

## ORIGINAL ARTICLE

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## Assessment of knowledge, attitudes, and behaviors regarding sexually transmitted infections during late adolescence

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### Abstract

The aim of this study was to assess the knowledge level, attitudes, and behaviors regarding sexually transmitted infections (STIs) among young individuals aged 18 to 21 years. This study was designed as a single-center, cross-sectional, descriptive, and analytical study. A total of 157 individuals aged between 18 and 21 years who presented to Family Medicine outpatient clinics for any reason were included. In addition to sociodemographic data, participants were administered a questionnaire developed by the researchers based on a literature review to assess their knowledge about STIs, along with questions evaluating their attitudes and behaviors. The mean age of participants was  $19.84 \pm 1.12$  years. A total of 74.5% reported that they had not received any prior education on STIs. The mean STI knowledge score was  $18.06 \pm 5.20$  (range: 7–31). A statistically significant positive correlation was found between knowledge score and both age and age of sexual debut ( $p=0.015$  and  $p=0.024$ , respectively). Participants who had received education on STIs or obtained information from school or healthcare professionals had significantly higher knowledge scores ( $p<0.001$ ). Those who perceived their knowledge as sufficient had lower actual knowledge scores compared to those who considered their knowledge insufficient or were undecided ( $p=0.003$ ). Participants using contraceptive methods had lower STI knowledge scores than those who did not ( $p=0.034$ ). HIV/AIDS was the most commonly recognized STI (82.8%), while herpes (9.6%) and syphilis (14%) were the least recognized. The study revealed insufficient levels of STI-related knowledge among young individuals, with widespread misconceptions particularly regarding preventive methods. Significant associations were found between knowledge levels and factors such as age, gender, receipt of education, and access to reliable information sources. These findings highlight the critical need for comprehensive and structured sexual health education programs targeting youth to protect and promote public health.

**Keywords:** Adolescent, sexual health, preventive medicine, family medicine

### Introduction

The World Health Organization (WHO) defines sexually transmitted infections (STIs) as infections transmitted through sexual contact and passed between sexually active individuals during intercourse. STIs often remain asymptomatic but may present with acute symptoms and signs following sexual contact, and frequently become chronic infectious diseases [1].

Adolescence is a transitional phase in the human life course that begins with puberty and ends with the acquisition of adult identity and behaviors. This period is commonly divided into three stages: early adolescence (ages 11–14), middle adolescence

(ages 15–17), and late adolescence (ages 18–21) [2].

Research has shown that approximately half of all new STI cases occur during middle and late adolescence, particularly among individuals aged 15–24 years [3]. Several factors contribute to the higher prevalence of STIs in this age group, including early initiation of sexual activity, engagement in risky sexual behaviors, having multiple sexual partners, and substance use. Furthermore, insufficient and inaccurate knowledge regarding STIs and preventive methods during middle and late adolescence significantly increases the risk of infection [4].

Studies conducted in Türkiye indicate that young individuals lack adequate knowledge about STIs and reproductive health [5].

### CITATION

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In a nationwide study conducted by the Prime Ministry Family Research Institution, 57.3% of adolescents stated that they did not consider their knowledge of STIs and reproductive health to be sufficient [6].

Despite this, only a small proportion of young people perceive themselves as vulnerable to STIs or at risk of unintended pregnancy. Supporting this observation, several studies have reported that many adolescents in the middle and late stages of adolescence do not use effective contraceptive methods during sexual intercourse, and that contraceptive use increases with age [6]. Systematic educational programs may play a critical role in addressing these deficiencies and positively influencing young people's sexual health behaviors. Evidence suggests that STI-related education contributes to safer sexual practices among youth and helps prevent unintended pregnancies [7].

Based on these findings, this study aimed to assess the knowledge, attitudes, and behaviors regarding STIs among individuals in the late adolescence period, specifically those aged 18 to 21 years.

## Material and Methods

This study was designed as a single-center, cross-sectional, descriptive, and analytical study. It aimed to assess the knowledge, attitudes, and behaviors regarding STIs among individuals in the late adolescence period (ages 18–21) who presented to the Family Medicine outpatient clinics of Şişli Hamidiye Etfal Health Practice and Research Center for any reason.

Based on institutional records, 257 individuals aged 18–21 had visited the clinic in the past six months. Using this number as the population size, the required sample size was calculated with a 95% confidence interval and a 5% margin of error, yielding a minimum of 155 participants. Although the sample size was initially calculated under the assumption of a simple random sampling approach, in practice the study population consisted of all eligible individuals who presented to the Family Medicine outpatient clinic during the study period, which represents a convenience sample. Data collection continued until the target number was reached. Following ethics committee approval, a total of 157 participants were enrolled over a three-month period. Individuals outside the 18–21 age range, those who declined participation, and those with communication difficulties were excluded.

Participants were administered an 18-item questionnaire developed by the researchers based on a literature review. The questionnaire included items on sociodemographic characteristics, prior education on STIs, sources of information, attitudes regarding communication about sexual health, and protective behaviors.

In order to assess participants' knowledge of STIs, a 34-item questionnaire was developed by the researchers following a comprehensive review of the national/international literature, WHO sexual and reproductive health guidelines, and national protocols in Türkiye [8-11]. Each item was dichotomously coded (0=incorrect, 1=correct), and total scores ranged from 0 to 34. Psychometric evaluation was limited to internal consistency

reliability, as no formal Content Validity Index calculation, expert panel review, or pilot testing was conducted during the development process. Given the dichotomous structure of the items, classical exploratory factor analysis was considered methodologically inappropriate. The internal consistency of the questionnaire was acceptable, with a Cronbach's alpha value of 0.762, exceeding the commonly accepted threshold of 0.70 [12].

Ethical approval for the study was obtained from the Ethics Committee of the University of Health Sciences Şişli Hamidiye Etfal Training and Research Hospital, with the protocol approval number 4496 dated 20/08/2024.

All statistical analyses were conducted using IBM SPSS version 25.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were presented as mean  $\pm$  standard deviation (Mean  $\pm$  SD), while categorical variables were expressed as frequencies (n) and percentages (%). Upon examining the normality assumptions for the total scores of the STI knowledge questionnaire, it was determined that the data did not follow a normal distribution. This was based on skewness and kurtosis values divided by their standard errors falling outside the threshold range of  $\pm 3.29$ . The relationships between the total STI knowledge scores and continuous variables were analyzed using Spearman's rank correlation test. To examine whether there were significant differences in STI knowledge scores across demographic and other variables, appropriate statistical tests were selected based on the distribution and number of groups: For comparisons between two groups with normally distributed variables, the Independent Samples t-test was used. For two-group comparisons of non-normally distributed variables, the Mann–Whitney U test was applied. For comparisons among variables with three or more groups: If the variable followed a normal distribution, the One-Way ANOVA test was used. If not, the Kruskal–Wallis H test was employed. When a statistically significant difference was found among three or more groups, Bonferroni and Dunn's post-hoc tests were used to identify which specific groups differed. In addition, for multiple subgroup comparisons involving independent two-group tests, Bonferroni correction was applied to adjust for familywise error. For comparisons involving categorical variables, the Chi-square test was used. A p-value  $< 0.05$  was considered statistically significant.

## Result

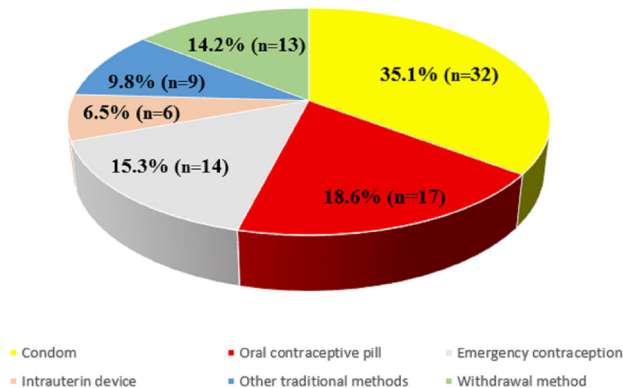
A total of 157 participants were included in the study. The mean age of the participants was  $19.84 \pm 1.12$  years (min: 18 – max: 21). Of these, 54.1% (n=85) were female and 45.9% (n=72) were male. A total of 54.8% (n=86) were not employed.

Among the participants, 25.5% (n=40) reported having previously received education related to STIs, while 74.5% (n=117) stated that they had not. The most commonly cited sources of STI-related information were school (41.4%), television/magazines/books (40.8%), and healthcare professionals (24.8%). Additionally, 15.9% (n=25) reported not receiving any information from any source.

When participants were asked to self-assess their knowledge about STIs, 35.0% (n=55) considered their knowledge sufficient, 43.9%

(n=69) deemed it insufficient, and 21.0% (n=33) were undecided. The majority of participants (83.4%, n=131) believed that education on STIs should be provided in schools, whereas 6.4% (n=10) disagreed. Furthermore, 72.0% (n=113) considered access to sexual health services in Türkiye to be adequate, while 6.4% (n=10) found access insufficient.

Among participants who had sexual experience (68.2%, n=107), the mean age at first sexual intercourse was 18.21±2.53 years (min: 12 – max: 21). Of these individuals, 63.5% (n=68) reported having used at least one contraceptive method. As multiple responses were allowed, the most commonly used contraceptive methods were condoms (35.1%, n=32), oral contraceptive pills (OCPs) (18.6%, n=17), emergency contraception (15.3%, n=14), intrauterine devices (IUDs) (6.5%, n=6), traditional methods (9.8%, n=9), and the withdrawal method (14.2%, n=13) (Figure 1).



**Figure 1.** Distribution of contraceptive method preferences among participants who had previously used at least one method (Multiple responses allowed)

When participants were asked with whom they felt comfortable discussing issues related to STIs or safe sexual practices, 53.5% (n=84) reported that they could talk with their friends, 52.2% (n=82) with their family physician or nurse, and 20.4% (n=32) with family members or relatives. However, 22.3% (n=35) stated that they could not comfortably discuss such topics with anyone.

The mean score obtained from the STI Knowledge Questionnaire was 18.06±5.20 (min: 7–max: 31). The relationship between STI knowledge scores and both age and age at sexual debut was examined using Spearman’s correlation analysis. A weak but statistically significant positive correlation was found between age and STI knowledge score (Rho=0.194, p=0.015), indicating that STI knowledge scores were positively correlated with age. Additionally, a significant positive correlation was observed between age at first sexual intercourse and STI knowledge score (Rho=0.320, p=0.024), showing that higher age at first sexual intercourse was associated with higher STI knowledge scores.

Table 1 presents the relationships between STI knowledge scores and various demographic and individual characteristics. Knowledge scores were significantly higher among female participants compared to males (t=2.427, p=0.016). Knowledge scores were significantly higher in participants who reported

having received prior education on STIs compared to those who did not (t=−7.197, p<0.001). Participants who reported receiving information from healthcare professionals were found to have higher knowledge scores (t=−4.331, p<0.001). Knowledge scores were also higher among those who reported receiving information from school compared to those who did not (t=−7.306, p<0.001). Those who reported not receiving information from any source had lower knowledge scores than those who reported at least one source (t=6.192, p<0.001). After Bonferroni correction for multiple subgroup comparisons, these differences remained statistically significant (Healthcare Professional, p=0.006; School, p=0.006; None, p=0.006). Other sources, including television/magazines/books, parents, and internet/social media, did not show significant associations with knowledge scores after correction (all corrected p>0.05).

As presented in Table 2, there was a statistically significant difference between participants’ self-assessment of their STI knowledge level and their actual STI knowledge scores (F=6.172, p=0.003). STI knowledge scores differed significantly across self-assessed knowledge categories; scores were higher among those who rated their knowledge as ‘insufficient’ compared to those who rated it as ‘sufficient’ (p=0.042). Scores were also higher in participants who reported being ‘undecided’ compared to those who considered their knowledge ‘sufficient’ (p=0.003).

A statistically significant difference was also found between participants’ attitudes regarding whether STI education should be provided in schools and their STI knowledge scores (χ²=26.879, p<0.001). Knowledge scores were higher among participants who believed that education should be provided in schools compared to those who either did not support school-based education or were undecided (p=0.001, p<0.001, respectively).

There was also a significant difference between participants’ opinions about the adequacy of access to sexual health services in Türkiye and their STI knowledge scores (χ²=6.145, p=0.046). However, post-hoc analyses did not reveal any significant pairwise differences between the groups (Table 2).

In Table 3, participants’ behaviors related to STIs were compared in terms of their STI knowledge scores. No significant difference was found between having prior sexual experience and STI knowledge scores (t=1.528, p=0.139). Knowledge scores were significantly lower among those who reported using contraceptive methods compared to those who did not (t=2.141, p=0.034).

Knowledge scores were significantly higher among participants who reported discussing STIs or safe sexual practices with peers or healthcare professionals compared to those who did not (t=−4.335, p<0.001; t=−3.424, p=0.001, respectively). Knowledge scores were also lower among participants who reported being unable to discuss these topics comfortably with anyone compared to those who could (t=2.797, p=0.006) After Bonferroni correction for multiple subgroup comparisons, these

associations remained statistically significant (Talk with friends,  $p=0.004$ ; Talk with physician/nurse,  $p=0.004$ ; Cannot talk with anyone,  $p=0.024$ ). No significant difference was observed for those who reported being able to talk with family/relatives (corrected  $p=0.376$ ). (Table 3).

As shown in Table 4, the most commonly identified disease perceived by participants to be sexually transmitted was AIDS/HIV (82.8%), followed by genital fungal infections (64.3%) and genital warts (58.6%). The least recognized STIs were herpes simplex (9.6%), syphilis (14.0%), and gonorrhea (34.4%).

**Table 1.** Comparison of demographic and other characteristics of participants in terms of STI knowledge scores (n=157)

| Variables                                           | n   | STI Knowledge Score (Mean±SD) | t or z   | p-value          | p-value*     |
|-----------------------------------------------------|-----|-------------------------------|----------|------------------|--------------|
| <b>Gender</b>                                       |     |                               |          |                  |              |
| Female                                              | 85  | 18.97±5.18                    | t=2.427  | <b>0.016</b>     | -            |
| Male                                                | 72  | 16.98±5.04                    |          |                  |              |
| <b>Employment Status</b>                            |     |                               |          |                  |              |
| Unemployed                                          | 86  | 18.59±4.84                    | t=-1.413 | 0.158            | -            |
| Employed                                            | 71  | 17.42±5.57                    |          |                  |              |
| <b>Have you ever received education about STIs?</b> |     |                               |          |                  |              |
| No                                                  | 117 | 16.55±4.63                    | t=-7.197 | <b>&lt;0.001</b> | -            |
| Yes                                                 | 40  | 22.50±4.14                    |          |                  |              |
| <b>Sources of STI Information</b>                   |     |                               |          |                  |              |
| TV/Magazine/Book                                    |     |                               |          |                  |              |
| No                                                  | 93  | 17.59±5.61                    | t=-1.433 | 0.154            | 0.924        |
| Yes                                                 | 64  | 18.75±4.50                    |          |                  |              |
| <b>Healthcare Professional</b>                      |     |                               |          |                  |              |
| No                                                  | 118 | 17.08±4.80                    | t=-4.331 | <b>&lt;0.001</b> | <b>0.006</b> |
| Yes                                                 | 39  | 21.03±5.28                    |          |                  |              |
| <b>Parents</b>                                      |     |                               |          |                  |              |
| No                                                  | 130 | 17.85±5.17                    | t=-1.152 | 0.251            | 1.000        |
| Yes                                                 | 27  | 19.11±5.32                    |          |                  |              |
| <b>School</b>                                       |     |                               |          |                  |              |
| No                                                  | 92  | 15.86±4.73                    | t=-7.306 | <b>&lt;0.001</b> | <b>0.006</b> |
| Yes                                                 | 65  | 21.18±4.15                    |          |                  |              |
| <b>Internet/Social Media</b>                        |     |                               |          |                  |              |
| No                                                  | 145 | 17.97±5.26                    | z=-0.801 | 0.423            | 1.000        |
| Yes                                                 | 12  | 19.17±4.39                    |          |                  |              |
| <b>None</b>                                         |     |                               |          |                  |              |
| No                                                  | 132 | 19.07±4.81                    | t=6.192  | <b>&lt;0.001</b> | <b>0.006</b> |
| Yes                                                 | 25  | 12.76±3.84                    |          |                  |              |

Z=Mann whitney U test, t=Independent samples t test, \*Bonferroni corrected,  $p<0.05$ , STI= Sexually transmitted infections

**Table 2.** Comparison of participants' attitudes toward STIs in relation to their STI knowledge scores (n=157)

| Variables                                                                                          | n   | STI Knowledge Score (Mean±SD) | p-value, post-hoc | $\chi^2/F$ |
|----------------------------------------------------------------------------------------------------|-----|-------------------------------|-------------------|------------|
| <b>Do you think education about sexually transmitted infections should be provided in schools?</b> |     |                               |                   |            |
| 1) No                                                                                              | 10  | 13.00±4.11                    | <b>&lt;0.001*</b> | 26.879*    |
| 2) Undecided                                                                                       | 16  | 13.25±4.22                    |                   |            |
| 3) Yes                                                                                             | 131 | 19.04±4.84                    |                   |            |
| <b>Do you consider access to sexual health services in Türkiye sufficient?</b>                     |     |                               |                   |            |
| 1) No                                                                                              | 10  | 14.70±5.64                    | 0.046*            | 6.145*     |
| 2) Undecided                                                                                       | 34  | 17.03±5.45                    |                   |            |
| 3) Yes                                                                                             | 113 | 18.67±4.96                    |                   |            |
| <b>How would you rate your knowledge level about sexually transmitted infections?</b>              |     |                               |                   |            |
| 1) Sufficient                                                                                      | 55  | 16.29±4.53                    | 0.003+            | 6.172+     |
| 2) Insufficient                                                                                    | 69  | 18.55±5.21                    |                   |            |
| 3) Undecided                                                                                       | 33  | 20.00±5.45                    |                   |            |

\*  $\chi^2$ =Kruskal Wallis H test, Post-Hoc=DUNN'S,  $p<0.05$ , + F=One-Way ANOVA test, Post-Hoc=Bonferroni,  $p<0.05$ , STI= Sexually transmitted infections

**Table 3.** Comparison of participants' behavioral characteristics related to STIs in terms of STI knowledge scores (n=157)

| Variables                                                                                                    | n   | STI Knowledge Score<br>(Mean $\pm$ SD) | t      | p-value | p-value* |
|--------------------------------------------------------------------------------------------------------------|-----|----------------------------------------|--------|---------|----------|
| <b>Have you ever had sexual experience?</b>                                                                  |     |                                        |        |         |          |
| No                                                                                                           | 50  | 18.50 $\pm$ 5.29                       | 1.528  | 0.139   | -        |
| Yes                                                                                                          | 107 | 17.14 $\pm$ 4.93                       |        |         |          |
| <b>Do you use any contraceptive method?</b>                                                                  |     |                                        |        |         |          |
| No                                                                                                           | 89  | 18.83 $\pm$ 5.12                       | 2.141  | 0.034   | -        |
| Yes                                                                                                          | 68  | 17.06 $\pm$ 5.17                       |        |         |          |
| <b>Which of the following reflects your situation regarding talking about STIs or safe sexual practices?</b> |     |                                        |        |         |          |
| I can talk with my family/relatives                                                                          |     |                                        | -1.685 | 0.094   | 0.376    |
| No                                                                                                           | 125 | 17.71 $\pm$ 5.24                       |        |         |          |
| Yes                                                                                                          | 32  | 19.44 $\pm$ 4.87                       |        |         |          |
| <b>I can talk with my group of friends</b>                                                                   |     |                                        |        |         |          |
| No                                                                                                           | 73  | 16.22 $\pm$ 5.29                       | -4.335 | <0.001  | 0.004    |
| Yes                                                                                                          | 84  | 19.67 $\pm$ 4.58                       |        |         |          |
| <b>I can talk with my family physician or nurse</b>                                                          |     |                                        |        |         |          |
| No                                                                                                           | 75  | 16.63 $\pm$ 5.32                       | -3.424 | 0.001   | 0.004    |
| Yes                                                                                                          | 82  | 19.38 $\pm$ 4.75                       |        |         |          |
| <b>I cannot talk comfortably with anyone</b>                                                                 |     |                                        |        |         |          |
| No                                                                                                           | 122 | 18.67 $\pm$ 4.96                       | 2.797  | 0.006   | 0.024    |
| Yes                                                                                                          | 35  | 15.94 $\pm$ 5.52                       |        |         |          |

t=Independent samples t test, \*Bonferroni corrected, p&lt;0.05, STI= Sexually transmitted infections

**Table 4.** Frequency distribution of participants' correct and incorrect responses to STI knowledge items (n=157)

| Items                                                                              | Incorrect n (%) | Correctn (%) |
|------------------------------------------------------------------------------------|-----------------|--------------|
| <b>Is the statement "Sexually transmitted" correct for the following diseases?</b> |                 |              |
| AIDS/HIV                                                                           | 27 (17.2)       | 130 (82.8)   |
| Syphilis                                                                           | 135 (86.0)      | 22 (14.0)    |
| Hepatitis B                                                                        | 72 (45.9)       | 85 (54.1)    |
| Hepatitis C                                                                        | 100 (63.7)      | 57 (36.3)    |
| Genital Fungal Infection                                                           | 56 (35.7)       | 101 (64.3)   |
| Genital Warts (HPV)                                                                | 65 (41.4)       | 92 (58.6)    |
| Herpes Simplex                                                                     | 142 (90.4)      | 15 (9.6)     |
| Gonorrhea                                                                          | 103 (65.6)      | 54 (34.4)    |
| <b>Which of the following are effective in preventing STIs?</b>                    |                 |              |
| Monogamous relationship helps prevent STIs                                         | 77 (49.0)       | 80 (51.0)    |
| IUD protects against STIs                                                          | 19 (12.1)       | 138 (87.9)   |
| Birth control pills protect against STIs                                           | 18 (11.5)       | 139 (88.5)   |
| Good hygiene of the partner protects against STIs                                  | 85 (54.1)       | 72 (45.9)    |
| Having multiple sexual partners increases STI risk                                 | 57 (36.3)       | 100 (63.7)   |
| Condom protects against STIs                                                       | 55 (35.0)       | 102 (65.0)   |
| <b>Which of the following are risk groups for STIs?</b>                            |                 |              |
| Individuals with multiple sexual partners                                          | 19 (12.1)       | 138 (87.9)   |
| Individuals engaging in anal intercourse                                           | 64 (40.8)       | 93 (59.2)    |
| Sex workers                                                                        | 39 (24.8)       | 118 (75.2)   |
| Individuals with poor personal hygiene                                             | 47 (29.9)       | 110 (70.1)   |
| Homosexual individuals                                                             | 101 (64.3)      | 56 (35.7)    |
| People who use drugs                                                               | 101 (64.3)      | 56 (35.7)    |
| <b>Which of the following are symptoms of STIs?</b>                                |                 |              |
| Genital sores                                                                      | 43 (27.4)       | 114 (72.6)   |
| Genital itching                                                                    | 46 (29.3)       | 111 (70.7)   |
| Pain during intercourse                                                            | 95 (60.5)       | 62 (39.5)    |
| Lower back pain                                                                    | 108 (68.8)      | 49 (31.2)    |
| Erectile dysfunction                                                               | 40 (25.5)       | 117 (74.5)   |
| Weakened immune system                                                             | 79 (50.3)       | 78 (49.7)    |
| Menstrual irregularities                                                           | 60 (38.2)       | 97 (61.8)    |
| Burning during urination                                                           | 87 (55.4)       | 70 (44.6)    |
| <b>What are the possible consequences of STIs?</b>                                 |                 |              |
| Transmission to baby during pregnancy                                              | 87 (55.4)       | 70 (44.6)    |
| Infertility                                                                        | 117 (74.5)      | 40 (25.5)    |
| Cancer                                                                             | 85 (54.1)       | 72 (45.9)    |
| Erectile dysfunction                                                               | 121 (77.1)      | 36 (22.9)    |
| Menstrual irregularities                                                           | 98 (62.4)       | 59 (37.6)    |
| Weak immune system/frequent infections                                             | 54 (34.4)       | 103 (65.6)   |

n: number, %: Frequency, STI: Sexually transmitted infections

Regarding STI prevention methods, 88.5% of participants believed that OCPs, and 87.9% believed that IUDs, provide protection against STIs. Additionally, 87.9% identified having multiple sexual partners and 75.2% identified engaging in sexual activity for payment as risk factors for STIs.

In terms of STI symptoms, the most commonly recognized signs included genital ulcers (72.6% correct), genital itching (70.7% correct), and erectile dysfunction (74.5% correct). In contrast, awareness was lower for symptoms such as pain during intercourse (39.5% correct), burning sensation during urination (44.6% correct), and weakened immune system (49.7% correct).

Regarding potential consequences of STIs, participants demonstrated higher awareness of vertical transmission during pregnancy (44.6% correct), cancer (45.9% correct), and immune system suppression (65.6% correct). However, knowledge was limited concerning infertility (25.5% correct), erectile dysfunction (22.9% correct), and menstrual irregularities (37.6% correct).

## Discussion

This study comprehensively examined the knowledge level of adolescents aged 18–21 regarding STIs, their sources of information, attitudes toward communication preferences, and protective behaviors. The findings indicate that the majority of participants had not received adequate education on STIs, and that knowledge was particularly limited regarding certain infections. Moreover, the finding that individuals who reported being able to communicate with healthcare professionals had higher knowledge scores is consistent with the importance of effective health education and counseling.

It was found that 74.5% of participants had not previously received education about STIs. According to the guidelines of the Reproductive Health Program for Youth conducted by the General Directorate of Maternal and Child Health and Family Planning in Türkiye, many national studies have reported that adolescents lack sufficient knowledge about reproductive health [10]. In a study by Bakır et al., 62.9% of students reported perceiving their level of knowledge as inadequate [6]. Another study found that 85% of university students had never received any services related to sexual health [11]. The rate found in the present study is consistent with these findings in the literature.

In the present study, female participants had higher STI knowledge scores compared to their male counterparts. Similar findings have been reported in the studies of Oğuzkaya-Artan and Baykan, as well as Reis et al. [13,14]. However, there are also studies in the literature that found no significant gender differences in STI knowledge levels, or even reported higher knowledge among males compared to females [15,16]. These discrepancies suggest that factors such as education and awareness levels may play a more critical role in determining knowledge levels than gender alone.

A slight increase in STI knowledge scores was observed with increasing age. This is consistent with the findings of Siyez et

al., who also reported higher STI knowledge with increasing age [17]. Similarly, the study by Bakır and Beji demonstrated a positive association between age and STI knowledge [6]. These results suggest that STI knowledge scores tend to be higher in older age groups, possibly reflecting greater exposure to education and information over time.

Globally, the average age of first sexual intercourse has been declining, which poses serious health risks such as unintended pregnancies, pregnancy-related complications, and sexually transmitted infections [18]. Therefore, initiating comprehensive sexual health education during adolescence is crucial, as it not only facilitates accurate knowledge acquisition but also promotes the development of healthy and safe sexual behaviors. A report published by the United Nations also emphasized that sexual health education reduces risky behaviors and strengthens overall sexual health [19]. Studies conducted in Türkiye support these findings, showing that sexual education provided to adolescents significantly reduces engagement in risky behaviors [20].

In the 2023 Türkiye Youth Survey, it was found that among young people who had experienced sexual intercourse, half did not use any contraceptive method, only one in four obtained sexual health information from teachers, and there were significant gaps in their knowledge regarding fundamental aspects of fertility and reproduction [10]. Similarly, the study conducted by Ipinimo et al. revealed that adolescents who had not received sexual health education tended to initiate sexual activity at an earlier age and were more likely to engage in unprotected sex [21]. These findings, in line with the results of the present study, where 68% of late-adolescent participants reported having had sexual experience and 75% stated they had never received any form of sexual health education, highlight a critical gap. Many young people appear to enter sexual relationships without adequate knowledge or preparation, which may be linked to increased risks of unintended pregnancies and sexually transmitted infections. This clearly underscores the urgent need for comprehensive and systematic sexual health education starting in early adolescence, not only to delay sexual initiation but also to promote safer sexual behaviors and better public health outcomes.

In a study conducted in Türkiye, it was found that participants obtained information about sexuality primarily from healthcare professionals (44.2%), followed by family members (24.4%), schools (22.1%), media and the internet (11.9%), peers (8.3%), and erotic content (2.2%) [22]. Similarly, another study reported that young people preferred to receive information about sexual health primarily from healthcare professionals, followed by books/magazines and parents [23]. In the present study, however, participants in the late adolescence period cited school, television/magazines/books, and healthcare professionals as their primary sources of information, respectively. Notably, participants who reported school or healthcare professionals as their sources of information had significantly higher STI knowledge scores than those who did not. This finding suggests an association with the

potential quality of education received from reliable, scientific sources and underscores the critical role of schools in providing sexual health education.

In the literature, several studies have questioned the content and effectiveness of STI education. For example, in one study, only 39% of students found their STI-related knowledge satisfactory, while just 35.9% were deemed to have an adequate knowledge score [16]. In the study by Koç and Sağlam, although 95.1% of students stated that they had knowledge about STIs, only 4.6% believed that this knowledge was sufficient [24]. Similarly, in the present study, although individuals who had received education on STIs had higher knowledge scores, many still assessed their knowledge level as “insufficient.” This may be explained by the fact that individuals who receive education are more likely to grasp the multidimensional nature of the topic and evaluate the information they acquire with a more critical perspective. Greater access to information and education may be associated with both enhanced awareness and a more critical evaluation of one’s own knowledge adequacy.

In the current study, 83% of participants stated that STI education should be provided in schools. This rate aligns with the 75% support reported in the study by İncesu et al. [25]. The strong demand for structured, school-based education reflects the essential role of education in addressing knowledge gaps among youth. Moreover, the finding that those who supported school-based education had significantly higher STI knowledge scores suggests that individuals with greater knowledge are more likely to recognize the importance of education.

When participants were asked with whom they felt comfortable discussing sexual health issues, 53.5% reported being able to talk to their friends, 52.2% to healthcare professionals, and 20.4% to family members. However, 22.3% stated that they were unable to communicate with anyone on this topic. The literature frequently highlights that young people often find it difficult to discuss sexuality with their families and primarily rely on their peer groups for information [26-30]. In contrast, studies in developed countries have shown that parents are generally more open to discussing these issues with their children [31]. In the present study, participants who reported discussing these topics with friends or healthcare professionals had significantly higher STI knowledge scores, whereas those who were unable to discuss them with anyone had lower scores. Nevertheless, 52.8% of those who reported not being able to talk to anyone stated that they would consult a family physician or nurse if they encountered a problem. These findings suggest that primary care providers are perceived as accessible and trustworthy sources of guidance, and that healthy communication with both peers and family members appears to be associated with higher STI-related knowledge.

When evaluating participants’ knowledge levels regarding STIs, notable gaps were observed both in disease recognition and in understanding transmission risks. The literature consistently

reports that AIDS/HIV is the most commonly known STI, whereas awareness of HPV, gonorrhea, syphilis, and fungal infections remains limited [26,32-34]. Consistent with these findings, the present study showed that AIDS/HIV was the most well-known STI, while knowledge levels regarding syphilis, herpes simplex, and gonorrhea were considerably lower. This gap in knowledge is concerning, especially given the epidemiological data: according to 2023 reports, approximately 48.2% of reported cases of chlamydia, gonorrhea, and syphilis in the United States occurred among adolescents and young adults aged 15–24 years [35].

Additionally, participants demonstrated limited knowledge regarding high-risk groups for STI transmission. In the study by Yaşar et al., the majority of participants identified individuals with multiple sexual partners (77.2%), homosexual individuals (74.4%), sex workers (61.2%), and those with an active sexual life (54.4%) as high-risk groups [36]. However, in a study by Demir et al., these proportions were notably lower, with particularly limited awareness regarding homosexual individuals (17.3%) and people who use drugs (7.1%) [26]. Similarly, in the present study, while 87.9% of participants recognized multiple sexual partners as a risk factor, awareness was lower for homosexuality, substance use, and anal intercourse. These findings suggest that despite being at increased risk for exposure to STIs and high-risk behaviors, many young individuals do not possess sufficiently comprehensive knowledge to adequately identify such risks.

In this study, 63.5% of participants reported having used at least one contraceptive method, with the most commonly used methods being condoms (35.1%), OCPs (18.6%), emergency contraception (15.3%), and the withdrawal method (14.2%). Similar results have been reported in the literature, Sayar and Yazar identifying condoms as the most frequently used method among adolescents [37]. Dilmen and Kocaöz highlighted the ongoing preference for traditional methods such as withdrawal, while Çakmak et al. noted persistent knowledge gaps regarding the effects of oral and emergency contraceptives despite their widespread use [38,39].

These findings indicate that while young individuals may have theoretical knowledge about contraceptive methods, they face challenges in accessing accurate information and translating this knowledge into safe behavior. Indeed, in the present study, only 65% of participants correctly identified condoms as effective in preventing STIs, and a portion of respondents incorrectly believed that contraceptive methods such as OCPs and IUDs also protect against STIs. Similar misconceptions have been previously reported [6,15,17,40], with studies highlighting that some adolescents either do not use protection at all or use contraceptive methods incorrectly [37].

Our findings also revealed that participants who reported using contraceptive methods had lower STI knowledge scores compared to non-users. Beyond the misconceptions discussed above, other factors may also contribute to this result. For instance, some adolescents may prioritize pregnancy prevention over STI prevention and therefore pay less attention to STI-related

knowledge and protective behaviors. Furthermore, this finding may reflect gaps in sexual health education and counseling, where information about contraception is provided without sufficient emphasis on STI risks [41]. These observations underscore the need for comprehensive sexual health education that clearly distinguishes between contraception and STI prevention.

This study has several limitations. First, although the STI knowledge questionnaire was developed based on WHO and national guidelines, it was not subjected to formal content validity testing, expert review, pilot testing, or factor analysis. Moreover, the dichotomous coding of the items (0/1) limited the applicability of conventional factor analysis in SPSS. As a result, the construct validity of the scale may be limited, and the findings should be interpreted with caution. Second, the study sample was drawn from a single outpatient clinic, representing a convenience sample, which may introduce sampling bias and limit the generalizability of the results to broader adolescent populations. Third, the STI knowledge score was analyzed as a continuous variable without defining cut-off values for adequate versus inadequate knowledge; thus, the results should be interpreted descriptively. Finally, regression modeling was not performed, and potential confounding could not be fully controlled. Future studies with larger and more diverse samples should incorporate multivariate analyses to identify independent predictors of STI knowledge.

## Conclusion

The findings of this study indicate that adolescents aged 18–21 have insufficient knowledge regarding STIs, with significant gaps particularly in the recognition of specific STIs and associated transmission risks. The lack of prior education among a substantial proportion of participants, the presence of misconceptions about protective methods, and limited access to reliable sources of guidance suggest that many young individuals remain vulnerable to STIs. The observed associations between knowledge level and factors such as gender, age, sources of information, and communication preferences underscore the importance of individualized, credible, and structured sexual health education programs.

Expanding school-based education initiatives, reinforcing the guiding role of healthcare professionals, and promoting community-based interventions that encourage open communication around sexual health will help improve access to accurate information and support the adoption of healthy behaviors among youth. Accordingly, the development and implementation of sustainable, scientifically grounded, and age-appropriate national sexual health education policies represent a critical requirement for the protection and promotion of public health.

## Conflict of Interests

*The authors declare that there is no conflict of interest in the study.*

## Financial Disclosure

*The authors declare that they have received no financial support for the study.*

## Ethical Approval

*The study received ethical approval from the University of Health Sciences Şişli Hamidiye Etfal Training and Research Hospital (Approval No: 4496) (Approval Date: 20.08.2024).*

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