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The relationship between HIV/AIDS knowledge level and sexual risk-taking behavior among university students in Turkey

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Abstract

Introduction: Although risky sexual behavior is a common problem among university students, they present low level of knowledge about human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS). The aim of this descriptive study was to determine the relationship between university students' level of knowledge about HIV/AIDS and their sexual risk-taking behavior.

Material and methods: The study included 501 university students. Data were collected with a questionnaire developed by the researchers, in line with the literature, using sexual risk-taking scale and HIV Knowledge Questionnaire. Data were analyzed with SPSS for Windows 25.0 software. Descriptive analyses (number, percentage, mean, and standard deviation) and Kruskal-Wallis, Mann-Whitney-*U*, and hierarchical regression test methods were employed to compare quantitative data in non-normally distributed scales. Correlation analysis was used to assess the relationship between continuous variables.

Results: According to the results of our study, the mean score of sexual risk-taking behavior of female students was significantly lower than that of male students ($p < 0.05$). Being male and having sexual experience explained approximately 58% of the variance in sexual risk-taking behavior. It was found that level of knowledge about HIV predicted sexual risk-taking behavior in a statistically significant way (R^2 = 59%). There was a positive relationship between gender and sexual risk-taking behavior at a moderate level (0.487), a strong positive relationship between sexual experience and sexual risk-taking behavior (0.737), and a weak positive relationship between HIV knowledge level and sexual risk-taking behavior (0.175) ($p < 0.05$).

Conclusions: According to the results of our study, it was determined that the mean scores of sexual risk-taking behavior of male students and students with previous sexual experience, were higher than those of students without sexual experience. It was shown that there was no relationship between gender and HIV/AIDS knowledge level. Although the students had a high level of HIV/AIDS knowledge, it did not reflect in their attitudes and behaviors sufficiently while engaging in sexual risk-taking behaviors.

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Key words: HIV/AIDS knowledge level, risky sexual behavior, university student, sexuality.

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Introduction

Sexually transmitted diseases (STDs) affect individuals of all ages, especially young people. Biological, behavioral, and social factors make adolescents and young adults vulnerable to STDs. Hormonal changes in this period lead to the emergence of risky sexual behaviors, such as experiencing sexuality in early period, having multiple sexual partners, unintended pregnancies, and planned abortions, which can all result in getting infected with STDs and health problems, which may even lead to death [1-4].

Human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) are sexually transmitted diseases and public health problem that threaten the entire world. Currently, it has been reported that approximately 37.7 million people in the world are infected with HIV, 1.5 million people contracted HIV, and 680 thousand people died due to AIDS in 2020 (UNAIDS, 2020) [5]. In Turkey, 26,447 HIV and 1,974 AIDS cases were reported between 1985 and 2021, with 18.95% of females and 81.5% of males [6]. Adolescence is a period where sexual behaviors are acquired and shaped, with sexual health problems becoming apparent [4]. Especially in this period, unprotected sexual intercourse, high sexual risk-taking behavior, changes in sexual behavior, insufficient or incorrect information about protection from STDs, and the lack of institutions educating young people, make it difficult to prevent diseases, such as HIV and AIDS [1, 2, 7-9]. Studies have shown that the level of knowledge among young people about HIV/AIDS is not sufficient [10-12]. In Turkey, a significant part of studies on the subject focused only on measuring the HIV/AIDS knowledge level in certain groups, while the relationship between this knowledge level and sexual risk-taking behavior was not taken into account [11]. Research examining the relationship between HIV/AIDS knowledge levels and sexual risk-taking behavior are limited. Therefore, this study aimed to evaluate the relationship between the level of knowledge about HIV/AIDS and sexual risk-taking behavior among university students.

Material and methods

Population and sample

Population of this descriptive study consisted of university students in Turkey. In order to determine the sample size, a power analysis was performed by considering studies evaluating HIV/AIDS knowledge and attitudes of university students; the power of the study was measured using G*Power (v. 3.1.7) program. Sample size was calculated with a 95% confidence interval, and the minimum number of participants was considered as 384. To increase the study's power, it was desired to reach more students, and a total of 501 students who agreed to participate by snowball sampling method constituted the sample of the study. Survey data were collected online using Google Forms, in which participants were required to answer every question of the survey in order to prevent data loss.

Inclusion criteria

Students over the age of 18 years, studying at university, fluent in Turkish, and volunteering to participate in the study regardless of gender, were included in the study.

Intervention and measurements

Measurements

Data were collected using descriptive information form, HIV knowledge questionnaire, and sexual risk-taking behavior scale. Due to the COVID-19 pandemic, data were gathered online using Google Forms between September and December 2021. Data collection tools were sent to the students via e-mail, WhatsApp, and other social networks.

Descriptive information form

This form was created by the researchers in line with the literature, and consisted of questions on socio-demographic characteristics of students, their level of knowledge about sexuality, ways of obtaining information, their sexual experience, and methods of protection [1-4, 7-12].

Sexual risk-taking scale (SRTS)

This scale was developed by Stulhofer *et al.* [13] and adapted into Turkish by Kıylıoğlu [14]. It contains a total of 10 items aiming to collect information about risky sexual behaviors experienced in the last 12 months and throughout their life. The Cronbach's α coefficient of the scale was reported to be 0.68. In this scale, five items are "Yes/No" questions, two items are answered as fill-in-the-blank, two items as 3-point Likert's scale, and one item as 4-point Likert's scale. Score of the scale ranges between 0 and 10, and higher scores indicating taking more sexual risks [14]. In our study, the alpha internal consistency coefficient value was determined as 0.684.

HIV/AIDS Knowledge Questionnaire

This scale was developed by Carey and Schroder [15] and adapted into Turkish by Bulduk [16]. It consists of 18 items, with answers "Yes", "No", and "I don't know": "Yes" = 1 score, "No" = 0, and "I don't know" = 0. The Cronbach's α coefficient of the scale was reported to be 0.85. The total score ranges from 0 to 18, with a high score indicating a higher level of AIDS knowledge [16]. In our study, the alpha internal consistency coefficient was agreed as 0.703.

Data analysis

Research data were analyzed using SPSS (Statistical Package for Social Sciences) program for Windows ver-

sion 25.0. Descriptive analyzes, such as number, percentage, mean, and standard deviation, were employed in data reliability analysis to assess consistency of the scales. It was observed that Likert's scales used in the questionnaire did not have a normal distribution, for which non-parametric tests were used for statistical analyzes. Kruskal-Wallis, Mann-Whitney-*U*, and hierarchical regression test methods were employed to compare quantitative data in non-normally distributed scales. Correlation analysis was applied to test the relationship between continuous variables, with significance set at $p < 0.05$.

Results

The mean score of SRTS among female students was lower than that of male students ($p < 0.05$). However, no significant difference was found in the mean score of HIV knowledge level regarding gender ($p > 0.05$). According to the type of graduated high school, students who graduated from a regular high school (11%) had higher SRTS mean scores than those of other high school types ($p < 0.05$), while it was found that students who graduated from health vocational high schools (20.6%) had higher AIDS knowledge levels compared with those of other high school types ($p < 0.05$) (Table 1).

In addition, the mean SRTS scores (2.08 ± 1.66) and HIV knowledge level mean score (5.80 ± 2.76) of students who stated that the first sexual intercourse should be experienced with someone special, were found to be higher ($p < 0.05$). The SRTS (3.34 ± 1.57) and HIV knowledge level mean scores (5.31 ± 2.64) of students with sexual experience were found to be higher than in those who never experienced sexual intercourse ($p < 0.05$). The SRTS score (4.36 ± 1.77) and HIV Knowledge Questionnaire mean score of students with sexual experience under the age of 18 years were found higher ($p < 0.05$). It was determined that the mean score of sexual risk-taking behavior and HIV knowledge level was higher in those who did not use contraceptives during their sexual experiences ($p < 0.05$) (Table 2). Moreover, there was a moderate positive (0.487) relationship between gender and sexual

Table 1. Comparison of students' demographic characteristics with HIV Knowledge Questionnaire and sexual risk-taking scale (SRTS)

Socio-demographic characteristics	*n*	%	SRTS $\overline{X}$ ± SD	HIV Knowledge Questionnaire $\overline{X}$ ± SD
Gender				
Female	411	82.0	1.13 ± 0.51	4.43 ± 2.69
Male	90	78.0	2.48 ± 1.91	4.82 ± 3.11
Test			$U = -8.414$, $p = 0.000$	$U = -0.931$, $p = 0.352$
Type of graduated high school				
Medical vocational high school[1]	103	20.6	1.53 ± 1.27	5.36 ± 2.27
Regular high school[2]	55	11.0	1.92 ± 1.66	4.30 ± 3.37
Anatolian/science high school[3]	264	52.7	1.23 ± 0.76	4.35 ± 2.67
Religious vocational high school[4]	37	7.4	1.24 ± 1.21	4.21 ± 3.24
Vocational high school[5]	42	8.4	1.28 ± 0.77	3.83 ± 2.87
Test			KW = 16.286, $p = 0.003$	KW = 16.041, $p = 0.003$
Post hoc test/Tamhane			2 > 1, $p = 0.037$	1 > 2, $p = 0.004$ 1 > 5, $p = 0.030$
Family income				
Income lesser than expenses[1]	141	28.1	1.33 ± 1.06	3.93 ± 2.90
Income equivalent to expenses[2]	299	59.7	1.37 ± 1.02	4.73 ± 2.63
Income higher than expenses[2]	61	12.2	1.50 ± 1.27	4.68 ± 2.97
Test			KW = 1.847, p = 0.397	KW = 8.988, $p = 0.011$
Post hoc test/Tamhane				2 > 1, $p = 0.017$
Family type				
Nuclear family	384	76.6	1.35 ± 0.99	4.40 ± 2.67
Extended family	99	19.8	1.45 ± 1.31	4.92 ± 3.14
Broken family	18	3.6	1.50 ± 1.15	4.33 ± 2.63
Test			KW = 0.323, $p = 0.851$	KW = 2.731, $p = 0.255$

*$p < 0.05$.
KW – Kruskal-Wallis test, U – Mann-Whitney-U test

Table 2. Comparison of students' sexual experience with HIV Knowledge Questionnaire and sexual risk-taking scale (SRTS)

	n	%	SRTS $\overline{X}$ ± SD	HIV Knowledge Questionnaire $\overline{X}$ ± SD
When should first sexual intercourse be experienced?				
After getting married[1]	270	53.9	1.07 ± 0.45	4.40 ± 2.77
When you feel ready[2]	157	31.3	1.66 ± 1.29	4.61 ± 2.59
When it is someone special[3]	35	7.0	2.08 ± 1.66	5.80 ± 2.76
I am not sure[4]	39	7.8	1.66 ± 1.64	3.64 ± 3.14
Test			KW = 47.107, p = 0.000	KW = 11.248, p = 0.010
Post hoc test/Tamhane			2 > 1, p = 0.000 3 > 1, p = 0.006	3 > 1, p = 0.043 3 > 4, p = 0.014
Having sexual experience				
Yes	78	17.8	3.34 ± 1.57	5.31 ± 2.64
No	423	83.2	1.06 ± 0.46	4.37 ± 2.77
Test			U = –16.296, p = 0.000	U = –2.568, p = 0.010
What should be the age to start sexual life?				
Under 18 years old[1]	10	2.0	4.10 ± 2.33	5.10 ± 3.41
Over 18 years old[2]	472	94.2	1.24 ± 0.79	4.50 ± 2.73
18 years old[3]	19	3.8	3.21 ± 2.07	4.31 ± 3.43
Test			KW = 59.604, p = 0.000	KW = 0.291, p = 0.865
Post hoc test/Tamhane			1 > 2, p = 0.011 3 > 2, p = 0.002	
Age of first sexual experience				
Under 18 years old[1]	19	3.8	4.36 ± 1.77	6.63 ± 2.75
Over 18 years old[2]	41	8.2	2.68 ± 1.08	5.53 ± 2.54
At the age of 18 years[3]	18	3.6	3.72 ± 1.87	3.22 ± 3.11
No previous sexual experience[4]	423	84.4	1.03 ± 0.35	4.36 ± 2.71
Test			KW = 27.92, p = 0.000	KW = 20.014, p = 0.000
Post hoc test/Tamhane			1 > 2, p = 0.005 1 > 4, p = 0.000 2 > 4, p = 0.000 3 > 4, p = 0.001	1 > 3, p = 0.008 2 > 4, p = 0.043 1 > 4, p = 0.013
Did you use contraception during your first sexual experience?				
Yes[1]	43	8.6	3.25 ± 1.51	5.30 ± 2.31
No[2]	35	7.0	3.17 ± 1.71	5.26 ± 3.56
No previous sexual experience[3]	423	84.4	1.04 ± 0.40	4.36 ± 2.72
Test			KW = 28.04, p = 0.000	KW = 6.59, p = 0.037
Post hoc test/Tamhane			1 > 3, p = 0.000 2 > 3, p = 0.000	1 > 3, p = 0.047
Contraception method used during first sexual experience				
Condom[1]	37	7.4	3.18 ± 1.39	5.31 ± 2.07
Birth control pill[2]	41	8.2	4.45 ± 1.80	5.95 ± 3.32
No previous sexual experience[3]	423	84.4	1.05 ± 0.41	4.33 ± 2.74
Test			KW = 27.12, p = 0.000	KW = 11.05, p = 0.003
Post hoc test/Tamhane			1 > 3, p = 0.000 2 > 3, p = 0.000	2 > 3, p = 0.025

Table 2. Cont.

	n	%	SRTS $\overline{X}$ ± SD	HIV Knowledge Questionnaire $\overline{X}$ ± SD
Regular contraception in your sexual life				
Yes[1]	43	8.6	2.81 ± 1.24	5.89 ± 2.52
No[2]	35	7.0	4.03 ± 1.78	5.13 ± 2.96
No previous sexual experience[3]	423	84.4	1.04 ± 0.41	4.32 ± 2.74
Test			KW = 27.42, p = 0.000	KW = 12.80, p = 0.002
Post hoc test/Tamhane			2 > 1, p = 0.008 2 > 3, p = 0.000 1 > 3, p = 0.000	1 > 3, p = 0.001
Reason for protection during sexual intercourse				
To avoid pregnancy[1]	35	7.0	3.16 ± 1.77	4.83 ± 2.72
To prevent STDs[2]	7	2.2	2.28 ± 1.97	4.57 ± 2.76
All[3]	32	6.4	2.70 ± 1.54	5.82 ± 2.64
No previous sexual experience[4]	423	84.4	1.05 ± 0.42	4.33 ± 2.75
Test			KW = 19.39, p = 0.000	KW = 12.21, p = 0.007
Post hoc test/Tamhane			1 > 4, p = 0.000 3 > 4, p = 0.000	3 > 4, p = 0.003

*$p < 0.05$.
KW – Kruskal-Wallis test, U – Mann-Whitney-U test

Table 3. Correlations in sexual risk-taking scale total (SRTS-T), gender, sexual experience, and HIV Knowledge Questionnaire total

	SRTS-T	Gender**	Sexual experience***	HIV Knowledge Questionnaire
SRTS-T	1			
Gender	0.487*	1		
Sexual experience	0.737*	0.416*	1	
HIV Knowledge Questionnaire	0.175*	0.053*	0.117*	1

*$p < 0.05$.

risk-taking behavior, a strong positive relationship (0.737) between sexual experience and sexual risk-taking behavior, and a weak positive relationship (0.175) between HIV knowledge level and sexual risk-taking behavior ($p < 0.05$) (Table 3).

In the first model, gender (t [498] = 6.836*, $p < 0.05$) and sexual experience (t [498] = 20.307*, $p < 0.05$) showed that the variables were statistically significant predictors of sexual risk-taking behavior. Being male and having sexual experience revealed approximately 58% of the variance in sexual risk-taking behavior.

In the second model examining the status of being male and sexual experience, the level of knowledge about HIV (t [497] = 3.093*, $p < 0.05$) was found statistically significant predictor of sexual risk-taking behavior, which explained 59% of the variance in the model (Table 4).

Discussion

Changes in social lives and lifestyles of young people who start university education affect their perspectives on sexuality and the way they perceive it. For this reason, university students experience adjustment problems, undertake more risks in general, and demonstrate increased risky sexual behaviors [17]. Risky sexual behavior refers to any behavior that increases the likelihood of adverse outcomes related to sexual contact, including AIDS, sexually transmitted diseases, and unintended/unwanted pregnancies [18]. Furthermore, individual differences, such as cultural values, difficulty in accessing protection methods (i.e., condoms), presence of drugs and alcohol in the environment, individual's personality traits, and lack of information about sexually transmitted diseases, influence their risky sexual behaviors [19].

Table 4. Hierarchical regression analysis predicting sexual risk-taking behavior

	Model 1					Model 2				
Variable	**B**	**SE B**	**β**	***t***	**Part**	**B**	**SE B**	**β**	***t***	**Part**
Gender**	0.606	0.089	0.218	6.836*	0.198	0.604	0.088	0.217	6.879*	0.197
Sexual experience***	2.004	0.099	0.647	20.307*	0.588	1.972	0.098	0.636	20.045*	0.575
HIV Knowledge Questionnaire						0.034	0.011	0.089	3.093*	0.089
R^2	0.583					0.591				
F	347.677					238.961				
F change	347.677					9.567				

*$p < 0.05$.
**Gender: male = 1, female = 0.
***Sexual experience: yes = 1, no = 0.

In our study, it was determined that male students compared with female students had higher mean scores of SRTS. Similarly, in a study by Kıylıoğlu [14], male students had higher mean SRTS scores. In another study, being a male was shown as a predictor factor of sexual risk-taking behavior [20]. This situation can be interpreted as the fact that the society, in which the study was conducted, has a patriarchal structure, and the experience of sexual intercourse before marriage in young girls is considered a sin, it is not considered morally correct, and it is not welcomed by the society. In addition, due to gender roles, the strong role and position of men in society supports them to take more risks, and these risky behaviors are welcomed by the society.

In our study, it was determined that only 38.3% of the students had sufficient knowledge about HIV. Similarly, Avcıkurt [11] investigated the HIV/AIDS knowledge level of university students, showing 48.3% them having insufficient level of knowledge. Conversely, Maimati *et al.* in their study [21] found that 74.5% of the students had a knowledge level slightly above the average, and Mulu *et al.* [12] reported 45.7% of the students with HIV/AIDS knowledge. In general, the above studies showed that students do not have sufficient knowledge on HIV/AIDS [11, 12, 21].

While 53.9% of the students stated that sexual intercourse should be experienced after marriage, 2.0% revealed that they had their first sexual experience under the age of 18 years, and 17.8% of the total number of individuals stated that they had sexual experience. In a study, it was shown that 25.5% of the students were sexually active, and majority had their first sexual intercourse under the age of 17 years [22]. In a study investigating the prevalence of risky behaviors among university students, early sexual intercourse experience in males was reported as a risky behavior, and it was determined that 26.5% of females and 59.3% of males had sexual intercourse, with 35% of females and 23.5% of males using the withdrawal method [23]. In a study by Golbasi and Kelleci [24], 33.8% of the students had sexual experience and 51.9% of sexually active students were not using protection during sexual intercourse. In international studies conducted among university students, it was reported that the rate of sexual intercourse was higher [23, 25-29].

It is obvious that sexual experiences and sexual behaviors are affected by socio-cultural structure of a society. In our study, the sexual risk-taking behavior and HIV knowledge level means among students with sexual experience were higher than among those without sexual experience. This result can be interpreted as that HIV/AIDS knowledge does not prevent sexual risk-taking. Similarly, Özdemir *et al.* [30] and Yilmaz and Yüksel [31] demonstrated that although students' HIV/AIDS knowledge level was high, it was not sufficiently reflected in their attitudes and behaviors].

In the current study, 8.4% of the students were using protections during their first sexual experiences, with 8.2% taking birth control pills as a contraceptive method, while 7.0% were protected only to prevent pregnancy. It was determined that the mean scores of sexual risk-taking behavior and HIV knowledge level of the students using contraceptive methods were higher than among those who used condoms during sexual intercourse and who did not have prior sexual experiences ($p < 0.05$). This suggests that the students feel more secure due to using contraceptives and engage in more risky sexual behaviors easily (Table 2). In our study, it was determined that there was a weak positive (0.175) relationship between HIV knowledge level and sexual risk-taking behavior ($p < 0.05$) (Table 3). A study by Kıylıoğlu [14] showed no relationship between HIV/AIDS knowledge level and sexual risk-taking behavior, while Snelling *et al.* [32] found the opposite. In line with Kıylıoğlu [14], Mullings *et al.* [33] found no relationship between the two variables. Male students and those with previous sexual experiences presented higher sexual risk-taking behavior scores. Similar to our study result, Kıyıoğlu [14] reported that male students' risky sexual behavior scores were significantly higher than those of female students.

In the present study, sexual risk-taking scores were found higher in those with sexual experiences, who had a sexual intercourse at the age of 18 years and under, and who did not regularly use contraception during sexual intercourses. The variables of gender and sexual experience were statis-

tically significant predictors of sexual risk-taking behavior. According to a study by Biney *et al*. [34], early sexual intercourse is a risk factor for unsafe sexual practices, while Eubanks *et al*. [20] showed that predictors of sexual risk-taking behavior were male gender, being young, and having first-time sexual intercourse before the age of 16 years.

In the current study, a weak positive relationship was determined between sexual risk-taking behavior and HIV knowledge score. This finding was interpreted as the participants' tendency to obtain information about HIV after engaging in sexually risky behaviors. Factors affecting sexual risk-taking behavior, such as sexual experience and age at onset of sexual life, have high HIV knowledge scores. Risky behaviors of the participants demonstrated selectivity in learning.

Conclusions

In the current research, it was determined that male students' sexual risk-taking behaviors were higher, while HIV knowledge levels were similar in both genders. Students who stated that first sexual intercourse should be after marriage had lower SRTS mean scores. The mean SRTS scores of those with previous sexual experiences indicated higher HIV knowledge levels, while the mean SRTS scores of those who revealed that sexual life should be started at the age of 18 years and under, were found higher. Students who had their first sexual experience under the age of 18 years had both higher mean score of SRTS and higher level of HIV knowledge. Those who were not regularly using protections in their sexual practices had higher SRTS mean scores. Furthermore, a moderate positive relationship was determined between the mean SRTS score and gender, a moderate positive relationship between gender and sexual experience, while no relationship between gender and HIV knowledge level was observed. Also, a strong positive relationship between sexual experience and sexual risk-taking behavior was seen. Sexual experience explains 58% of the variance in the sexual risk-taking behavior of male students. Having examined gender and sexual experience, the level of knowledge about HIV supports the variance in sexual risk-taking behavior with 59%.

Recommendations

Sexual and reproductive health as well as reproductive health trainings should be provided according to age periods, but before the age at which young people start risky sexual behaviors, with regular trainings planned on sexually transmitted diseases, such as HIV/AIDS. In addition, we suggest that these trainings should be considered as lifelong education, and should be updated in all life periods, especially before the age of becoming sexually active; this should be prioritized when developing health policies. Moreover, we recommend to increase detailed education and awareness programs for young people about the ways of HIV/AIDS transmission and to carry out studies to investigate other factors affecting students' sexual risk-taking behaviors.

Disclosures

1. Institutional review board statement: Ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee of a university (Decision No: 04; Approval No: E-69396709-050.01.04-173985; Date: 16 June 2021). Participants were informed about the purpose of the study, voluntary participation, confidentiality, and their right to withdraw from the study at any time. Written informed consent was obtained electronically from all participants prior to data collection. The study was conducted in accordance with the Declaration of Helsinki.
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