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A Peer-Supported Learning Model Led by Medical Students to Enhance University Students' Knowledge and Awareness of Sexually Transmitted Infections

Tıp Fakültesi Öğrencileri Tarafından Yürütülen Akran Destekli Bir Öğrenme Modelinin Üniversite Öğrencilerinde Cinsel Yolla Bulaşan Enfeksiyonlar Konusundaki Bilgi ve Farkındalık Düzeyine Etkisi

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Abstract

Aim: Sexually transmitted infections (STIs) remain a major public health concern among adolescents and young adults. Persistent knowledge gaps and misconceptions among university students highlight the need for feasible, learner-centered educational approaches. This study evaluated the effectiveness of a medical student–led, peer-supported STI education session on university students' STI knowledge.

Material and Method: A quasi-experimental pretest–posttest study was conducted within a Special Study Module at Faculty of Medicine. The intervention consisted of a single, in-person, interactive session delivered by trained medical students under faculty supervision. STI knowledge was assessed immediately before and after the session using a validated 25-item instrument. Pretest–posttest matching was performed via anonymous self-generated codes. Total score changes were analyzed using the Wilcoxon signed-rank test, and item-level changes in correct responses were examined with exact McNemar tests.

Results: Twenty-nine participants with matched pretest and posttest data were included. Mean knowledge scores increased from 10.24±5.17 to 17.79±4.27 after the intervention (Z=−4.319, p<0.001). Item-level analyses demonstrated significant improvements in key domains, including HIV–STI co-risk, hepatitis B transmission risk, HPV-related cancer risk, treatment availability for gonorrhea and chlamydia, and correction of common misconceptions (exact McNemar p-values<0.05 for multiple items).

Conclusion: A single-session, medical student–led peer-supported educational intervention was associated with a substantial improvement in university students' STI knowledge. This pragmatic model may represent a scalable approach for strengthening sexual health literacy in university settings.

Keywords: Sexually transmitted infections, STI knowledge, Peer-supported learning, Medical students, Undergraduate education

Öz

Amaç: Cinsel yolla bulaşan enfeksiyonlar (CYBE), genç erişkinler arasında önemli bir halk sağlığı sorunudur. Üniversite öğrencileri arasındaki bilgi eksiklikleri ve yanlış inanışlar, uygulanabilir ve öğrenen merkezli eğitim yaklaşımlarına ihtiyacı ortaya koymaktadır. Bu çalışmada, tıp fakültesi öğrencileri tarafından yürütülen akran destekli bir CYBE eğitim oturumunun, CYBE bilgi düzeyine etkisi değerlendirilmiştir.

Gereç ve Yöntem: Araştırma, Tıp Fakültesi Özel Çalışma Modülü kapsamında gerçekleştirilen, yarı deneysel ön test–son test çalışmasıdır. Müdahale, öğretim üyesi gözetiminde eğitim almış tıp fakültesi öğrencileri tarafından uygulanan tek oturumluk, yüz yüze ve interaktif bir eğitimden oluşmaktadır. Geçerliliği kanıtlanmış 25 maddelik bir ölçüm aracı kullanılarak eğitim öncesi ve sonrasında CYBE bilgi düzeyi değerlendirilmiştir. Ön test–son test eşleştirmesi anonim rumuzlar aracılığıyla yapılmıştır. Toplam puanlardaki değişim Wilcoxon Signed Ranks testi ile, madde bazında doğru yanıt değişimleri ise kesin McNemar testi ile analiz edilmiştir.

Bulgular: Ön test ve son test verileri eşleştirilebilen 29 katılımcı analize dahil edilmiştir. Ortalama bilgi puanı, eğitim öncesinde 10,24±5,17 iken, eğitim sonrasında 17,79±4,27 olarak saptanmıştır (Z=−4,319; p<0,001). Madde bazlı analizlerde; HIV–CYBE birlikte risk durumu, hepatit B bulaş riski, HPV'nin kansere yol açabilmesi, gonore ve klamidya tedavisinin varlığı ile yaygın yanlış inanışların düzeltilmesi gibi temel alanlarda istatistiksel olarak anlamlı bilgi artışı gözlenmiştir (birden fazla madde için kesin McNemar p<0,05).

Sonuç: Tıp fakültesi öğrencileri tarafından yürütülen tek oturumluk akran destekli eğitim müdahalesi, üniversite öğrencilerinin cinsel yolla bulaşan enfeksiyonlara ilişkin bilgi düzeyini anlamlı düzeyde artırmıştır. Bu pragmatik model, üniversite ortamında cinsel sağlık okuryazarlığını güçlendirmek için ölçeklenebilir bir yaklaşım sunabilir.

Anahtar Kelimeler: Cinsel yolla bulaşan enfeksiyonlar, CYBE bilgisi, Akran destekli öğrenme, Tıp fakültesi öğrencileri, Lisans eğitimi

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INTRODUCTION

Sexually transmitted infections (STIs) remain a major global public health problem, with adolescents and young adults constituting a particularly vulnerable population.[1] Individuals aged 15–24 years account for a substantial proportion of newly diagnosed STIs worldwide, reflecting increased sexual activity, inconsistent condom use, and limited engagement with preventive health services during this critical developmental period. Despite advances in diagnostic techniques, vaccination strategies, and preventive interventions, STI incidence among young populations continues to rise, leading to significant short- and long-term consequences, including reproductive morbidity, adverse pregnancy outcomes, psychosocial distress, and increased susceptibility to human immunodeficiency virus infection.[2,3]

A growing body of evidence indicates that young adults and university students often have insufficient knowledge and suboptimal awareness regarding STIs and safe sexual practices.[4] Misconceptions related to transmission routes, preventive measures, and treatment options are frequently reported, even among students enrolled in health-related programs.[5] Formal sexual health education is commonly fragmented, inconsistently delivered, or introduced at later stages of education, while discussions around sexuality remain influenced by stigma, cultural norms, and feelings of embarrassment or shame.[6] As a result, adolescents and young adults frequently rely on informal information sources such as peers, social media platforms, and online searches, which may contribute to the dissemination of misinformation and hinder informed decision-making regarding sexual health.[7,8]

Educational interventions aimed at improving STI knowledge and awareness have demonstrated meaningful short-term improvements in knowledge scores and attitudes toward prevention.[9] Pre–post intervention studies consistently show that structured and well-designed sexual health education programs can enhance awareness and correct prevalent misconceptions.[10] However, increased knowledge does not necessarily translate into sustained behavioral change, particularly with respect to consistent condom use, routine STI testing, and engagement with preventive health services.[11] These findings suggest that the effectiveness of sexual health education is strongly influenced by pedagogical factors, including content relevance, delivery format, educator credibility, and active learner engagement.[12]

In recent years, peer-supported and near-peer educational approaches have gained prominence in adolescent and young adult sexual health promotion. Peer-led models have been shown to improve acceptability, foster trust, reduce stigma, and facilitate open discussion of sensitive topics such as sexuality and STIs, thereby supporting preventive behaviors.[13,14] Qualitative evidence further indicates that young people prefer youth-friendly, confidential, and nonjudgmental learning environments and value opportunities for active participation in the design and implementation of sexual health interventions.[15]

Medical students represent a unique and underutilized near-peer resource, combining foundational biomedical knowledge with social proximity and approachability. Although emerging evidence supports the effectiveness of peer-based interventions in sexual health education, structured medical student–led peer-supported learning programs targeting university students' STI knowledge and awareness remain scarce in the literature. Addressing this gap, the present study evaluates the effectiveness of a medical student–led, peer-supported educational intervention designed to enhance university students' knowledge and awareness of sexually transmitted infections.

MATERIAL AND METHOD

Study Design and Setting

This study was designed as a quasi-experimental pretest–posttest study and conducted through a collaboration between the Department of Infectious Diseases and Clinical Microbiology and the Department of Medical Education at Faculty of Medicine. The educational intervention was implemented as a single-session program on March 10, 2025.

Participants and Sample Size

The sample size of the study was calculated using G*Power version 3.1 based on a paired t-test for dependent groups. The statistical significance level was set at $\alpha=0.05$ (two-tailed), with a power $(1-\beta)$ of 0.80 and an expected effect size (Cohen's d) of 0.60. According to these parameters, the minimum required sample size was calculated as 24 paired participants. Following data collection, distributional assumptions were assessed and normality was not met for the total knowledge scores. Therefore, non-parametric analysis using the Wilcoxon signed-rank test was applied. Accordingly, a post hoc sample size verification was performed using the Wilcoxon signed-rank test (matched pairs) in G*Power, applying the same significance level, power, and effect size assumptions. This analysis confirmed that a minimum of 23 paired participants would be sufficient, supporting the adequacy of the achieved sample size for the primary outcome analysis.

The inclusion criteria were being a university student, participation in the educational program conducted within the scope of a Special Study Module, attendance at the educational session, willingness to complete the questionnaire, and being 18 years of age or older.

The exclusion criteria were defined as non-attendance at the educational session and refusal to complete the questionnaire.

Data Matching and Eligibility for Analysis

Pretest–posttest matching was performed using anonymous self-generated codes created by the participants. Only data from participants who completed both the pretest and

posttest questionnaires in full and for whom successful code matching was achieved were included in the analysis. Participants for whom code matching was not possible or who did not complete both questionnaires were excluded from the study.

Educational Intervention

Before the intervention, medical students enrolled in a Special Study Module underwent systematic instruction on sexually transmitted illnesses and preventative measures, conducted by a faculty expert in Infectious Diseases and Clinical Microbiology. The preparation training comprised 32 hours over an 8-week duration and was implemented using active learning techniques. Subsequent to this training, the medical students created an instructional slide presentation for the peer-supported learning session, grounded in contemporary scientific data and according to national and international criteria.

The intervention comprised a systematic training session on sexually transmitted diseases (STIs), including transmission mechanisms, risk factors, preventative strategies, vaccine, treatment modalities, and prevalent misconceptions. The session lasted approximately 45 minutes and was delivered in person using interactive techniques by medical students engaged in a Special Study Module, under faculty supervision. University students were asked to participate in the session as a component of a peer-supported educational framework.

Participants undertook a 25-item online knowledge assessment immediately prior to (pretest) and subsequent to (posttest) the session to evaluate variations in knowledge levels. Before participation, all students were apprised of the study protocols, and electronic informed consent was secured.

The intervention was grounded in principles of active learning and peer-supported education, emphasizing learner engagement, social proximity, and interactive knowledge construction rather than passive information transfer.

Data Collection Tool

Knowledge of sexually transmitted infections (STIs) was assessed using a validated 25-item knowledge scale originally developed by Jaworski and Carey[16] and adapted into Turkish with established validity and reliability by Yalnız Dilcen et al.[17] Items are answered as "Yes," "No," or "I don't know," with the latter considered an incorrect response. Total scores range from 0 to 25, with higher scores indicating greater knowledge levels. In the present study, the scale demonstrated high internal consistency, with Cronbach's alpha values of 0.846 for the pretest and 0.815 for the posttest.

Data Collection Procedure

Data were collected using Google Forms accessed via QR codes scanned by participants on their smartphones. The knowledge questionnaire was administered immediately before (pretest) and after (posttest) the educational session. Pretest–posttest matching was performed using anonymous self-generated codes. Only participants who completed both questionnaires in full and for whom successful matching was achieved were included in the analysis. Prior to participation, all students were informed about the study procedures, and electronic informed consent was obtained.

Study Variables

The dependent variables were item-level correct response status on the knowledge test (true/false) and the total number of correct responses (range: 0–25). The independent variables included age (years), year of study (1st, 2nd, and 4th year), and faculty affiliation (Faculty of Medicine vs. other faculties).

Ethical Considerations

The study was approved by the Ethics Committee of a tertiary training and research hospital (Decision No: 422, Date: 26.02.2025). Electronic informed consent was obtained from all participants prior to data collection in accordance with the principles of the Declaration of Helsinki. All data were collected anonymously and stored in accordance with confidentiality and data protection principles.

Reporting

The study was reported in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist, adapted for pretest–posttest study designs.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as mean±standard deviation (SD) for continuous variables and as frequencies and percentages for categorical variables.

Item-level changes in the proportion of correct responses between the pretest and posttest were analyzed using the McNemar test (exact, two-tailed). In cells with low expected frequencies, exact p-values based on the binomial distribution were calculated using the SPSS Exact module. Effect sizes were reported using the eta (η) coefficient.

Changes in total knowledge scores between the pretest and posttest were assessed using the Wilcoxon signed-rank test (two-tailed), as the data did not meet the assumptions of parametric testing. The Z statistic and corresponding p-values were reported.

A p-value<0.05 was considered statistically significant.

RESULTS

Approximately 45 students attended the educational session. Of these, 42 participants completed the pretest questionnaire and 39 completed the posttest questionnaire. Following pretest–posttest matching using anonymous self-generated codes, data from 29 participants who completed both assessments were included in the final analysis.

The mean age of the analyzed participants was 20.45±1.33 years (range: 18–24). Most participants were second-year university students (89.7%), followed by first-year (6.9%) and fourth-year students (3.4%). The majority were enrolled in the Faculty of Medicine (86.2%), while the remaining participants were from other faculties (13.8%) (**Table 1**).

Table 1. Descriptive characteristics of the participants

	Frequency	Percent	Valid Percent	Cumulative Frequency
Year of study at the university				
1	2	6.9	6.9	6.9
2	26	89.7	89.7	96.6
4	1	3.4	3.4	100.0
Total	29	100.0	100.0	
Faculty				
Medicine	25	86.2	86.2	86.2
Other	4	13.8	13.8	100.0
Total	29	100.0	100.0	

Item-level changes in correct response rates before and after the intervention are summarized in **Table 2**. Statistically significant improvements were observed across several key domains following the educational session. In particular, participants demonstrated increased awareness of the heightened risk of HIV acquisition in the presence of other STIs, the elevated risk of hepatitis B associated with anal intercourse, and the carcinogenic potential of human papillomavirus (HPV).

Significant gains were also observed in knowledge regarding the availability of effective treatment for gonorrhea and chlamydia, as well as the absence of vaccines for these infections. In addition, the intervention was effective in correcting prevalent misconceptions, including beliefs related to HIV testing, immunity following previous gonorrhea infection, and the transmission pathways of genital warts. Effect size estimates indicated the strongest educational impact for items addressing the HIV–STI relationship, interpretation of HIV test results, and awareness of hepatitis B vaccination (**Table 2**).

Following the peer-supported educational intervention, a statistically significant improvement in overall STI knowledge was observed. The mean total knowledge score increased from 10.24±5.17 at pretest to 17.79±4.27 at posttest. According to the Wilcoxon signed-rank test, this increase represented a statistically significant difference between pretest and posttest scores ($Z=-4.319$, $p<0.001$) (**Table 3**).

Table 2. Comparison of correct responses to individual knowledge items before and after the educational intervention using the McNemar test

Item No.	Statement (English)	Correct answers Pre-test n (%)	Correct answers Post-test n (%)	McNemar p (exact, 2-sided)	Effect size (η)
1	Having any sexually transmitted infection makes it easier for a person to acquire HIV.	11 (38%)	20 (69%)	0.004	0.524
2	Anal intercourse increases the risk of hepatitis B infection.	19 (66%)	27 (93%)	0.021	0.089
3	A woman with genital herpes can transmit the infection to her baby during childbirth.	21 (72%)	29 (100%)	–	–
4	HPV can cause genital warts.	23 (79%)	28 (97%)	0.063	0.37
5	Using condoms can protect a person against HIV transmission.	22 (76%)	22 (76%)	1	0.435
6	HPV can cause cancer in women.	20 (69%)	28 (97%)	0.021	0.127
7	There is a vaccine to prevent hepatitis B.	23 (79%)	27 (93%)	0.125	0.533
8	Gonorrhea can be treated.	17 (59%)	26 (90%)	0.022	0.055
9	Chlamydia can be treated.	9 (31%)	25 (86%)	<0.001	0.052
10	There is a vaccine to prevent gonorrhea.	5 (17%)	21 (72%)	<0.001	0.282
11	There is a vaccine to prevent chlamydia.	5 (17%)	23 (79%)	<0.001	0.233
12	A positive HIV test result can also indicate how sick a person is.	15 (52%)	24 (83%)	0.004	0.472
13	Genital herpes can be transmitted only if open sores are present.	12 (41%)	21 (72%)	0.035	0.049
14	A person who has had gonorrhea becomes immune to the disease.	13 (45%)	26 (90%)	<0.001	0.306
15	Washing the genitals after intercourse prevents genital warts.	8 (28%)	23 (79%)	<0.001	0.315
16	The virus that causes genital herpes is the same as HIV.	10 (34%)	20 (69%)	0.013	0.173
17	HPV is the same virus that causes HIV.	10 (34%)	19 (66%)	0.022	0.221
18	HPV can cause HIV infection.	9 (31%)	16 (55%)	0.092	0.155
19	A woman can detect gonorrhea by observing her body.	3 (10%)	8 (28%)	0.125	0.297
20	Vaginal intercourse is required to acquire genital warts.	10 (34%)	23 (79%)	0.001	0.191
21	A woman can identify an STI by bodily changes.	1 (3%)	9 (31%)	0.008	0.282
22	A man can detect hepatitis B by bodily changes.	8 (28%)	13 (45%)	0.18	0.374
23	Open genital sores appear shortly after HIV infection.	4 (14%)	11 (38%)	0.039	0.306
24	STIs cause more severe health problems in men than women.	11 (38%)	22 (76%)	0.003	0.275
25	Foul-smelling vaginal discharge indicates chlamydia infection.	8 (28%)	5 (17%)	0.453	0.331

HIV: Human immundeficiecy Virus, HPV: Human Papilloma Virus, STI: Sexually Transmitted Infection, McNemar test (exact, two-tailed); η: effect size.
Table footnote: Values are presented as number (percentage) of correct responses. Changes in paired categorical responses were analyzed using the McNemar exact test (two-sided). Effect sizes are reported as eta (η). Items with no variability at baseline or post-test are indicated with a dash (–).

Table 3. Comparison of total number of correct responses before and after the educational intervention using the Wilcoxon signed-rank test

Test Statistics*	N	Mean	SD	Minimum	Maximum	Z (Post_Total - Pre_Total)	Asymp. Sig. (2-tailed)
Pre_Total	29	10.241	5.166	2.00	21.00	-4.319†	0.000
Post_Total	29	17.793	4.270	5.00	25.00		

*Wilcoxon Signed Ranks Test, †Based on negative ranks Z: test statistic, SD: standard deviation

DISCUSSION

This study demonstrated that a peer-supported educational intervention conducted by medical students was associated with a significant improvement in university students' understanding of STIs. The overall rise in total knowledge scores and the item-level modifications seen post-intervention demonstrate that a singular, organised educational session may significantly improve STI-related knowledge in young people.

In accordance with prior research, initial knowledge levels in the pretest were notably low, indicating enduring deficiencies in comprehension of STI transmission, prevention, and treatment among university students. Previous studies have shown that teenagers and young adults commonly possess misunderstandings about STIs and regularly depend on informal or internet sources for sexual health information, thereby perpetuating wrong ideas. The pre-intervention findings of this study correspond with reports highlighting inadequate sexual health literacy, even among educated youth and, in certain instances, among students in health-related disciplines.[4-7]

Post-intervention, a significant enhancement in knowledge scores was noted, corroborating the assertion that organised educational initiatives can elevate STI awareness. Comparable enhancements have been shown in prior pretest–posttest studies assessing educational interventions on sexual health, especially when the content is distinctly organised and grounded in evidence.[9,10] This research significantly contributes to the literature by demonstrating that a peer-supported strategy, implemented by educated medical students, may provide substantial knowledge gains in a brief, single-session manner.

Item-level analyses demonstrated significant enhancements in areas pertinent to public health and clinical practice, including the correlation between HIV and other STIs, hepatitis B transmission risks, HPV-related cancer risk, and the presence—or lack thereof—of specific preventive interventions such as vaccines. The rectification of prevalent myths, such as those about HIV testing, immunity following previous gonorrhoea infections, and the transmission pathways of genital warts, is significant. Such misconceptions have consistently been recognised as obstacles to effective preventive and prompt healthcare-seeking behaviour.[8,15] The found impact sizes for these items indicate that peer-supported education may be especially helpful in confronting deep-seated yet erroneous ideas. Interestingly, item 25 demonstrated a decrease in the proportion of correct responses following the intervention. This finding may reflect confusion arising from discussions emphasizing the non-specific nature of vaginal discharge and its association with multiple etiologies. While the educational content aimed to reduce symptom-based misclassification, a single-session format may not have been sufficient to clarify this distinction for all participants.

The peer-supported framework of the intervention is a significant strength of this study. Prior studies have shown that peer-led and near-peer teaching methods can improve acceptance, trust, and involvement in discussions about sensitive subjects like sexual health.[13,14,18] Medical students hold a distinctive role within this framework, integrating fundamental medical knowledge with close social ties to the target community. This dual function may promote open dialogue and diminish stigma, therefore enhancing the efficacy of information transfer. The current findings align with qualitative and mixed-methods research indicating that adolescents choose youth-friendly, non-judgmental educational settings and appreciate peer participation in sexual health education.[15,19]

Although the peer-supported intervention targeted university students, the majority of participants were medical students, which may limit the generalizability of the findings to the broader university population. Students receiving medical education may have higher baseline awareness and greater motivation toward health-related topics, introducing a potential selection bias. Therefore, the results should be interpreted with caution when extrapolating to non-health-related student groups.

Several limitations should be considered when interpreting the findings of this study. The quasi-experimental pretest–posttest design did not include a control group, which limits the ability to draw definitive causal inferences regarding the observed effects. The final sample size was relatively modest, and attrition between session attendance and successful pretest–posttest matching may have introduced a degree of selection bias. In addition, the outcomes assessed were restricted to short-term knowledge acquisition, and neither behavioral changes nor long-term retention of knowledge were evaluated. Another limitation of the study is the reduction in sample size due to unmatched pretest and posttest responses. Despite 45 students attending the educational session, only 29 participants completed both assessments with identifiable anonymous codes. Despite meeting the minimum required sample size based on power analysis, the reduction in analyzable participants due to unmatched pretest–posttest responses represents a limitation. Finally, as the study was conducted at a single academic institution, the generalizability of the findings to other university settings may be limited. Despite these limitations, the use of a validated knowledge instrument, item-level analyses, and effect size reporting strengthen the internal validity of the findings.

Notwithstanding these constraints, the study possesses significant ramifications. The results indicate that peer-supported, medical student-led educational interventions might serve as a viable, cost-effective, and scalable approach to enhance STI knowledge among university students. Considering the persistent prevalence of STIs among youth and the shortcomings of conventional teaching methods, it is essential to further investigate the incorporation of organised peer education frameworks into university health promotion initiatives. Future research necessitates controlled designs, bigger and more varied populations, and longitudinal follow-up to evaluate the durability of knowledge acquisition and its potential impact on preventative behaviours.

CONCLUSION

This study illustrates that a peer-supported educational intervention conducted by medical students may markedly enhance university students' understanding of sexually transmitted illnesses. The results underscore the potential efficacy of organised, evidence-driven peer education in bridging knowledge deficits and rectifying prevalent misunderstandings regarding STIs. This model may be a useful technique for sexual health teaching in university settings due to its practicality, minimal resource needs, and acceptance. Additional study utilising controlled settings and extended follow-up durations is necessary to assess the durability of knowledge acquisition and its potential effects on preventative behaviours.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was approved by the Ethics Committee of İzmir Demokrasi University Buca Seyfi Demirsoy Training and Research Hospital (Decision No: 422, Date: 26.02.2025).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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