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RESEARCH ARTICLE

Technology-facilitated sexual violence exposure among university students and its relationship with perceived social support and traumatic stress

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ABSTRACT

Objective: With the growing use of digital communication technologies, new forms of sexual violence have emerged. Technology-facilitated sexual violence (TFSV) is prevalent among young adults and is associated with a range of adverse mental health outcomes and impaired functioning. This cross-sectional study aimed to examine the prevalence of TFSV exposure and its predictive relationship with psychological outcomes, including psychological distress and traumatic stress. Additionally, the study investigated whether perceived social support moderates the relationship between TFSV exposure and psychological outcomes.

Method: A sample of university students (n=192) was recruited through an online survey, which included a Sociodemographic Information Form, the TFSV-Victimization Scale (TFSV-VS), the Impact of Event Scale-Revised, the Multidimensional Scale of Perceived Social Support, and the Kessler Psychological Distress Scale.

Results: Of the participants, 78.1% reported experiencing at least one subtype of TFSV in their lifetime, and 59.9% reported exposure within the past year. Lifetime TFSV exposure significantly and positively predicted both traumatic stress symptoms and psychological distress. Perceived social support moderated the relationship between lifetime TFSV exposure and traumatic stress.

Conclusion: A substantial proportion of university students are affected by TFSV. Exposure to TFSV is associated with psychological distress and traumatic stress symptoms. Perceived social support may serve as a protective factor, mitigating the adverse psychological effects of TFSV among emerging adults.

Keywords: Cyberbullying, exposure to violence, gender-based violence, sex offenses, sexual trauma, sexual violence

INTRODUCTION

Sexual violence is a widespread violation of human rights across the globe (1). According to the World Health Organization (2), 35% of women have experienced either physical or sexual violence, most often perpetrated by an intimate partner, but also by friends, family members, relatives, or strangers.

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Alarmingly, such violence is not confined to physical spaces; numerous forms of sexual violence have also emerged in virtual environments in recent years. While digital technologies enable users to connect and communicate with friends, family, and others, they can also create an environment conducive to violent crime. With the growing use of digital communication technologies, a new form of sexual violence, Technology-Facilitated Sexual Violence (TFSV), has emerged. This form of sexual violence involves abusive acts carried out through digital platforms, including online harassment, digital harassment, cyberbullying, and cyberstalking (3). Some scholars refer to these behaviors as "electronic aggression" (4), "electronic harassment" (5), or "online harassment" (6).

TFSV can occur at any time, in any place, even when individuals believe they are safe (1). Such experiences can have serious psychological consequences for survivors. For example, TFSV exposure has been identified as a risk factor for increased anxiety, depression, and post-traumatic stress (7, 8). Moreover, empirical evidence has shown a significant association between TFSV and suicidality, as well as self-harm (8, 9). Similarly, mixed-method research indicates that TFSV exposure increases the risk of anxiety, stress, depression, feelings of loss of control, impaired academic and occupational functioning, and problematic alcohol use (10). Thus, a valid and reliable assessment of TFSV exposure can be considered the first step in preventing and addressing its negative consequences.

In this context, Powell and Henry developed the Technology Facilitated Sexual Violence-Victimization Scale (TFSV-VS) to assess the frequency of negative, sexually based behaviors experienced online or via other electronic devices (11). The scale consists of four dimensions: Digital Sexual Harassment/Intrusion, Image-Based Sexual Abuse, Sexual Aggression/ Coercion, and Gender/Sexuality-Based Harassment (11). This multidimensional structure enables researchers to evaluate various aspects of TFSV. The first dimension, Digital Sexual Harassment/Intrusion, refers to unwanted or unwelcome sexual behavior conducted via electronic means such as email, voice and/or video calls, text and/or picture messages, and posts in online spaces. Image-Based Sexual Abuse involves the non-consensual sharing of sexually explicit images of someone with others (11). Sexual Aggression/Coercion includes applying non-physical pressure for sexual cooperation, using digital platforms to initiate in-person contact that leads to sexual assault, such as meeting someone through online dating sites, and using digital technologies to exacerbate the impact of sexual assault, for example by recording and/or disseminating photos of the incident (12). The final dimension, Gender/Sexuality-Based Harassment, refers to harassment based on gender and/or sexual identity, such as making misogynistic jokes or sharing someone's photos with the intent to humiliate or insult them (13). Existing research indicates that the TFSV-VS is a valid and reliable instrument for measuring TFSV exposure (11). However, to our knowledge, a Turkish adaptation of the TFSV-VS has not yet been developed. This makes it challenging to examine the prevalence of TFSV exposure and its associations with adverse psychological outcomes, such as depression, anxiety, post-traumatic stress, and psychological distress, in Turkiye. Therefore, a Turkish adaptation of the TFSV-VS is needed.

Regarding the prevalence of TFSV exposure, a meta-analysis of 19 studies found that 17.6% of participants had experienced Digital Sexual Harassment/Intrusion, 8.8% had experienced Image-Based Sexual Abuse, and 7.2% had experienced Sexual Aggression/Coercion (14). Furthermore, women, girls, and individuals identifying as lesbian, gay, bisexual, transgender, and intersex (LGBTI) appear to be at greater risk of experiencing technology-facilitated Gender/Sexuality-Based Harassment than men and heterosexual individuals (15, 16). However, Powell and Henry reported no gender differences in overall lifetime TFSV prevalence, although the types of TFSV experienced varied by gender (11). Specifically, women were more likely to experience sexual harassment than men, while men reported higher rates of non-consensual distribution of sexual images compared to women (11). Similarly, research has shown that women experience more TFSV across nearly all categories of sexual violence, except cyberbullying, compared to men (17). These findings suggest that gendered patterns may influence both the prevalence and nature of TFSV. To build on this evidence, the present study aimed to explore TFSV exposure prevalence across genders.

Social support is recognized as one of the key resilience factors in both psychological distress (18) and trauma literature (19, 20). Findings have shown a negative association between social support and post-traumatic symptom severity following various traumatic events, including earthquakes (21), family violence (22), child and adult sexual abuse (23), and betrayal trauma (24), underscoring the importance

of social support. Moreover, meta-analytic evidence suggests that social support may buffer the relationship between traumatic experiences and trauma-related psychological consequences (20). These findings suggest that social support may also moderate the relationship between TFSV exposure and adverse psychological outcomes. However, to our knowledge, only one study has tested this hypothesis by examining the moderating role of social support in the relationship between TFSV exposure and depressive symptoms. That study found that perceived social support did not moderate the relationship (3). To extend this previous research, we included perceived social support as a moderator variable and aimed to test whether it moderates the relationship between TFSV exposure and two psychological outcomes: subjective distress related to traumatic experiences (as measured by the Impact of Event Scale-Revised) and general psychological distress (as measured by the Kessler Psychological Distress Scale).

The Present Study

TFSV is a relatively new phenomenon, and a growing body of research has begun to explore its nature and consequences. However, in Turkiye, aside from the Online Sexual Harassment Scale (25, 26), there is currently no instrument available to measure TFSV exposure. Therefore, the first aim of this study was to translate the TFSV-VS into Turkish and examine its validity and reliability. By doing so, the present study seeks to contribute to both scientific knowledge and social awareness of TFSV in Turkiye. Secondly, we aimed to determine the prevalence of TFSV among Turkish young adults. While most existing research has primarily focused on TFSV targeting children and adolescents (27–30), relatively few studies have investigated TFSV in adult populations. There are still gaps in the literature, particularly regarding how TFSV exposure may differ across sociodemographic variables in adults. To address this, we also aimed to examine whether the prevalence of TFSV exposure, both in the past year and over the lifetime, varied by gender. As previous studies have indicated, TFSV exposure is positively associated with depression, anxiety, post-traumatic stress (7, 8), and suicidality (9). In light of these findings, our final aim was to test the predictive associations between TFSV exposure and two psychological outcomes: subjective distress related to traumatic experiences (measured by the Impact of Event Scale-Revised) and general psychological distress (measured by the Kessler Psychological Distress Scale). In this context, we hypothesized that TFSV exposure would significantly and positively predict both subjective distress related to traumatic experiences (H_1) and general psychological distress (H_2), after controlling for sociodemographic variables (i.e., gender and age) and perceived social support (i.e., scores on the Multidimensional Scale of Perceived Social Support). Additionally, considering prior findings suggesting that social support can serve as a resilience factor against trauma-related psychological outcomes (31), we aimed to test whether social support moderates the relationship between TFSV exposure and subjective distress related to traumatic experiences and psychological distress. Specifically, we hypothesized that social support would significantly moderate the relationship between TFSV exposure and subjective distress related to traumatic experiences (H_3), as well as the relationship between TFSV exposure and psychological distress (H_4).

METHODS

Participants

The study sample consisted of university students. Although 196 students initially completed the online questionnaire battery, three participants were excluded based on the inclusion and exclusion criteria. The inclusion criteria were being between 18 and 25 years old and fluent in Turkish; participants younger than 18 or older than 25 were excluded. Of the final sample, 82.8% (n=159) were female and 17.2% (n=33) were male. Their mean age was 20.53 years (standard deviation, SD=1.71). In terms of perceived income level, 18.2% (n=35) reported a low income, while 75.0% (n=144) identified as middle-income, and 6.8% (n=13) reported a high-income level. Most participants (97.9%, n=188) had at least one social media account. Only 22 participants (11.5%) reported using online dating sites or apps. The average amount of time spent on the internet daily was 4.89 hours (SD=2.23) (Table 1). A subsample of 68 participants also took part in the second phase of the study, conducted 21 days later, for the test-retest assessment of the Turkish version of the TFSV-VS. These participants completed the TFSV-VS for a second time. The data collected in the second phase (n=74) were used exclusively for the test-retest analysis of the Turkish version of the TFSV-VS; all other analyses were conducted using the data from the first phase.

Table 1: Descriptive characteristics of the sample

	M	SD	N	%	Min	Max
Age	20.54	1.71	192		18	25
Gender						
Female			159	82.8		
Male			33	17.2		
Average time spent online per day (hours)	4.89	2.23	192		1	18
Having at least one social media account						
Yes			188	97.9		
No			4	2.1		
Using online dating (sites or apps)						
Yes			22	11.5		
No			170	88.5		
Perceived income level						
Low			35	18.2		
Middle			144	75.0		
High			13	6.8		
History of a romantic relationship that lasted one month or longer						
Yes			136	70.8		
No			56	29.2		

SD: Standard deviation; Min: Minimum; Max: Maximum.

Measurements

Sociodemographic Information Form

This form was developed by the researchers to collect basic information from participants, including age, gender, perceived income level, use of social media and online dating platforms, and average daily time spent on the internet.

Technology Facilitated Sexual Violence - Victimization Scale (TFSV-VS)

The TFSV-VS was developed by Powell and Henry to assess individuals' experiences of technology-facilitated sexual violence (11). This dichotomous scale consists of 21 items (e.g., nude or semi-nude images posted online/sent to others without permission) and includes four sub-dimensions: Digital Sexual Harassment/Intrusion, Image-Based Sexual Abuse, Sexual Aggression/Coercion, and Gender/Sexuality-Based Harassment. The internal consistency reliability of the original TFSV-VS scale was 0.93. In the present study, we translated the TFSV-VS into Turkish and modified the response options. The original version used the following response categories: ever/never in the lifetime, none in the past 12 months, once in the past 12 months, and more than once in the past 12 months. While these options allow for the assessment of multiple TFSV exposures within the past year, they do not account for repeated experiences that occurred more than 12 months ago. To address this limitation, we implemented a 3-point Likert scale for both the past year and lifetime assessments (0 = never, 1 = once, and 2 = more than once). Higher scores on the TFSV-VS indicate greater exposure to TFSV. See Appendix for Turkish TFSV-VS.

Impact of Event Scale-Revised (IES-R)

The IES-R was developed by Weiss and Marmar to assess the severity of traumatic stress symptoms (32). It includes 22 items (e.g., "*I felt irritable and angry*") rated on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*extremely*). Higher scores on the IES-R reflect more severe traumatic stress symptoms. The Turkish adaptation of the IES-R was conducted by Corapcioglu et al. (33), and the internal consistency reliability of the Turkish version was 0.94. In the current study, we used the composite score of the IES-R, as we were primarily interested in participants' overall subjective distress related to traumatic experiences. The internal consistency reliability of the IES-R in the present sample was 0.94. The IES-R was administered after the TFSV-VS, accompanied by specific instructions asking participants to "*Please answer the following questions in relation to the unwanted online sexual experiences mentioned in the previous sections*."

Kessler Psychological Distress Scale (K10)

The K10 was developed by Kessler et al. (34) to screen for non-specific psychological distress and mental disorders. It is also used by the World Health Organization in mental health screenings. The K10 includes 10 items (e.g., "*in the past four weeks, about how often did you feel nervous?*"), rated on a 5-point Likert scale ranging from 1 (*none of the time*) to 5 (*all of the time*). Higher scores on the K10 indicate greater psychological distress. The Turkish validity and reliability study of the K10 was conducted by Altun et al. (35), with an internal consistency reliability of 0.95. In the present study, we used the composite score of the K10 to assess participants' overall psychological distress. The internal consistency reliability of the K10 in our sample was 0.92.

Multidimensional Scale of Perceived Social Support (MSPSS)

The MSPSS was developed to assess the level and sources of perceived social support (36). It consists of three subscales (perceived support from family, friends, and a significant other) and contains 12 items (e.g., "*I get the emotional help and support I need from my family*"). Items are rated on a 7-point Likert scale ranging from 1 (*very strongly disagree*) to 7 (*very strongly agree*), with higher scores indicating greater perceived social support. The Turkish adaptation of the MSPSS was carried out by Eker et al. (37). The internal consistency of the full scale in the Turkish adaptation study was 0.89, and in the present study, it was 0.86.

Translation Procedure

After obtaining permission from Anastasia Powel, one of the original developers of TFSV-VS, to translate the scale into Turkish, three faculty members specializing in psychology and psychiatry translated the scale items into Turkish. The translated items were then reviewed, and the best versions, based on their semantic similarity to the original items, were selected or revised to most accurately reflect the original meaning. A bilingual researcher subsequently back-translated the selected/revised items into English. After comparing the original and back-translated versions, the research team finalized the Turkish version of the TFSV-VS.

Recruitment Process

Following approval from the Ethics Committee of Eskisehir Osmangazi University (dated 08/02/2022, decision number 13), the survey was uploaded to an online platform (Qualtrics), and the study was announced to potential participants. Invitations were extended through announcements made by faculty members in university classrooms, as well as via social media platforms.

After participants clicked on the study link, they were provided with information about the purpose of the study, the anonymity of their responses, the voluntary nature of participation, and their right to withdraw at any time. After giving online consent, participants completed the scales in a counterbalanced order, except for the Sociodemographic Information Form, which was always presented first, followed by the TFSV-VS.

At the end of the questionnaire, participants were asked whether they would like to take part in a follow-up (retest) study 21 days later. Those who selected the option "*I want to participate in the second phase of the study*" were automatically directed to a separate webpage within the Qualtrics system, where they were asked to choose a nickname and provide their email address. A second questionnaire, containing only the nickname field and the TFSV-VS items, was sent to those participants 21 days later.

To encourage participation, students who completed the study scales received one extra course point as an incentive. This was implemented through a separate link provided at the end of the online survey. Participants who wished to receive the extra point were directed to this second link, where they entered their course code and student number. This information was collected separately and was not linked to their survey responses, ensuring the anonymity of participants was preserved. Anonymous lists, excluding participant names, were then shared with the relevant instructors to facilitate the allocation of bonus points.

Statistical Analysis

We first examined the validity and reliability of the Turkish version of the TFSV-VS. For the validity of the TFSV-VS, we expected significant and positive correlations between the TFSV-VS scores and theoretically related constructs, specifically the IES-R and the K10 scores. For divergent validity, we assessed the correlations between the TFSV-VS and theoretically unrelated variables, such as average daily internet usage and perceived social support, and expected non-significant or relatively low correlations. We expected a non-significant or relatively low correlation between the TFSV-VS and average daily internet usage time, as recent studies suggest that internet use habits do not influence the likelihood of experiencing technology-facilitated sexual violence

(38). The reliability of the Turkish version of the TFSV-VS was assessed through internal consistency and 21-day test-retest reliability. For both internal consistency and 21-day test-retest reliability, we calculated Cronbach's alpha and the intraclass correlation coefficient (ICC) for each subscale of the TFSV-VS and for the overall scale. Next, we examined the frequency of TFSV exposure both in the past year and across participants' lifetimes. Additionally, we conducted chi-square tests of independence and Fisher's exact tests to determine whether TFSV exposure varied by gender. When the assumptions of the chi-square test were violated, the results of Fisher's exact test were reported instead.

We also conducted independent samples t-tests to examine whether TFSV (in both the past year and lifetime) differed between participants who used online dating sites/apps and those who did not. Furthermore, two one-way analyses of variance (ANOVAs) were performed to assess whether TFSV exposure differed by participants' perceived income levels for both the past year and lifetime.

To examine the relationship between TFSV exposure and adverse psychological outcomes, we conducted two separate hierarchical linear regression analyses to explore the predictive association of lifetime TFSV exposure with subjective distress related to traumatic experiences (i.e., IES-R scores) and general psychological distress (i.e., K10 scores). Prior to each regression analysis, assumptions regarding the independence of residuals, linearity between independent and dependent variables, homoscedasticity, multicollinearity, normal distribution of residuals, and the presence of outliers were assessed. All assumptions were met. Based on previous findings showing that females are more likely to experience traumatic stress symptoms (39) and that social support serves as a resilience factor for such symptoms (40), gender (dummy coded) and perceived social support were entered as control variables in the first regression analysis, where IES-R score (i.e., traumatic stress symptoms) was the dependent variable. Similarly, considering that women tend to report higher K10 scores than men (41), that younger individuals report higher K10 scores than older individuals (42), and that social support is negatively associated with psychological distress (43), we included gender, age, and perceived social support as control variables in the second regression analysis, where K10 score was the dependent variable. For each regression model, a post hoc analysis was conducted using G*Power to evaluate whether the study's sample size was adequate (44).

Additionally, we conducted two moderation analyses (Model 1) using the PROCESS Macro (45) to test whether the association between lifetime TFSV exposure and IES-R and K10 scores depends on levels of perceived social support (i.e., MSPSS scores). Since lifetime TFSV exposure includes experiences from both the past year and earlier periods, and because our focus was on the long-term associations between TFSV exposure and psychological outcomes (i.e., IES-R and K10 scores), we used lifetime TFSV exposure as the independent variable in both the regression and moderation analyses rather than TFSV exposure in the past year. The composite score of lifetime TFSV exposure was used as a predictor variable.

RESULTS

Validity and Reliability of the Turkish Version of the TFSV-VS

We conducted Pearson zero-order correlation analyses to examine bivariate relationships among the study variables. As expected, general TFSV exposure was significantly and positively correlated with both IES-R and K10 scores, supporting the validity of the Turkish TFSV-VS. Also consistent with expectations, TFSV exposure was not significantly associated with average daily internet usage time or perceived social support (Table 2).

We examined the reliability of the Turkish version of the TFSV Victimization Scale using internal consistency and 21-day test-retest reliability. Specifically, we calculated Cronbach's alpha and the intraclass correlation coefficient for each subscale of the TFSV Victimization Scale and for the total scale. As shown in Table 3, the internal consistency reliabilities for the full scale measuring TFSV exposure in the past year and over the lifetime were 0.74 and 0.84, respectively, while the test-retest reliability coefficients were 0.90 and 0.95. These findings supported the reliability of the Turkish TFSV-VS. However, some subscales demonstrated poor internal consistency reliabilities, including Digital Sexual Harassment/Intrusion, Image-Based Sexual Abuse, and Sexual Aggression/Coercion. Additionally, the test-retest reliability coefficient for the Sexual Aggression/Coercion subscale was notably low.

Prevalence of TFSV-V

The findings revealed that 78.1% of participants (n=150) reported experiencing at least one form of TFSV in their lifetime. Regarding the specific subtypes of TFSV exposure: 75.0% (n=144) reported

Table 2: Bivariate correlations among study variables

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	20.54	1.71	–													
2. Average internet use (hours/day)	4.89	2.23	-0.01 (0.899)	–												
3. LT Total TFSV	5.06	5.65	0.01 (0.910)	0.06 (0.393)	–											
4. LT-DSH	2.99	3.01	0.02 (0.839)	0.12 (0.091)	**0.90** (0.000)	–										
5. LT-IBSA	0.28	0.80	0.02 (0.751)	-0.06 (0.417)	**0.65** (0.000)	**0.47** (0.000)	–									
6. LT-SAC	0.25	0.77	0.03 (0.731)	-0.11 (0.141)	**0.48** (0.000)	**0.31** (0.000)	**0.50** (0.000)	–								
7. LT-GSBH	1.53	2.46	-0.02 (0.841)	0.05 (0.534)	**0.84** (0.000)	**0.58** (0.000)	**0.44** (0.000)	**0.24** (0.001)	–							
8. Total TFSV-RY	2.57	3.52	0.05 (0.507)	0.04 (0.576)	**0.83** (0.000)	**0.73** (0.000)	**0.52** (0.000)	**0.34** (0.000)	**0.74** (0.000)	–						
9. DSH-RY	1.46	1.98	0.03 (0.667)	0.06 (0.381)	**0.69** (0.000)	**0.78** (0.000)	**0.42** (0.000)	**0.28** (0.000)	**0.41** (0.000)	**0.83** (0.000)	–					
10. IBSA-RY	0.11	0.54	-0.05 (0.515)	-0.08 (0.284)	**0.43** (0.000)	**0.27** (0.000)	**0.73** (0.000)	**0.27** (0.000)	**0.34** (0.000)	**0.52** (0.000)	**0.32** (0.000)	–				
11. SAC-RY	0.08	0.38	0.08 (0.272)	-0.04 (0.590)	**0.25** (0.000)	**0.16** (0.027)	**0.32** (0.000)	**0.49** (0.000)	0.13 (0.075)	**0.32** (0.000)	**0.18** (0.012)	**0.34** (0.000)	–			
12. GSBH-RY	0.92	1.85	0.06 (0.444)	0.04 (0.584)	**0.66** (0.000)	**0.43** (0.000)	**0.27** (0.000)	**0.18** (0.014)	**0.85** (0.000)	**0.80** (0.000)	**0.38** (0.000)	**0.29** (0.000)	0.11 (0.118)	–		
13. MSPSS	64.79	13.05	**0.19** (0.010)	0.00 (0.955)	-0.11 (0.139)	0.00 (0.987)	-0.13 (0.073)	**-0.17** (0.019)	**-0.15** (0.037)	-0.08 (0.270)	0.03 (0.642)	-0.13 (0.081)	**-0.19** (0.009)	-0.11 (0.117)	–	
14. K10	27.30	8.07	-0.04 (0.589)	**0.20** (0.005)	**0.27** (0.000)	**0.23** (0.001)	0.09 (0.242)	**0.26** (0.000)	**0.23** (0.002)	**0.24** (0.001)	**0.19** (0.008)	0.06 (0.435)	**0.19** (0.009)	**0.19** (0.009)	**-0.24** (0.001)	–
15. IES-R	35.68	15.76	-0.05 (0.504)	0.11 (0.149)	**0.64** (0.000)	**0.64** (0.000)	**0.37** (0.000)	**0.36** (0.000)	**0.47** (0.000)	**0.54** (0.000)	**0.52** (0.000)	**0.29** (0.000)	**0.30** (0.000)	**0.34** (0.000)	-0.08 (0.295)	**0.34** (0.000)

Note 1: Significant correlation values are shown in bold. Note 2: Values in parentheses indicate p-values for bivariate correlations. Note 3: LT Total TFSV: Lifetime technology-facilitated sexual violence (TFSV) victimization; LT-DSH: Lifetime digital sexual harassment victimization; LT-IBSA: Lifetime image-based sexual abuse victimization; LT-SAC: Lifetime sexual aggression and/or coercion victimization; LT-GSBH: Lifetime gender and/ or sexuality-based harassment victimization; Total TFSV-RY: TFSV victimization within the past year; DSH-RY: Digital sexual harassment victimization within the past year; IBSA-RY: Image-based sexual abuse victimization within the past year; SAC-RY: Sexual aggression and/or coercion victimization within the past year; GSBH-RY: Gender- and/or sexuality-based harassment victimization within the past year; MSPSS: Multidimensional Scale of Perceived Social Support; K10: Kessler Psychological Distress Scale; IES-R: Impact of Event Scale – Revised.

Table 3: Cronbach's alpha and 21-day test-retest reliability coefficients for the Turkish version of the Technology-Facilitated Sexual Violence (TFSV) Victimization Scale (n=68)

Variable	Cronbach's Alpha	21-Day Test-Retest Reliability Coefficients
1. LT Total TFSV	0.84	0.95
2. LT-DSH	0.73	0.94
3. LT-IBSA	0.64	0.95
4. LT-SAC	0.55	0.77
5. LT-GSBH	0.76	0.88
6. Total TFSV-RY	0.74	0.90
7. DSH-RY	0.59	0.83
8. IBSA-RY	0.62	0.84
9. SAC-RY	0.41	0.43
10. GSBH-RY	0.71	0.83

LT Total TFSV: Lifetime technology-facilitated sexual violence (TFSV) victimization; LT-DSH: Lifetime digital sexual harassment victimization; LT-IBSA: Lifetime image-based sexual abuse victimization; LT-SAC: Lifetime sexual aggression and/or coercion victimization; LT-GSBH: Lifetime gender- and/or sexuality-based harassment victimization; Total TFSV-RY: TFSV victimization in the past year; DSH-RY: Digital sexual harassment victimization in the past year; IBSA-RY: Image-based sexual abuse victimization in the past year; SAC-RY: Sexual aggression and/or coercion victimization in the past year; GSBH-RY: Gender- and/or sexuality-based harassment victimization in the past year.

at least one experience of digital sexual harassment, 15.1% (n=29) reported at least one experience of image-based sexual abuse, 13.0% (n=25) reported at least one experience of sexual aggression and/or coercion, and 43.2% (n=83) reported at least one experience of gender- and/or sexuality-based harassment. We performed multiple chi-square tests of independence to examine potential gender differences in lifetime TFSV exposure and its specific facets. According to the results, lifetime TFSV exposure [X^2 (1, N=192)=0.01, p=0.919], as well as the specific facets of TFSV, including digital sexual harassment [X^2 (1, N=192)=0.01, p=0.912], image-based sexual abuse [X^2 (1, N=192)=0.28, p=0.599], and gender- and/or sexuality-based harassment [X^2 (1, N=192)=1.59, p=0.207], were not associated with participants' gender. Since one of the assumptions for the chi-square was violated for the sexual aggression and/or coercion variable, we used Fisher's exact test to examine gender differences for this subscale. The results also indicated no gender difference in sexual aggression and/or coercion victimization (p=0.392).

Within the past 12 months, 59.9% (n=115) of participants reported experiencing at least one form of TFSV. Specifically, 50.5% (n=97) reported at least one instance of digital sexual harassment, 5.2% (n=10) reported at least one instance of image-based sexual abuse, 5.7% (n=11) reported at least one instance of sexual aggression and/or coercion, and 31.3% (n=60) reported at least one instance of gender- and/or sexuality-based harassment. The chi-square test of independence results revealed no gender differences for overall TFSV exposure [X^2 (1, N=192)=0.48, p=0.491] or its specific facets, including digital sexual harassment [X^2 (1, N=192)=1.05, p=0.307] and gender- and/or sexuality-based harassment [X^2 (1, N=192)=0.91, p=0.340]. Similar findings were observed for image-based sexual abuse (p=1.000) and sexual aggression and/or coercion (p=0.098) based on Fisher's exact test results. These findings indicate no gender differences in TFSV exposure or its subtypes.

Group Differences in TFSV Exposure

We conducted independent samples t-tests to examine whether TFSV exposure, both in the past year and across the lifetime, differed based on the use of online dating sites or apps. Additionally, we performed two one-way ANOVAs to explore whether TFSV exposure varied according to participants' perceived income levels. The results of the independent sample t-tests indicated no group differences based on online dating site or app usage for TFSV exposure in the past year [t (190)=0.20, p=0.840] and across the lifetime [t (190)=0.71, p=0.481]. Similarly, one-way ANOVA results showed no differences in TFSV exposure in the past year [F (2, 189)=0.36, p=0.697] or lifetime [F(2, 189)=1.04, p=0.356] across perceived income levels.

Regression Analyses

We conducted a hierarchical linear regression analysis to examine the predictive association between lifetime TFSV exposure and IES-R scores. Gender (dummy coded) was entered in the first step, and MSPSS scores were entered in the second step as control variables. Lifetime TFSV exposure was added in the third step. The results showed that gender explained a significant proportion of the variance in IES-R scores at the first step, F (3, 163)=4.90, R^2=0.03, p=0.028. Specifically, being female was significantly associated with higher IES-R scores. MSPSS scores did not explain a significant additional proportion of variance in the IES-R scores at the second step, ΔF (1, 162)=1.58, ΔR^2=0.01, p=0.210. However, lifetime TFSV exposure significantly accounted for additional variance in IES-R scores at the third step, ΔF (1, 161)=107.97, ΔR^2=0.39, p<0.001. Accordingly, lifetime TFSV exposure positively and significantly predicted IES-R scores, β=0.63, t (161)=10.39, p<0.001, indicating that lifetime TFSV exposure is a strong predictor of subjective distress related to traumatic events (Table 4).

Table 4: Hierarchical linear regression model predicting total scores on the Impact of Event Scale – Revised (IES-R)

Predictor	B	SE	β	P	ΔF	ΔR²
Step 1				0.028	4.90	0.03
1. Gender (dummy coded: 0 = female, 1 = male)	-7.15	3.23	-0.17	0.028		
Step 2				0.210	1.58	0.01
2. MSPSS	-0.12	0.09	-0.10	0.210		
Step 3				<0.001	107.97	0.39
3. LT Total TFSV	1.77	0.17	0.63	<0.001		

SE: Standard error; MSPSS: Multidimensional Scale of Perceived Social Support; LT Total TFSV: Lifetime technology-facilitated sexual violence (TFSV) victimization; IES-R: Impact of Event Scale – Revised.

Table 5: Hierarchical linear regression model predicting total scores on the Kessler Psychological Distress Scale (K10)

Predictor	B	SE	β	P	ΔF	ΔR²
Step 1				0.835	0.18	0.00
1. Gender (dummy coded: 0 = female, 1 = male)	-0.42	1.59	-0.02	0.792		
2. Age (years)	-0.17	0.35	-0.04	0.638		
Step 2				0.001	11.33	0.06
3. MSPSS	-0.15	0.05	-0.25	0.001		
Step 3				0.001	12.36	0.06
4. LT Total TFSV	0.35	0.10	0.24	0.001		

SE: Standard error; MSPSS: Multidimensional Scale of Perceived Social Support; LT Total TFSV: Lifetime technology-facilitated sexual violence (TFSV) victimization; K10: Kessler Psychological Distress Scale.

We also performed another hierarchical linear regression analysis to examine the predictive association between lifetime TFSV exposure and psychological distress, as measured by K10 scores. Demographic variables (i.e., gender and age) were entered in the first step, and MSPSS scores were entered in the second step. The results indicated that demographic variables did not explain a significant proportion of the variance in psychological distress at the first step, F (2, 189)=0.18, R^2=0.00, p=0.835. However, perceived social support explained additional variance in the psychological distress at the second step, ΔF (1, 188)=11.33, ΔR^2=0.06, p=0.001. Perceived social support was a significant negative predictor of psychological distress, β=-0.25, t (188)=-3.37, p=0.001. In the final step, lifetime TFSV exposure explained a significant additional proportion of variance in participants' psychological distress, ΔF (1, 187)=12.36, ΔR^2=0.06, p=0.001. Accordingly, lifetime TFSV exposure was a significant positive predictor of psychological distress, β=0.24, t (187)=3.52, p=0.001 (Table 5).

To assess whether the sample size was adequate for the regression analyses, two post hoc G*Power analyses were conducted. The first G*Power analysis (44) was performed for the regression model testing the predictive association of three variables (i.e., gender, perceived social support, and lifetime TFSV victimization) with IES-R scores. Based on a large effect size of 0.74 and a power level of 0.99, the analysis indicated that a minimum sample size of 37 was required. The second G*Power analysis was conducted for the regression model examining the predictive association of four variables (i.e., gender, age, perceived social support, and lifetime TFSV victimization) with K10 scores. Based on a small effect size of 0.13 and a power level of 0.95, a minimum sample size of 145 is required. Therefore, based on these post hoc analyses, the actual sample sizes used in the study (165 for the first regression analysis and 192 for the second) were determined to be sufficient for the conducted regression analyses.

Moderation Analyses

We conducted two separate moderation analyses (Model 1) using the PROCESS macro (45) to test whether social support moderates the relationship between lifetime TFSV exposure and scores on the IES-R and the K10. In the first analysis, where IES-R score was the dependent variable, the overall model was significant, F (3, 161)=40.36, R^2=0.43, p<0.001. The results indicated a significant main effect of lifetime TFSV exposure [b=1.71, t (161)=9.76,

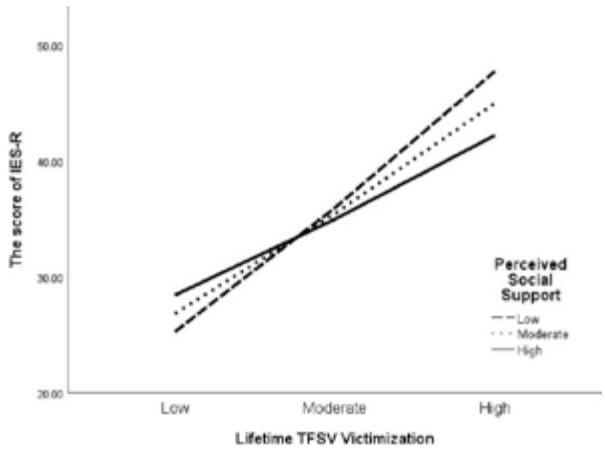

Figure 1. Relationship between participants' perceived social support and scores on the Impact of Event Scale – Revised (IES-R).

p<0.001] and an interaction effect between TFSV exposure and perceived social support [b=-0.03, t (161)=-2.25, p=0.026], but no main effect of perceived social support, [b=-0.04, t (161)=-0.52, p=0.605]. Slope analysis showed that lifetime TFSV exposure positively and significantly predicted IES-R scores at all levels of social support: low [b=2.11, t (161)=9.70, p<0.001], moderate [b=1.71, t (161)=9.76, p<0.001], and high [b=1.30, t (161)=4.59, p<0.001)]. As shown in Figure 1, the predictive association between lifetime TFSV exposure and IES-R scores weakened as participants' perceived social support increased.

Regarding the moderating effect of perceived social support on the relationship between lifetime TFSV exposure and K10 scores, the results revealed that the overall model was significant, F (3, 188)=8.20, R^2=0.12, p<0.001. There were significant main effects for lifetime TFSV exposure [b=0.35, t (188)=3.45, p<0.001] and perceived social support [b=-0.13, t (188)=-3.03, p=0.003], but the interaction effect was not significant [b=-0.00, t (188)=-0.04, p=0.971]. These results suggest that the relationship between lifetime TFSV exposure and psychological distress (i.e., K10 scores) did not vary based on levels of perceived social support.

DISCUSSION

In the present study, the TFSV-VS was translated into Turkish, and its psychometric properties were evaluated. Regarding reliability, the findings indicated that the full Turkish version of TFSV-VS demonstrated strong internal consistency and test-retest reliability. However, some subscales, including Digital Sexual Harassment/Intrusion, Image-Based Sexual Abuse, and Sexual Aggression/Coercion, showed poor reliability based on internal consistency coefficients. Therefore, we recommend that future studies prioritize the use of the total TFSV-VS score to obtain reliable findings. In terms of validity, the Turkish version of TFSV-VS demonstrated positive and significant correlations with IES-R and K10 scores, consistent with previous findings that link TFSV exposure to post-traumatic stress, depression, and anxiety (7, 8).

The prevalence of TFSV exposure in the past year and across the lifetime was 59.9% and 78.1%, respectively, which is consistent with rates reported in previous studies using the TFSV-VS. For example, in a sample of Canadian undergraduate students, the prevalence of TFSV exposure was 84.3% (3), while Powell and Henry (11) reported a lifetime prevalence of 71.8% among Australian adults aged 18–24. In contrast, Patel and Roesch (14) reported a pooled prevalence ranging between 7% and 17% in their meta-analysis. Examining TFSV exposure through specific sub-dimensions, such as distribution, creation, and threats, revealed substantial differences in prevalence rates. Notably, Patel and Roesch (14) focused only on the Image-Based Sexual Abuse subscale of the TFSV-VS. Using a similar approach, Snaychuk and O'Neill's (3) sample showed a TFSV exposure prevalence between 16.5% and 23.6%, while Powell and Henry's (11) full sample showed rates ranging from 9.3% to 10.7%. In the present study's sample, 15.1% of participants reported experiencing some form of image-based TFSV exposure. The gap may be attributed to Powell and Henry's (11) study, which recruited adults from community settings rather than university students. We propose that the distinction between image-based TFSV and technology-facilitated gender/sexuality-based harassment is similar to the difference between physical and psychological violence: the former is easier to detect, while the latter is more subtle and widespread. Therefore, we recommend that future research assess all dimensions of the TFSV-VS.

Regarding the role of gender in TFSV exposure, the current findings revealed no gender differences in experiences of overall TFSV and its specific subtypes, both in the past year and across the lifetime. In other words, being male or female was not associated with a higher likelihood of experiencing TFSV. This result aligns with the findings of Champion et al. (10) and Powell and Henry (11), who also reported similar TFSV

exposure rates among men and women. However, it contrasts with the findings of Snaychuk and O'Neill's (3), who reported that women were more frequently exposed to TFVS. A study conducted in a Turkish forensic medicine clinic examined the characteristics of survivors of real-life sexual violence and cyber violence, reporting that 91.4% were female and 82.8% were under the age of 18 (46). The *Digital Violence Study* in Turkiye, which recruited participants aged 15 and older, found that 51% of women and 27% of men had received harassing messages in digital environments (47). Esen et al. (26) validated the Online Sexual Harassment Scale among Turkish university students and found that women were more frequently exposed. Similarly, Kizilirmak et al. (48) reported that 16.6% of female participants and 7.9% of male participants had experienced cybersexual violence. According to studies conducted in Turkiye, females may be more vulnerable to TFSV. However, inconsistent findings across studies may be attributed to both individual and societal factors. As gender is a complex social construct, its effects on mental health may arise from both sociocultural and biological dimensions. To expand the existing literature on gender and TFSV, future studies should examine sex and gender differences in TFSV exposure and related mental health outcomes across diverse cultures. Additionally, response bias and sampling methods may have contributed to inconsistencies in findings.

The present study showed that perceived social support is associated with lower levels of traumatic stress in the context of TFSV exposure. More specifically, as participants' perceived social support increased, the predictive association between lifetime TFSV exposure and IES-R scores decreased. This study is the first to examine the moderating role of perceived social support in the relationship between TFSV exposure and the severity of traumatic stress symptoms. Previous findings demonstrating that social support is associated with reduced post-traumatic symptom severity following events such as earthquakes (21), family violence (22), child and adult sexual abuse (23), and betrayal trauma (24) can be interpreted as consistent with the current results. Hence, the traumatic impact of TFSV exposure may be mitigated by social support. On the other hand, our findings align with those of Snaychuk and O'Neill (3), who found that social support did not significantly moderate the relationship between lifetime TFSV exposure and depressive symptoms. Similarly, in the present study, social support did not moderate the relationship between lifetime TFSV exposure and the K10 scores.

Technology-facilitated sexual violence is an emerging area of study. The present research contributes to this growing field by expanding knowledge of TFSV exposure among college students. Additionally, the study confirmed that the full version of the TFSV-VS is both valid and reliable. However, several limitations should be considered when interpreting the findings. First, measuring experiences of violence is challenging (49). Respondents may feel ashamed or reluctant to answer truthfully, especially if the perpetrator is someone close to them. Due to prevailing social norms, some participants may not recognize certain behaviors as "violent." Thus, the present findings may not fully capture the extent of TFSV exposure. Second, gender was assessed in binary terms (female and male), despite gender being fluid and more complex. Similarly, the study did not identify LGBTQ+ individuals, who may experience TFSV differently (14). Third, the sample consisted of university students, limiting the generalizability of the results. Finally, the study relied on self-report measures administered through an online survey, which is subject to certain limitations such as social desirability bias and response bias.

A positive communication culture in online settings should be prioritized at the organizational level, as it can serve as a protective mental health intervention. Public service announcements should include psychoeducation on the mental health consequences of cyber trauma. Since online experiences can lead to real-life consequences, online social support may benefit internet users. Cyber social support groups could be developed to address exposure to TFSV. Mental health professionals might routinely inquire about online dating and social connections as part of a risk assessment for TFSV exposure. Clinicians could also provide brief psychoeducation on safe online dating. Recommendations include using a pseudonym instead of one's real identity, avoiding the permanent sharing of intimate photos, not feeling obliged to disclose personal information, and saving evidence in case adverse events occur. Additionally, since our findings indicate that TFSV exposure is widespread among university students, regular assessment of such experiences by university psychological support units may help prevent the psychological consequences associated with TFSV exposure.

CONCLUSION

The prevalence of TFSV is high among Turkish university students. The Turkish version of the TFSV-VS demonstrated good psychometric

properties in assessing the severity of TFSV exposure. TFSV exposure was found to be related to both psychological distress and traumatic stress. Perceived social support may help alleviate the negative psychological effects of TFSV exposure. Future studies should focus on developing preventive programs addressing both TFSV perpetration and victimization. Additionally, implementing standardized interventions for TFSV survivors with mental health disorders could help address the needs of affected youth.

Online Appendix: https://dusunenadamdergisi.org/storage/upload/files/1748265104-appendix-en.pdf

Ethical Approval: The Eskisehir Osmangazi University Ethics Committee granted approval for this study (date: 08.02.2022, number: 13).

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