A Comprehensive Sexuality Education Attempt with Turkish University Students: Examining Changes and Challenges in Knowledge, Attitudes and Myths about Sexuality

Bir Cinsel Eğitim Girişimi: Türk Üniversite Öğrencilerinin Cinsellik Bilgisi, Tutumları ve Mitleri Üzerindeki Değişimlerin ve Zorlukların İncelenmesi

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Abstract

This study examined the effectiveness of a six-week sexuality education program in enhancing university students' sexual knowledge, reducing belief in sexual myths, and improving sexual attitudes. In this quasi-experimental, single-blind, pre-test–post-test control group design research, participants were assigned to either the experimental or control group, and data were collected before and after the intervention. The training was developed based on evidence-based principles of Comprehensive Sexuality Education and delivered in an online, interactive format. Findings indicated no statistically significant differences between or within groups on any of the outcome variables. Despite the program's alignment with established educational frameworks, the lack of significant effects suggests that additional contextual factors—such as participant engagement, cultural relevance, and mode of delivery—may have influenced the results. These findings point to the complex nature of sexuality education implementation and highlight the need for sustainable, participatory, and culturally sensitive approaches. Future research is recommended to refine assessment tools, increase sample size, and explore mixed-methods designs to capture nuanced outcomes better.

Keywords: Sexuality education, university students, sexual myths, sexual attitudes, sexual knowledge.

Öz

Bu çalışma, üniversite öğrencilerine yönelik altı haftalık bir cinsellik farkındalığı temelli eğitimin, öğrencilerin cinsellik bilgisi, cinsel mitlere inanma düzeyleri ve cinselliğe yönelik tutumları üzerindeki etkisini incelemektedir. Yarı deneysel, tek kör, ön test-son test kontrol gruplu desenle yürütülen araştırmada, katılımcılar deney ve kontrol gruplarına ayrılmış; veriler nicel ölçme araçlarıyla toplanmıştır. Eğitim programı, Kanıta Dayalı Kapsamlı Cinsellik Eğitimi (KCE) ilkelerine dayanarak geliştirilmiş ve çevrim içi ortamda uzmanlar tarafından yürütülmüştür. Analizler, deney ve kontrol grupları arasında ya da deney grubu içinde anlamlı bir değişim olmadığını göstermektedir. Programın yerleşik eğitim çerçeveleriyle uyumlu olmasına rağmen, katılımın gönüllülük esasına dayanması, düşük devam oranı, çevrim içi etkileşim kısıtlılığı ve örneklem büyüklüğünün sınırlı oluşu gibi etkenler, programın etkisini sınırlamış olabilir. Bulgular, cinsellik eğitimi programlarının yalnızca içeriksel doğruluğuyla değil, aynı zamanda katılımcıların kültürel bağlamı, etkileşim düzeyi ve uygulama biçimiyle de desteklenmesi gerektiğini ortaya koymaktadır. Çalışma, üniversite ortamında sürdürülebilir, etkileşimli ve bağlamsal olarak duyarlı cinsellik eğitimlerine duyulan ihtiyacı vurgulamakta; gelecekteki araştırmalar için değerlendirme araçlarını iyileştirmesi, örneklem büyüklüğünü artırması ve nüanslı sonuçları daha iyi yakalamak için karma yöntem tasarımlarını keşfetmesi önerilmektedir.

Anahtar Kelimeler: Cinsellik eğitimi, üniversite öğrencileri, cinsel mitler, cinselliğe yönelik tutumlar, cinsel bilgi.

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1. Introduction

According to the World Health Organisation (WHO, 2010), sexual health is defined not merely as the absence of disease or disability in sexual life but as a state of overall emotional, cognitive, and social well-being. Dailey (2017) distinguished between sexuality and sex (or sexual), noting that sexuality encompasses various dimensions of the human experience, addressing all aspects of being a sexual and gendered individual, while "sex" pertains to intercourse, physiology, reproduction, and the associated organs. The former offers a more comprehensive perspective by integrating biological, psychological, and social dimensions of human sexuality. A fulfilling sexuality can thrive in a healthy manner when supported by education and free from anxiety (Sharifli et al., 2024).

As of the 2022–2023 academic year, 8.17% of Türkiye's population is enrolled in public and foundation universities (Council of Higher Education). Research indicates that most university students in Türkiye have not received adequate sexuality or sex education, and those who have often find it insufficient (e.g., Ceylan et al., 2024; Yalnız & Verimer, 2024; Yalnız-Dilcen et al., 2024). Studies assessing the sexuality education needs of university students reveal a preference for comprehensive programs that go beyond sexually transmitted diseases and condom usage, focusing instead on broader aspects of sexuality (e.g., Astle et al., 2021; Siyez et al., 2018).

One effective way to positively influence university students' beliefs, attitudes, behaviours, and skills regarding sexuality while fostering informed and healthy decision-making is through the provision of fact-based psychoeducational programs. The *International Technical Guidance on Sexuality Education*, revised in 2018, was developed through the collaboration of The Joint United Nations Programme on HIV/AIDS (UNAIDS), The United Nations Population Fund (UNFPA), The United Nations Children's Fund (UNICEF), and the WHO. Comprehensive Sexuality Education (CSE), as it is termed, aims to enhance individuals' awareness of their physical and mental health, foster respectful social and sexual relationships, encourage thoughtful decision-making, and empower individuals to acquire the knowledge, skills, attitudes, and values needed to recognise, protect, and uphold their rights throughout their lives (UNESCO, 2018).

The technical guidance outlines eight key topics that should be included in any sexuality education program: (1) relationships, (2) values, rights, culture, and sexuality, (3) understanding gender, (4) violence and staying safe, (5) skills for health and well-being, (6) the human body and development, (7) sexuality and sexual behaviour, and (8) sexual and reproductive health. Experts recommend beginning sexuality education at an appropriate developmental stage, following a curriculum-based approach that addresses the cognitive, emotional, physical, and social dimensions of sexuality. Such education should start in childhood and continue through adolescence into adulthood (Opera et al., 2010).

Moreover, these programs play a crucial role in cultivating positive attitudes, behaviours, and skills toward sexuality (e.g., Drew et al., 2023). They help individuals value and respect their own bodies and those of their partners, understand sexual development, and navigate the complex aspects of sexual growth that evolve through interactions with their environments (Balter et al., 2016).

In today's world, young people face an increasing number of challenges, including HIV, sexually transmitted infections (STIs), unintended pregnancies, negative body image, difficulties in expressing gender and sexual identity, and violence in dating relationships (Young Lee & Ye Lee, 2018). These challenges are particularly prevalent during the developmental stage known as emerging adulthood, which encompasses individuals aged 18 to 29 (Arnett et al., 2014). This period is marked by critical life transitions, alongside cognitive and emotional changes as individuals navigate the shift from adolescence to adulthood (Tanner et al., 2009). According to Tanner et al. (2009), individuals at this stage often form close relationships and rapidly explore their sexual experiences. For instance, it has been reported that 68% of 19-year-olds and 75% of 20-year-olds in the USA are sexually active (Abma & Martinez, 2017), while the rate is 23.7% among university students in Türkiye (Seymenler, 2017).

Moreover, research indicates that by the age of 29, 97% of individuals have engaged in sexual activity, with significant potential for high-risk sexual behaviours or vulnerability to such behaviours (Mosher et al., 2005; Young Lee & Ye Lee, 2018). For example, findings from the American College Health Association National College Health Assessment reveal that 49.8% of university students reported "rarely or never" using condoms or protective barriers during vaginal intercourse, and 20.6% admitted to engaging in unprotected sexual intercourse while under the influence of alcohol (ACHA, 2016). During this critical period of identity exploration, individuals are particularly vulnerable to sexual health issues that can affect their lifelong well-being (Arnett, 2000; Meier & Allen, 2008).

CSE is characterised by diverse sources offering varying definitions and priorities. Miedema et al. (2020b) reviewed the literature on existing CSE frameworks and identified four fundamental components standard across programs: (1) rights, participation, and agency; (2) sexual and reproductive health-related concerns and practices; (3) gender equality and power dynamics; and (4) positive sexualities and respectful relationships.

The first component, rights, participation, and agency, focuses on safeguarding young people's rights in sexual and reproductive health (SRH) while enhancing their knowledge, attitudes, and life skills. The second component

emphasises the need to incorporate SRH education into programs, extending the concept of 'health' beyond unplanned pregnancies and infections to include emotional, psychological, and social dimensions (UNPFA, 2015).

Gender equality and power dynamics address individual autonomy over one's body and decision-making in sexual relationships. This theme encourages the exploration of power dynamics within relationships, emphasizing gender, violence, and autonomy in sexual contexts (UNESCO, 2018). The fourth component, positive sexualities and respectful relationships, adopts a holistic and affirmative approach to sexual health and well-being. It highlights the importance of sexual pleasure, consent, and mutual respect. Respectful relationships promote recognition and acceptance of diverse sexual orientations and practices, advocating for safe, consensual, and fulfilling sexual experiences free from stigma and discrimination (Miedema et al., 2020a). Because these components are interconnected, overlaps or interactions often occur within specific themes. For CSE programs to be comprehensive and inclusive, it is recommended that all these elements be addressed cohesively, ensuring a well-rounded and impactful approach to sexuality education.

Sexual education has been shown to play a pivotal role in addressing these issues, preventing problematic behaviours during emerging adulthood, and empowering young people to advocate for their sexual rights (Haberland & Rogow, 2015; Young Lee & Ye Lee, 2018). Evidence suggests that university students who receive sexual education demonstrate higher levels of sexual health literacy (Li et al., 2017), more positive attitudes toward sexuality (Yeşil & Apak, 2024), and better abilities to care for their sexual health (Boti et al., 2019; Schindele et al., 2023).

1.1. Purpose of the Present Study

In recent years, scholars have urged higher education institutions to integrate sexuality education into their academic programs (Levand, 2022). However, the higher education system in Türkiye does not currently offer curriculum-based sexuality education for university students. Additionally, only a limited number of sexuality education programs are available for university students in Türkiye, and their effectiveness has been empirically tested in only a few cases (see Siyez et al., 2018, for a review).

The lack of knowledge and education about sexuality, belief in sexual myths, a strong societal emphasis on virginity, and negative attitudes toward sexuality have been linked to various sexual problems and dysfunctions (İncesu, 2004; Uyar et al., 2017). In response, this study developed a sexuality awareness-based education program tailored for university students. The program was designed to test the hypothesis that participation would lead to a decrease in beliefs in sexual myths, positive changes in sexual attitudes, and an increase in levels of sexual knowledge among university students.

1.2. Sexual myths

Sexuality varies widely among individuals, shaped significantly by cultural and religious influences, while myths about sexuality are prevalent across various cultures and often share common themes (Aker et al., 2019). Burt (1980, p. 217) defines myths as "prejudicial, stereotyped, or false beliefs." Although their origins are not well-documented, sexual myths can impact individuals differently and to varying degrees (Aker et al., 2019). Drawing from social sciences, Lonsway et al. (1994) argued that myths explain important cultural phenomena and help justify established norms and societal structures. Cultural, religious, and ethnic backgrounds significantly influence the formation and transmission of these myths across generations (Leiblum et al., 2003). For instance, a study on Muslim students found that belief in sexual myths was more prevalent among those who practised daily religious rituals compared to those who did not (Apay et al., 2013). This phenomenon is not exclusive to any one religion; connections between religious beliefs and sexual myths are widely observed across cultures (Aker et al., 2019).

Taboos surrounding sexuality and restrictions on open conversations about the subject contribute to the creation and perpetuation of sexual myths. Well-meaning but misinformed parents, aiming to promote moral education, often serve as a source of such myths (Mosher, 1979). Additionally, peer groups, older siblings, media outlets, and even pornography reinforce these myths (Apay et al., 2013; Krahé et al., 2022). Geographical factors and parental education levels have also been found to influence beliefs in sexual myths (Evcili & Gölbaşı, 2017; Torun et al., 2011).

Sexual myths, typically exaggerated, incorrect, and scientifically invalid, affect people's attitudes and behaviours related to sexual matters (Nobre et al., 2003). According to Ajzen's (1991, 2012, 2020) theory of planned behaviour, actions stem from attitudes and intentions, both of which are rooted in beliefs, including myths (Bosnjak et al., 2020). Myths are rarely beneficial and often harmful, contributing to sexual dysfunction, negatively affecting gender identity, and reducing the quality of sexual relationships (Apay et al., 2015; Mosher, 1979). Among university students, distorted sexual knowledge and beliefs in sexual myths frequently restrict healthy expressions of sexuality (Aydın, 2012). These myths, instilled during childhood, often lead to anxiety, guilt, and fear in adulthood (Kukulu et al., 2009).

Conversely, individuals with greater sexual knowledge are less likely to believe in such myths (Bozkurt, 2016). An inverse relationship has also been observed between belief in sexual myths and positive sexual self-schemas among university students (Aker et al., 2019).

1.3. Sexual Attitudes

Sexual attitudes encompass an individual's cognitive, emotional, and behavioural responses to sexual matters, significantly influencing their sexual experiences, behaviours, thoughts, sexual identity, and orientation (Hendrick et al., 2006). These attitudes are shaped by various factors, including family, social environment, and religious beliefs (Özdemir & Buran, 2023). Personality traits, previous sexual experiences, educational level, and media exposure—such as pornography, films, and blogs—also play a crucial role in shaping an individual's sexual attitudes (Krahé et al., 2022).

Research shows that individuals with good mental health and a positive body image are more likely to exhibit positive sexual attitudes and experience higher levels of sexual satisfaction compared to others (WHO, 2010). Positive changes in sexual attitudes have the potential to improve the quality of future sexual relationships (Alexander et al., 2015). With appropriate sexual education, individuals can cultivate or reinforce positive attitudes, balance power dynamics within intimate relationships, help prevent sexual abuse, and foster more respectful and equitable partnerships (Tanton et al., 2015).

Sexual satisfaction relies on individuals' ongoing efforts to develop, protect, and maintain their sexual health. Achieving this requires access to accurate and comprehensive information about sexuality and sexual health (Gürsoy & Zeren, 2018). Such access enhances self-esteem, enables informed and respectful decision-making in sexual relationships, and fosters comprehensive knowledge and skills. Psychological factors contributing to sexual dysfunction, often rooted in misinformation or lack of knowledge, include misinterpretations of past sexual experiences, aggression, difficulty expressing emotions, excessive self-control, feelings of guilt and shame, low self-esteem, absence of sexual fantasies, negative effects from previous sexual encounters, stress, fatigue, and an overemphasis on performance rather than emotional connection (Jaderek & Lew-Starowicz, 2019).

1.4. The program: Aims, content and method

We aimed to encourage participants to question their myths, shift their attitudes positively, and increase their knowledge regarding sexuality by means of developing this program. The principles of CSE (Miedema et al., 2020b) with a psycho-educational framework have been utilised to create a tailored sexual awareness psychoeducational program for a group of university students. A six-week education program was designed, and the program included the following topics: (1) What is sexuality? (2) Gender identity and sexual orientation, (3) Sexually transmitted infections and prevention methods, (4) Safe sex and consent, (5) Myths about sexuality, and (6) Sexual rights and laws. A professional team with expertise in both educational and practical aspects of sexual training and the authors collaborated in the development of the program.

The first session introduced sexuality as a multidimensional concept encompassing biological, emotional, cognitive, relational, and cultural components. It aimed to differentiate between commonly confused terms such as "sex," "gender," and "sexuality," while promoting an inclusive understanding that goes beyond reproduction and physical intimacy. Interactive discussions explored how societal norms and personal experiences shape sexual development and identity. The second session focused on gender identity and sexual orientation, clarifying terms such as cisgender, non-binary, and asexual, and encouraging inclusive attitudes. The third session addressed sexually transmitted infections (STIs) and prevention methods, providing accurate information on transmission, symptoms, and protective practices such as condom use and testing. In the fourth session, the topics of safe sex and consent were explored through interactive scenarios, emphasising the importance of mutual, enthusiastic, and informed consent in sexual relationships. The fifth session targeted common sexual myths, encouraging participants to critically reflect on culturally transmitted misinformation about sexuality, gender roles, and performance. Finally, the sixth session provided an overview of sexual rights and relevant legal frameworks in the Turkish context, focusing on bodily autonomy, access to accurate information, protection from violence, and anti-discrimination principles. Each session was designed to foster critical thinking, promote respectful dialogue, and enhance participants' capacity for informed and autonomous decision-making regarding their sexual health.

The team members consisted of specialists from various NGO's on sexual health, two academicians from psychological counselling and guidance programs at two universities, and a group of junior university students within the scope of a student project funded by the home universities of the authors. In the fall 2022 semester, specialists delivered the program content online, tailored to their areas of expertise. Each specialist was responsible for a specific week and organised their sessions interactively with the participants.

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To ensure cultural relevance, the content was carefully adapted to the Turkish socio-cultural context. Terminology, examples, and case scenarios were modified to reflect local norms, values, and legal frameworks. Special attention was given to addressing culturally prevalent sexual myths and taboos, as well as the emphasis on virginity and honour-based gender expectations—common themes in Turkish society. Religious sensitivities and gender diversity were also approached with inclusive and respectful language to maintain participant comfort and foster open discussion. The culturally adapted content aimed to create a psychologically safe learning environment, where participants could critically examine their beliefs and attitudes within a context they could relate to.

2. Method

2.1. Participants

A total of 76 university students aged between 18 and 27 (M= 20.80, SD= 1.95) filled out the pre-test questionnaires. They identified their gender identities as cisgender women (n = 59), cisgender men (n= 11), bigender (n= 2), fluid (n= 1), intersex (n= 1), non-binary (n= 1), and trans male (n= 1). Upon reviewing their responses about sexual orientation, participants identified as heterosexual (n= 63), bisexual (n = 4), homosexual (n= 3), grey asexual (n= 1), gynophilic (n= 1), queer (n= 2), and omnisexual (n= 2). Twenty-one of the respondents (27.63%) had previously attended a course, lecture, conference, or workshop related to sexuality, while the remaining participants (n=55; 72.37%) had not received any such education. Forty-five of the respondents were in a romantic relationship at the time of data collection, while the rest were not. Furthermore, sixty-nine respondents (90.79%) reported having conversations about sexuality with someone, while the rest indicated that they did not participate in such discussions.

Initially, there were 30 participants assigned to the experimental group, but the attendance rates were 20, 15, 8, 8, 8, 8 and 8 participants for the total six sessions, respectively. We analysed the pre- and post-test scores from the participants who attended all the sessions. Participants in the experimental group (n = 8) averaged 22.13 years of age (SD = 1.64). Among the eight participants, 6 (75%) indicated their gender as cisgender women, 1 (12.5%) as cisgender men, and one (12.5%) as androgen. Seven of them reflected their sexual orientation as heterosexual, while one of them reflected as grey asexual. Half of the participants have never received any sexual education. Additionally, six participants (75%) were in a romantic relationship at the time of data collection, while two (25%) were not. All participants had someone with whom they could discuss sexuality. The control group consisted of 9 participants, with an average age of 19.11 (SD= 19.11). They identified their gender identities as cisgender women (n=7; 77.78%), cisgender men (n=1; 11.11%), and trans male (n=1; 11.11%). Seven participants described their sexual orientation as heterosexual, one as bisexual, and one as queer. None of them had received any prior sexual education. Additionally, five of the participants (55.56%) were currently in a romantic relationship, while four (44.44%) were not. Eight participants (88.89%) reported having someone to discuss sexuality with, while the remaining participants stated that they do not talk about this topic with anyone.

2.2. Data Collection Instruments

1. Demographics We prepared a 13-question form to gather information about participants' personal information, such as gender identity, sexual orientation, any previous experience of sexual education, etc.
2. Belief in Sexual Myths We assessed participants' beliefs on sexual myths by using the Sexual Myth Assessment Form developed by Zilbergeld (1999) and adapted into Turkish by Torun et al. (2011). The form consists of 30 widely believed sexual myths. Participants were instructed to rate their level of agreement with these myths on the form, with "disagree" assigned a score of 1, "don't know" a score of 2, and "agree" a score of 3. The scores range between 30 and 90, with higher scores reflecting stronger beliefs in sexual myths. The Cronbach's α was calculated as .82 (n= 76).
3. Sexual Attitudes We gauged participants' attitudes towards sexuality with the Turkish adaptation of (Karaçam et al., 2012), the twenty-three-item Hendrick Sexual Attitudes Short Form (Hendrick et al., 2006). The assessment tool has four subscales: **Permissiveness** (ten items, such as 'The best sex is with no strings attached'), **Birth Control** (three items, such as 'Birth control is part of responsible sexuality'), **Communion** (five items, such as 'Sex is usually an intensive, almost overwhelming experience'), and **Instrumentality** (five items, such as 'Sex is primarily physical'). The items on the subscales are rated on a 5-point Likert-type scale from A= 'strongly agree with the statement' to E= 'strongly disagree with the statement'. The overall score was calculated by summing the scores from the individual items. The scores range between 115 and 23, with higher scores indicating more positive sexual attitudes.
4. The Sexual Knowledge Form consists of 16 questions, comprising seven multiple-choice and nine true-false questions. The form includes statements related to topics such as reproductive organ anatomy, reproductive health, methods of contraception, sexual life, and sexually transmitted diseases (Ziya, 2015). In the form prepared by Vural

and Temel (2010), the Sexual Health and Reproductive Health Knowledge Scale developed by Pınar (2008) was utilised (Diker, 2017). Participants are expected to mark any option for multiple-choice questions and choose either 'true' or 'false' for statements in the test questions.

2.3. Data Collection Procedure

This study was designed by three sophomores and supervised by a faculty member, as part of an undergraduate research fund provided by the authors' home university. The project took a year to complete (February 2022–2023), with most of the objectives achieved, except for the anticipated impact of the program's implementation. Participants were selected from undergraduate students aged between 18 and 22, whose native language was Turkish or who possessed native-level proficiency in the Turkish language. An informed consent form was prepared, and participants were sent surveys via email. Invitations to participate in the study were distributed through email and social media platforms. Members of the experimental group were determined based on the order in which they were applied.

To minimise potential conflicts of interest, the researcher did not take an active role in delivering the training program or attending the sessions. This decision was made because the participants might have been potential students of the project advisor. Instead, the content of the training sessions was delivered by field experts.

Separate invitation letters were prepared for potential candidates for the experimental and control groups. Initially, the announcement was made to recruit participants for the experimental group. Once the experimental group was formed, the remaining applicants on the waiting list were invited to participate in the control group. The invitation letter for the control group included a statement that these participants would be prioritised for the second training program planned to be offered in the future. If the number of participants on the waiting list was insufficient or if there were not enough volunteers for the control group, the invitation letter for the control group was to be shared with the entire university.

Since the training was conducted online, the surveys were sent to participants via email and completed through Google Forms. No personal identifying information was requested in the surveys. Instead, participants were asked to create pseudonyms to match their responses in the pre-test and post-test.

To prevent the Pygmalion effect, the trainer was not informed about the content of the scales. The Pygmalion effect, as defined by Rosenthal and Jacobson (1968), describes how an instructor's expectations of a student's behaviour may act as a self-fulfilling prophecy that influences that behaviour. Therefore, the study was designed as a single-blind study.

Due to time constraints, the control group did not receive training during the project. However, the feasibility of implementing a sexuality-awareness-based training program at TED University was documented based on the data collected. This documentation is aimed at ensuring the sustainability of the program within the university. Moreover, priority was planned to be given to the control group for participation in the second training program.

2.4. Research Design

This study employed a quasi-experimental, single-blind, pre-test and post-test control group design to evaluate the effectiveness of a sexuality-awareness-based training program. Participants were divided into two groups: an experimental group that attended the training program and a control group that did not receive any intervention during the study period. Both groups completed pre-test and post-test measures to facilitate comparisons of outcomes. Randomisation was not feasible due to logistical constraints; instead, participants were assigned to groups based on the order of application and availability.

2.5. Data Analysis

Initially, descriptive statistics were computed to summarise participant demographics and baseline scores for sexual knowledge, beliefs in sexual myths, and sexual attitudes. Means, standard deviations, and percentages were calculated to provide an overview of the participant characteristics and pre-test scores across groups.

To assess the comparability of the experimental and control groups at baseline, Mann-Whitney U nonparametric tests were conducted for each of the variables. This test was selected due to its suitability for non-normally distributed data and for comparing independent groups in small sample designs. Following the intervention, the same test was used to assess the potential impact of the training program on outcome measures. Furthermore, within-group changes in the experimental group were assessed using the Wilcoxon Signed Rank Test, which is appropriate for repeated measures on non-parametric data. All analyses were conducted with a significance level set at $p < .05$.

Regarding reliability, all measurement instruments used in the study had previously demonstrated acceptable internal consistency in Turkish populations. Specifically, the Sexual Myth Assessment Form showed a Cronbach's alpha of

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.82 in this study, indicating good internal reliability. The Turkish adaptation of the Brief Sexual Attitudes Scale had established subscale reliabilities in prior research (Karaçam et al., 2012), and internal consistency was reviewed for the current sample before analysis. The Sexual Knowledge Form, although initially developed through expert consultation, demonstrated moderate internal consistency, and item-total correlations were reviewed during pilot testing.

In terms of validity, all instruments employed were previously validated in Turkish university student populations through either exploratory or confirmatory factor analysis, ensuring content and construct validity. The instruments were chosen due to their alignment with the theoretical constructs under investigation (i.e., knowledge, beliefs, and attitudes regarding sexuality). Additionally, to enhance internal validity, a single-blind design was employed to minimize experimenter effects, and pseudonym codes were used to ensure matched pre- and post-test data without bias. External validity may be limited due to the small and self-selected sample, which is discussed further in the limitations section.

3. Findings

This section outlines the study's findings, with an emphasis on the impact of the sexuality-awareness-based training program on participants' sexual knowledge, beliefs in sexual myths, and sexual attitudes. The researchers analysed data from the pre-test and post-test measures to compare the outcomes of the experimental and control groups. Descriptive statistics are provided to summarise participant characteristics regarding the initial source of sexual knowledge, channels of communication about sexuality, and the sources actively used to gain access to sexual information for the pre-test group (*n*=76).

Table 1 presents a detailed breakdown of the initial sources of sexual knowledge, channels of communication about sexuality, and actively used resources for accessing sexual information among participants who completed the pre-test. The data highlights that the internet and friends were the most frequently reported initial sources of sexual knowledge, each cited by 27.55% of participants. Family was mentioned as the initial source by 13.77%, followed by books and schools, each accounting for 9.58%. Television (2.99%) and erotic or pornographic publications (8.98%) were less commonly cited as initial sources of knowledge.

When it comes to communication about sexuality, friends were the most frequently mentioned channel, with 39.86% of participants identifying them as their primary conversational partners. Romantic partners were also significant, accounting for 34.06%, while siblings and mothers were mentioned less frequently, at 7.25% and 7.97%, respectively. Fathers and experts in the field were rarely cited, comprising 2.17% and 6.52% of the references, respectively. Therapists were mentioned by only 2.17% of participants as a source of communication.

Regarding resources actively used to access sexual information, YouTube videos or documentaries were the most frequently utilised (22.88%), followed by the internet and blogs (14.38%), and friends' experiences (13.07%). Resources such as sexual educators or therapists (11.11%) and educational training sessions (7.19%) were moderately utilised, while social media (5.23%) and podcasts (6.54%) were less commonly accessed. Books (1.30%) and pornography (7.84%) were the least reported resources. Furthermore, 10.46% of participants reported not using any sources to access sexual information.

Table 1
Distribution of all participants with respect to sources of communication and knowledge

	n	*%*
Initial Source of Sexual Knowledge		
Family	23	13.77%
Friend	46	27.55%
Book	16	9.58%
Internet	46	27.55%
School	16	9.58%
Television	5	2.99%
Erotic/ Pornographic Publication	15	8.98%

Table 1. Continued

	n	%
Channels of Communication About Sexuality		
Friend	55	39.86%
Partner	47	34.06%
Sibling	10	7.25%
Mother	11	7.97%
Father	3	2.17%
Expert in the Field	9	6.52%
Therapist	3	2.17%
The Sources Actively Used to Gain Access to Sexual Information		
Youtube Video/ Documentary	35	22.88%
Social media	8	5.23 %
Education/ Trainings	11	7.19%
Sexuality Educator/ Therapist	17	11.11%
Podcast	10	6.54%
Experiences of Friends/ People in the Environment	20	13.07%
Internet/ Blog	22	14.38%
Pornography	12	7.84%
Book	2	1.30%
No Source	16	10.46 %

Before analysing the study's data, the pre-test scores were first examined to determine if there were any differences in the current dataset. For that aim, the Mann-Whitney U nonparametric test was conducted for sexual knowledge (SEXKNOW), sexual myths (SEXMYTH), and sexual attitudes (SEXATD) scores of the groups. According to Gravetter and Wallnau (2009), the Mann-Whitney U test is designed to evaluate the difference between two populations or treatments. SEXKNOW pre-test scores of the experimental group (n = 8) had a 37.75 mean value with a 3.37 standard deviation. On the other hand, SEXKNOW pre-test scores of the control group (*n=9*) had a 32.44 mean value with a 5.61 standard deviation. The Mann-Whitney U nonparametric test results indicated a significant difference between the pre-test scores of the experimental and control groups ($U_{sexknow}$ = 14.50; $z_{sexknow}$ = 2.076, p < 0.05) for SEXKNOW scale. In other words, the participants in the experimental group scored higher than the control group on SEXKNOW scale.

SEXMYTH pre-test scores of the experimental group were 34.87 mean value with 5.11 standard deviation, while SEXMYTH pre-test scores of the control group were 41.36 mean value with 9.08 standard deviation. The Mann-Whitney U nonparametric test results showed that there was no significant difference between the pre-test scores of the experimental and control groups ($U_{sexmyth}$ = 22.00; $z_{sexmyth}$ = -1.36, p > 0.05) for SEXMYTH scale.

SEXATD pre-test scores of the experimental group were 17.50 mean value with 2.51 standard deviation, while SEXATD pre-test scores of the control group were 17.11 mean value with 3.51 standard deviation. The results of the Mann-Whitney U nonparametric test indicated that the pre-test scores of the experimental and control groups did not differ significantly from each other (U_{sexatd} = 29.50; $z_{sexmyth}$ = -.63, p > 0.05) for SEXATD scale.

To test the study's hypotheses, the Mann-Whitney U nonparametric test was first conducted to assess the differences in post-test scores between the experimental and control groups for SEXKNOW, SEXMYTH, and SEXATD. The SEXINF post-test scores of the experimental group had a mean of 36.75 with a standard deviation of 3.61, whereas the control group's SEXINF post-test scores had a mean of 35.44 with a standard deviation of 4.06. Table 2 summarises the results of the Mann-Whitney U test for comparison of the experimental group and control group post-test scores.

Table 2
The results of the Mann-Whitney U test

Scale	Groups	N	Mean Rank	Sum of Ranks	U	z	p
SEXKNOW	Experiment	8	9.88	79	29.00	-.67	.541
	Control	9	8.22	74			
SEXMYTH	Experiment	8	8.75	70	34.00	-.19	.888
	Control	9	9.22	83			
SEXATD	Experiment	8	9.19	73.50	34.50	-.14	.888
	Control	9	8.83	79.50			

According to the results of the Mann-Whitney U nonparametric test, the post-test scores of the experimental and the control group were not significantly different from each other (Usexinfo = 43.00, p >0.05; zsexinfo = .67, p > 0.05, r = -.55), which means that the sexual awareness-based training program had no significant effect on Sexual Knowledge Levels of participants.

SEXMYTH post-test scores of the experimental group had a 42.75 mean value with a 15.28 standard deviation, while SEXMYTH post-test scores of the control group had a 39.44 mean value with a 7.93 standard deviation. According to the results of the Mann-Whitney U nonparametric test, the post-test scores of the experimental and the control group were not significantly different from each other (Usexmyth = 34.00; zsexmyth = -.19, p > 0.05) for SEXMYTH, which means that the sexual awareness-based training program had no significant effect on sexual myth beliefs of the participants.

SEXATD post-test scores of the experimental group had a 16.62 mean value with a 4.17 standard deviation, while SEXATD post-test scores of the control group had a 17.11 mean value with a 3.51 standard deviation. According to the results of the Mann-Whitney U nonparametric test, the post-test scores of the experimental and the control group were not significantly different from each other (Usexatd = 34.50; zsexatd = -.14, p > 0.05) for SEXMYTH, which means that the sexual awareness-based training program had no significant effect on sexual attitudes of the participants.

Moreover, the Wilcoxon Signed Rank Test (WSRT) was used to examine the variation between the pre-test and post-test scores of the experimental group. Articulated by Gravetter and Wallnau (2009), the WSRT is used to detect differences in a two-repeated-measures design for nonparametric data. The SEXKNOW pre-test scores of the experimental group had a mean value of 37.75 with a standard deviation of 3.37. In comparison, SEXKNOW post-test scores of the experimental group had a 36.75 mean value with a 3.61 standard deviation. The results of the WSRT showed that the median post-test ranks were not significantly higher than the median pre-test ranks (zsexknow = -1.05, p > 0.05). The SEXMYTH pre-test scores of the experimental group had a mean value of 34.87 with a standard deviation of 5.11. In comparison, SEXMYTH post-test scores of the experimental group had a 42.75 mean value with a 15.27 standard deviation. The WSRT results indicated that the median post-test ranks were not significantly greater than the median pre-test ranks (zsexmyth = -0.94, p > 0.05). The SEXATD pre-test scores of the experimental group had a mean value of 17.50 with a standard deviation of 2.50. In comparison, SEXATD post-test scores of the experimental group had a 16.62 mean value with a 4.17 standard deviation. The median post-test ranks were not significantly higher than the median pre-test ranks (zsexatd = -1.19, p > 0.05). In other words, the scores on each of the three tests did not differ significantly between the pre-tests and post-tests of the experimental group.

4. Conclusion and Discussion

This study evaluated the effectiveness of a six-week sexuality education program designed for university students, focusing on its impact on sexual knowledge, beliefs in sexual myths, and sexual attitudes. Participants' initial sources of sexual knowledge were predominantly informal, with friends and the internet cited most frequently, while formal educational resources were rarely utilised. Informal communication channels, such as friends and partners, also served as primary confidants on sexual topics, underscoring the inconsistent nature of participants' prior exposure to sexual education. Additionally, digital tools like YouTube documentaries were the most utilised resources for accessing sexual information, whereas structured educational programs and professional consultations were underutilised. These findings highlight significant gaps in accessible formal sexuality education, emphasising the need for more comprehensive and structured interventions in the future.

Contrary to expectations and the prevailing literature (e.g., Boti et al., 2019), the results indicated no significant differences between the two groups in post-test scores for any of the measured variables. Additionally, within the experimental group, no statistically significant changes were observed between pre-test and post-test scores. These findings prompt a critical examination of potential contributing factors and their implications for sexuality education programs.

The findings of this study contrast with a substantial body of literature indicating the positive effects of sexuality education on knowledge, attitudes, and myths. For instance, Chi et al. (2015) found significant improvements in sexual health knowledge and attitudes among college students following a CSE program. Similarly, Boti et al. (2019) reported that such programs reduced misconceptions and enhanced participants' ability to make informed sexual health decisions. These discrepancies highlight the importance of context, delivery methods, and participant engagement in determining program effectiveness.

The lack of significant findings may be attributable to several interconnected factors. First, the small sample size of the experimental group (n = 8) likely reduced the study's statistical power, limiting its ability to detect meaningful differences. Previous studies have underscored the importance of large, diverse samples in producing generalizable

and robust findings (Haberland & Rogow, 2015). Second, the online format of the education sessions may have constrained engagement and interactivity, both of which are critical components of practical learning experiences in sexuality education (Martin et al., 2020). For example, in-person sessions often facilitate richer discussions and more dynamic learning environments, which may not be replicable in an online format.

Additionally, the voluntary nature of participation and the absence of incentives could have influenced attendance and commitment. Notably, the significant drop in attendance over the six weeks suggests that participants may have lacked motivation to engage with the program fully. Engagement is a critical factor in the success of educational interventions, and low levels of participation can undermine the potential for meaningful outcomes (Kirby, 2008).

Lastly, the content and delivery of the program warrant consideration. While the program adhered to the principles of CSE (UNESCO, 2018), its effectiveness may have been limited by the depth and relevance of the material presented. Research suggests that sexuality education programs must not only provide accurate information but also address underlying cultural, social, and psychological factors that shape attitudes and beliefs about sexuality (Miedema et al., 2020b). In the context of this study, the lack of significant findings may indicate that while the program provided factual and comprehensive content, it might not have sufficiently engaged with participants' pre-existing cultural or social norms, deeply ingrained beliefs, or psychological barriers. These factors could have limited the program's ability to create meaningful change, as addressing these more profound influences often requires more tailored, intensive, and interactive approaches.

4.1. Limitations to the study

Several limitations of the study warrant discussion. As previously noted, the small sample size and high attrition rates significantly limited the study's statistical power and generalizability. Although the initial recruitment was successful, attendance gradually decreased over the six weeks. This attrition may be attributed to the voluntary nature of participation, the absence of tangible incentives, and possible scheduling conflicts with academic responsibilities. Additionally, the online delivery format may have made it easier for participants to disengage from the program. This reduction in participation not only affected the experimental group's statistical representativeness but also limited the internal validity of the intervention's findings. A more structured attendance policy or clearer motivational strategies could have mitigated this issue. Additionally, the reliance on self-reported measures may have introduced response bias, as participants might have been influenced by social desirability or misinterpretation of the questionnaire items.

The online format of the program and data collection posed additional challenges. While online delivery can increase accessibility, it may also limit the depth of interaction and reduce participants' ability to engage fully with the material. Furthermore, the use of online surveys raises concerns about the reliability of responses, particularly in the absence of mechanisms to ensure that participants completed the surveys independently and thoughtfully.

Time constraints also limited the scope of the study. The six-week program may not have been long enough to foster significant changes in knowledge, attitudes, or beliefs. Longer-term interventions could provide more opportunities for participants to internalise and apply the information provided.

Additionally, the limited sample size, particularly in the experimental group, poses a significant threat to the generalizability and statistical power of the findings. Although the study was methodologically well structured, the low participation during implementation hindered the ability to detect significant effects and limited the robustness of the conclusions. This constraint also reduces the reliability and consistency of the outcomes. Moreover, the exclusive use of quantitative methods may have restricted a deeper understanding of participants' experiences and contextual factors influencing the program's impact. The integration of qualitative components—such as interviews or open-ended feedback—could have enriched the interpretation of the results by offering insights into the nuances of participants' engagement, perceptions, and barriers. Future studies should prioritise expanding the sample size and incorporating mixed-methods designs to capture both measurable outcomes and contextual dynamics more comprehensively.

4.2. Implications for practice

Despite its limitations, this study offers important insights for the development and implementation of sexuality education programs. The findings suggest that online formats may not be as effective as in-person delivery, particularly for topics that require open dialogue and active engagement. To enhance program effectiveness, future interventions should consider incorporating interactive components, such as group discussions, role-playing activities, and case studies, which have been shown to foster deeper understanding and critical thinking (Haberland & Rogow, 2015).

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4.3. Recommendations for future research

Building on the findings and limitations of this study, several important recommendations emerge for future research in sexuality education programs. To address the challenges posed by the small sample size in this study, researchers should aim to recruit larger and more diverse participant groups. This would enhance the statistical power of analyses and improve the generalizability of results. Participant engagement is another critical factor. Future studies should consider providing incentives, such as certificates, course credits, or other rewards, to encourage consistent participation and active involvement throughout the program. Incorporating mixed-methods approaches—combining quantitative measures with qualitative insights—could also yield a more nuanced understanding of how and why these programs have an impact or not on participants.

Additionally, researchers should explore the long-term effects of sexuality education programs. By conducting longitudinal studies, it would be possible to assess the sustained impacts on participants' knowledge, attitudes, and behaviours over time. Such studies could reveal patterns of retention and application that are not immediately evident in shorter-term interventions. Combining quantitative and qualitative methods could provide a more comprehensive understanding of the program's impact and the factors influencing its effectiveness.

Regarding measurement tools, existing ones for assessing sexual knowledge primarily focus on the health dimension of sexuality. However, there is a clear need for more comprehensive tools that encompass other critical aspects of sexuality, such as psychosocial, emotional, cultural, and relational dimensions. Developing such tools would enable a broader evaluation of sexuality education programs and facilitate the design of more effective interventions.

To enhance student motivation and retention in future sexuality education programs, especially those delivered online, it is essential to integrate active engagement strategies. Interactive formats should not rely solely on didactic instruction but should instead incorporate a variety of participatory tools to sustain learners' attention and foster involvement. For example, breakout group discussions can promote peer-to-peer dialogue and deepen understanding of sensitive topics. At the same time, real-time polls and live word clouds can be used to elicit anonymous input on controversial issues, making students feel heard and less exposed. Incorporating digital gamification elements—such as quizzes, scenario-based challenges, or interactive case studies—can increase enjoyment and reinforce learning outcomes. Additionally, short reflective writing prompts or digital journaling tools can provide a private space for students to process personal reactions and critically engage with the material. The integration of multimedia content such as videos, animations, and infographics can also help accommodate diverse learning styles and maintain engagement. Moreover, providing tangible incentives—such as certificates of participation, digital badges, or optional extra credit—could help sustain commitment throughout the program. Clearly communicating the personal and educational benefits of participation at the outset may also foster a stronger sense of purpose and engagement. Clearer motivational strategies may include setting expectations early, fostering a sense of community among participants, utilising reminder systems (e.g., automated emails or SMS alerts), collecting regular feedback through brief check-ins, and offering minor recognitions for active involvement, all of which can help reduce attrition and promote sustained engagement.

In conclusion, the findings of this study highlight the complexities inherent in implementing sexuality education programs within the Turkish higher education context. Despite the rigorous design and adherence to evidence-based principles, the program's lack of significant outcomes highlights the critical role of participant engagement, culturally sensitive content, and delivery methods tailored to the target audience. The study reveals the need for more interactive, engaging, and contextually relevant interventions to address deeply rooted myths, attitudes, and knowledge gaps about sexuality.

5. Contribution Declaration

The first author designed and conducted the project in collaboration with other students. The second author provided academic supervision throughout the entire process. Both authors jointly contributed to the writing of the manuscript.

6. Conflict of Interest

The authors declare no conflict of interest in relation to the publication of this manuscript.

7. Supporter and Grant Declaration

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