20.6%)	23 (18.2%)	3 (2.4%)	7 (5.6%)

TABLE 4: Comparison of pretest and posttest scores on the AIDS Knowledge and Attitude Scale.

	AIDS Knowledge and Attitude Scale			
	Knowledge scores		Attitude scores	
Variable	X̄±SD	Median [minimum-maximum]	X̄±SD	Median [minimum-maximum]
Pretest	10.46±4.70	11.0 [0.0-21.0]	56.07±10.63	55,5 [29.0-85.0]
Posttest	13.59±4.74	15.0 [0.0-21.0]	59.58±11.39	58.5 [22.0-81.0]
Statistical analysis*	Z=-6.103		t=-3.712	
Probability	**p<0.001**		**p<0.001**	

*Paired Sample-t test (t-table value) statistics were used to compare the measurement values of two dependent groups in data with normal distribution. "Wilcoxon" test (Z-table value) statistics were used to compare the measurement values of two dependent groups in data that do not have normal distribution. SD: Standard deviation.

TABLE 5: Correlation of pretest and posttest scores on the AIDS Knowledge and Attitude Scale.

	AIDS Knowledge and Attitude Scale	
	Pretest	Posttest
Correlation*	Knowledge Scores	Knowledge Scores
Attitude scores	r=0.224	r=0.228
	p=0.012	**p=0.010**

*Spearman correlation coefficient.

toward responsible health behavior and is recommended to prevent the spread of sexually transmitted diseases.[4,17] Therefore, increasing awareness and encouraging HIV testing among young people is essential.

The posttest HIV/AIDS knowledge scores of the students in this study were significantly higher than their pretest scores, indicating the effectiveness of the education provided. Similarly, a randomized controlled trial conducted in Shanghai reported increased knowledge among individuals who received education on sexually transmitted diseases.[18] A study in the Czech Republic also found a 15.5% increase in students' knowledge levels after training.[19] Chi et al. demonstrated a significant improvement in sexual health knowledge including reproductive health, birth control, condom use, and HIV/AIDS following sexual education.[20] It is well established that a lack of knowledge can lead to negative emotions, such as fear of the unknown, and foster incorrect attitudes. Therefore, it is crucial for health students to be informed about diseases they are at risk of transmitting. Many studies highlight the importance of education in improving knowledge and enhancing disease prevention efforts.[21,22]

The posttest HIV/AIDS attitude scores of the students were significantly higher than the pretest scores, indicating that the education provided led to positive changes in attitudes. This study also found a positive correlation between HIV/AIDS knowledge and attitude scores, showing that increased knowledge resulted in more positive attitudes. A similar study reported that a sexual education program for university students effectively promoted positive sexual attitudes.[20] In a meta-analysis by Körük et al. it was found that protective behaviors against sexually transmitted diseases were directly proportional to knowledge levels, with an increase in knowledge leading to significant changes in attitudes and behaviors.[23] Ribeiro et al. highlighted the issue of HIV/AIDS related stigma, stressing the importance of evaluating health students' attitudes during the educational process.[24] Additionally, a systematic review by Sekoni et al. found that training for health students and professionals resulted in short-term improvements in knowledge, attitudes, and practices regarding the health needs of lesbian, gay, bisexual, and transgender individuals.[25]

In a study conducted by Mohsen et al. among medical students, it was concluded that the group of students who had sufficient knowledge did not have negative attitudes towards HIV/AIDS.[26] Contrary to the results of this study, there are also a few studies that show no change in attitudes when knowledge levels increased.[27,28] However, data in the literature suggest that knowledge about HIV/AIDS increases

with the provision of sexual education to students, that protective behaviors improve with the removal of fears caused by misinformation, and that health students may develop more positive behaviors toward people with the disease whom they will frequently encounter in the workplace.[29-31]

LIMITATIONS

The limitation of the study is that the research was conducted only on the students of the vocational school of health services. This research can only be generalized to the students within the scope of the research.

CONCLUSION

This study emphasizes the importance of increasing awareness about HIV/AIDS, a sexually transmitted disease, among university students. Accurate information about HIV/AIDS is crucial for preventing its spread and supporting those affected. The study found that students' knowledge and attitudes towards HIV/AIDS improved significantly after the provided training, with the increase in knowledge positively influencing their attitudes. Based on these findings, it is recommended that sexual health education, particularly regarding HIV/AIDS, be integrated into the curriculum for health students, and that seminars and conferences on the topic be expanded.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

All authors contributed equally while this study preparing.

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