



Technology Involvement in Child Sexual Abuse: Characteristics and Psychiatric Implications

Çocuk Cinsel İstismarında Teknolojinin Rolü: Özellikler ve Psikiyatrik Sonuçlar

© Gökçe Nur Say¹, © Umut Tecir², © Berna Aydın², © Ahmet Turla²

¹Ondokuz Mayıs University Faculty of Medicine, Department of Child and Adolescent Psychiatry, Samsun, Türkiye

²Ondokuz Mayıs University Faculty of Medicine, Department of Forensic Medicine, Samsun, Türkiye

ABSTRACT

Objectives: This study examined the prevalence and patterns of digital technology involvement in contact child sexual abuse (CSA). We also investigated whether online-facilitated CSA cases exhibit unique characteristics and psychiatric consequences compared with cases without digital-technology involvement.

Materials and Methods: A retrospective review of medical records was undertaken for 1,755 sexual abuse victims under 18 years of age who were referred by the court. The comprehensive evaluation process included interviews with the victims and their parents, along with psychiatric examinations. Victims were categorized as "online-facilitated CSA" if the offender had utilized digital technologies, and a comparison was conducted with CSA cases not involving digital technology.

Results: 12% (n=212) of contact CSA victims also experienced online-facilitated CSA. Over half of the victims encountered perpetrators online before meeting them face-to-face. Notably, 45% had explicit images recorded, 38% experienced threats, and 11% were abused by individuals who were privy to the digital records. Online CSA victims, mainly adolescents and females, endured more severe and repetitive abuse, physical violence, and threats compared with offline CSA victims. They also exhibited higher rates of psychiatric disorders.

Conclusion: The results of this study indicate that digital technologies can be used to initiate and perpetuate CSA and may be associated with more severe psychiatric outcomes. Education for children and parents, professional training, and policy adaptation for a holistic approach are essential to prevent both offline and online CSA.

Keywords: Digital technology, internet, children, sexual abuse, psychopathology

ÖZ

Amaç: Bu çalışmada, dijital teknolojilerin istismarcı tarafından çocuk cinsel istismarına (ÇCİ) dahil edilme oranı ve kullanım amacı araştırılmıştır. Ayrıca, dijital destekli ÇCİ mağdurlarının dijital teknolojilerin istismara dahil edilmediği olgular ile istismara ait özellikler ve psikiyatrik sonuçları bakımından kıyaslanması hedeflenmiştir.

Gereç ve Yöntem: Mahkeme tarafından yönlendirilen 18 yaş altı 1.755 ÇCİ mağduruna ait adli raporlar retrospektif olarak incelenmiştir. Kapsamlı değerlendirme süreci, mağdurlar ve ebeveynleri ile yapılan görüşmeleri ve psikiyatrik muayeneleri içermiştir. Mağdurlar, istismarcının dijital teknolojileri kullandığı ve kullanmadığı olgular olarak iki gruba ayrılarak karşılaştırılmıştır.

Bulgular: Bu çalışmada, ÇCİ mağdurlarının %12'sinde (n=212) dijital teknolojiler istismarcı tarafından istismara dahil edilmiştir. Bu mağdurların yarısından fazlası istismarcı ile yüz yüze buluşmadan önce çevrimiçi ortamda tanışmışlardır. Ayrıca, %45'inin cinsel içerikli görüntüleri kaydedilmiş, %38'i kaydedilen görüntüler ile tehdit edilmiş ve %11'i dijital kayıtlardan haberdar olan başka kişiler tarafından istismara uğramıştır. Dijital teknolojilerin istismara dahil edildiği grupta örneklemin geri kalanına kıyasla kız cinsiyet, ergen yaş grubu, tekrarlayıcı istismar, fiziksel şiddet/tehdide maruz kalma ve psikiyatrik bozukluk oranı anlamlı derecede daha yüksek bulunmuştur.

Address for Correspondence/Yazışma Adresi: Gökçe Nur Say Prof Dr, Ondokuz Mayıs University Faculty of Medicine, Department of Child and Adolescent Psychiatry, Samsun, Türkiye

E-mail: gokcenurtasdemir@yahoo.com.tr ORCID: orcid.org/0000-0002-9106-4397

Received/Geliş Tarihi: 13.11.2024 Accepted/Kabul Tarihi: 27.03.2026 Epub: 29.06.2026

Cite this article as/Atf: Say GN, Turla A, Aydın B, Tecir U. Technology involvement in child sexual abuse: characteristics and psychiatric implications. Turk J Child Adolesc Ment Health. [Epub Ahead of Print]

Copyright © 2026 by the Author(s). Published by Galenos Publishing House on behalf of the Turkish Association of Child and Adolescent Psychiatry. This is an open access article licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) License.



Sonuç: Çalışmanın sonuçları dijital teknolojilerin ÇCİ'yi başlatmak ve sürdürmek amacıyla kullanılabilirliğini ve daha ciddi psikiyatrik sonuçlar ile ilişkili olabildiğini göstermektedir. Çocukların, ebeveynlerin ve profesyonellerin eğitimi ve politikaların geliştirilmesi çevrimiçi ve çevrimdışı çocuk istismarını önlemede büyük öneme sahiptir.

Anahtar Kelimeler: Dijital teknoloji, internet, çocuklar, cinsel istismar, psikopatoloji

Introduction

Over the past three decades, the Internet has become an essential and beneficial medium for children, offering unprecedented opportunities for learning, creativity, communication, and social engagement. Through educational platforms, online games, and social media, children can access vast resources, develop digital literacy, and connect with peers across the globe. However, alongside these benefits, it is essential to recognize that digital environments also carry significant risks, particularly when used without adequate supervision or safeguards. The same features that make digital platforms attractive—such as accessibility, anonymity, and interactivity—can also render children vulnerable to various forms of online harm. These include exposure to inappropriate content, cyberbullying, online grooming, coercion, sextortion, and exploitation by individuals who may misrepresent their identity. The integration of digital tools into offline child sexual abuse (CSA) introduces complex, multifaceted dynamics that challenge traditional understandings of abuse modalities.

According to international reports, digital technologies are involved in a significant proportion of CSA cases. For instance, the Internet Watch Foundation found a 64% increase in online CSA content reports in recent years,¹ while Europol has warned of the growing convergence between online and offline abuse modalities.² UNICEF has also highlighted that 1 in 3 Internet users globally is a child, many of whom are at risk of online grooming or exploitation.³

Offenders may exploit digital technology to initiate, facilitate, and maintain offline sexual abuse. Perpetrators can utilize various digital platforms to establish initial contact, groom victims, and manipulate them into engaging in offline sexual abuse.⁴ The anonymity and accessibility provided by digital platforms facilitate offenders' targeting and exploitation of vulnerable children. Furthermore, the ability to record and disseminate CSA material through digital means introduces additional risks and challenges. The distribution and circulation of CSA material can have severe, long-lasting consequences for the child involved.

Online-facilitated CSA refers to the process of establishing or building a relationship with a child, either in person or via the Internet or other digital technologies, to facilitate online or offline sexual contact with that child. The online environment or digital technologies may be involved at any stage of the offence. Three forms of online-facilitated CSA have been defined: 1) online only; 2) online-to-offline, in which offenders initially make contact with victims through online platforms or communication technologies and then transition to offline interactions for further abuse. This group represents cases where

digital technologies were primarily used as a means to establish initial contact and facilitate subsequent offline abuse; 3) offline progresses to online: the sexual abuse initially occurred through offline means, and later technology was introduced as a tool to exploit the victim or to record and disseminate CSA material.⁵

When explicit images or videos depicting a child's sexual abuse are disseminated, the child is subjected to enduring psychological trauma. The awareness that these materials are being viewed and shared by others intensifies the child's experience of shame, guilt, fear, and a sense of powerlessness.⁶ This protracted trauma can have severe consequences, including the development of post-traumatic stress disorder (PTSD), depression, anxiety disorders, and various other psychological and emotional impairments.⁷ Furthermore, the utilization of digital technologies in CSA was found to be significantly associated with a more severe form of abuse and an increased risk of revictimization.⁴ The cases involving digital technologies may result in more complex and compounded psychiatric outcomes due to the persistent and often public nature of the abusive material. These cases may be uniquely associated with chronic shame, heightened anxiety, and identity-related disturbances stemming from the perceived permanence and uncontrollability of the digital footprint of abuse. This study makes a unique contribution to the existing literature by focusing on a subset of CSA cases that are often overlooked: those in which digital technology facilitated contact sexual abuse that was not confined to virtual interactions. Our findings, derived from examining the psychiatric profiles of these victims in comparison to non-digitally facilitated CSA cases, offer novel insights into the distinct psychological impacts of technology-enabled abuse. This perspective is crucial for tailoring clinical interventions and informing mental health professionals, law enforcement, and policymakers about the evolving nature of CSA in the digital era.

Despite the growing body of research on online CSA, there is a notable gap in the literature specifically addressing offline-contact CSA cases involving digital technology as a facilitating tool. This underexplored area requires greater attention, given its distinctive mechanisms and implications. The scarcity of studies in this area limits our understanding of the full spectrum of risks and consequences associated with digitally facilitated offline abuse.

The primary objective of this study was to explore the prevalence and patterns of digital technology involvement in facilitating contact sexual abuse within a diverse sample of sexually abused children and adolescents. Additionally, it examines whether online-facilitated CSA exhibits unique characteristics and psychiatric consequences compared with cases that do not involve digital technology. This research aims

to gain a comprehensive understanding of this phenomenon by exploring the frequency and characteristics of offline CSA facilitated by digital technologies. Understanding the dynamics and outcomes of this form of abuse is crucial for developing effective prevention and intervention strategies to protect children from digital technology-enabled CSA.

Ultimately, the findings of this study have the potential to guide more effective identification, prevention, and trauma-informed treatment strategies by highlighting the unique psychological burden of digitally facilitated CSA, thereby contributing to improved outcomes for vulnerable children and adolescents.

Materials and Methods

The medical records of 1755 sexual abuse victims under the age of 18, referred by the court between January 2009 and December 2019, were retrospectively reviewed. According to Turkish criminal law, the court referred sexually abused children to child and adolescent psychiatry clinics for psychiatric evaluation.

Interviews With the Victims and Parents

Each sexually abused child and adolescent admitted to the clinics underwent a comprehensive evaluation process, which included interviews with the victims and their parents. The interviews covered a range of topics, including the victim's age, sex, and education level. The victims were asked to provide a detailed account of the sexual abuse they had endured, including the type, duration, and frequency of the abuse, the offender's identity, the number of offenders, and the use of digital devices (such as mobile phones, computers, cameras, etc.) in perpetrating the sexual abuse. Additionally, the presence of threatening or physical violence during the abuse was documented.

Psychiatric Examination

In addition to the interviews, a thorough psychiatric examination was conducted by an expert child and adolescent psychiatrist. The examination followed the diagnostic criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV and DSM-V, enabling the identification and diagnosis of signs and symptoms of psychological distress, trauma-related responses, and other psychiatric conditions that may have resulted from the sexual abuse. Specialists in the department of forensic medicine performed general physical examinations of the children.

Participants

The study involved a comprehensive review of the medical records of all 1755 victims, all of whom were included in the analysis. The participants were categorized as “victims of online-facilitated CSA” if the offender utilized the online environment or digital technologies at any stage of the sexual abuse. A comparison was then made between victims of online-facilitated CSA and victims of CSA in which digital technologies were not involved. The study was conducted in accordance with the Declaration of Helsinki.

Statistical Analysis

The data obtained from the medical records were analyzed using IBM SPSS Statistics version 21.0 (IBM Corp. in Armonk, NY). Chi-square tests were employed to compare groups. Logistic regression analysis was performed to identify factors predicting the development of psychopathology following sexual abuse. A significance level of $p < 0.05$ was used.

Ethics

The study was approved by the Committee for Clinical Research Ethics of Ondokuz Mayıs University (approval number: 2024/454, date: 01.02.2024).

Results

Out of the 1755 children included in the study, 12% ($n=212$) had experienced the offender's use of digital technologies at any stage of the abuse (online-facilitated CSA). The relationship between the offender and the victim was initiated via the online environment, such as social media, in 55.7% of the cases. Nearly half of the children were also exposed to online sexual abuse. Sexual abuse material was recorded by the offender for 46% of online-facilitated CSA victims. A considerable proportion of online-facilitated CSA victims (nearly 40%) were also threatened with the recorded material, whereas the material was disseminated online in 15.5% of cases. The ways and rates of online technology use in abuse are presented in Table 1 and Figure 1.

When the study sample was divided into two groups—“online-facilitated CSA” and “offline CSA”—significant differences were observed across all variables. In the online-facilitated CSA group, nearly all victims were adolescents (99%) and female (94.8%). The online-facilitated CSA group also experienced more severe abuse patterns, including significantly higher rates of penetrative abuse (69% vs. 41%), longer abuse duration (55.7% vs. 40%), and higher rates of repeated victimization (72.6% vs. 46.2%). The rates of psychiatric disorders (88.2% vs. 64%), threats (100% vs. 24.2%), and violence (33.5% vs. 17.8%)

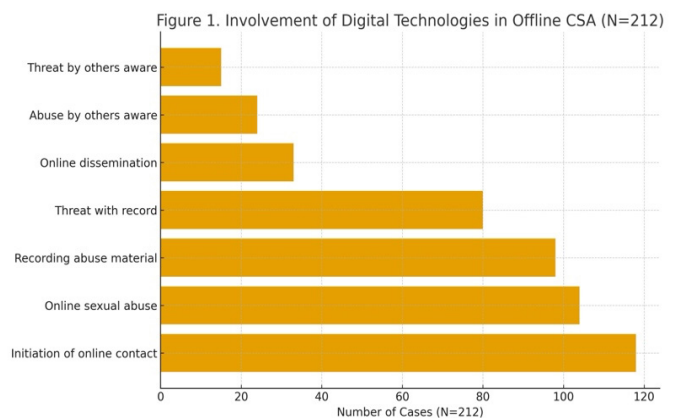


Figure 1. Involvement of digital technologies in offline CSA ($n=212$)
CSA: Child sexual abuse

were also significantly higher in the online-facilitated CSA group than in the offline CSA group (Table 2).

Logistic regression analysis identified several significant predictors of psychopathology among sexually abused children. Being younger than 12-years-old significantly increased the likelihood of developing a psychiatric disorder; children under 12 were 1.66 times more likely to develop psychopathology than older victims [B=0.506, $p<0.001$, odds ratio (OR)=1.658]. Female gender was also a strong predictor: girls had a twofold higher risk of psychopathology than boys (B=0.725, $p<0.001$, OR=2.065).

Exposure to penetrative abuse significantly increased the odds of psychopathology (B=0.519, $p<0.001$, OR=1.680). Physical violence and threats emerged as the strongest predictors in the model; children subjected to violence or intimidation were over

10 times more likely to develop psychiatric disorders (B=2.367, $p<0.001$, OR=10.670). Experiencing abuse by multiple offenders also significantly increased the risk of psychopathology, raising the likelihood by 2.50 times (B=0.917, $p<0.001$, OR=2.501). Likewise, incestuous abuse substantially elevated the risk that victims of incest had 1.86 times higher odds of developing psychiatric pathology (B=0.620, $p=0.003$, OR=1.858).

Regression analysis revealed that the involvement of digital technology was a significant independent predictor of psychopathology. After adjusting for demographic and abuse-related variables, victims whose abuse involved digital technologies were approximately 1.88 times more likely to develop psychiatric disorders (B=0.633, $p=0.027$, OR=1.883) (Table 3). Figure 2 also shows ORs and 95% confidence intervals for significant predictors of psychopathology in CSA victims.

Table 1. Involvement of digital technologies in offline CSA

	n (total: 212)	%
Initiation of offender-victim relationship in the online environment	118	55.7%
Online sexual abuse	104	49.1%
Recording sexual abuse material	98	46.2%
Threatening the victim with the sexual abuse record	80	37.7%
Disseminating sexual abuse material in an online environment	33	15.5%
Sexual abuse by other offenders who knew the record	24	11.3%
Threatened by those who knew the record	15	7.1%

Percentages represent the proportion of victims within the online-facilitated CSA group (n=212) who reported each form of digital technology involvement. Categories are not mutually exclusive; victims may have experienced more than one form of digital exploitation. CSA: Child sexual abuse

Table 2. Comparison of online-facilitated contact CSA victims with offline CSA victims

Variable	Online-facilitated CSA (n=212)	Offline CSA (n=1543)	χ^2	p
Age <12	2 (1%)	341 (22%)	53.056	<0.001
Age ≥12	210 (99%)	1202 (78%)		
Female	201 (94.8%)	1225 (79.4%)	29.098	<0.001
Penetrative abuse	146 (69%)	645 (41%)	55.155	<0.001
Duration ≤1 month	94 (44.3%)	928 (60.1%)	19.138	<0.001
Duration >1 month	118 (55.7%)	615 (40%)		
Partner/boyfriend	103 (48.6%)	268 (17.4%)	119.340	<0.001
Acquaintance	89 (42%)	876 (56.8%)	52.100	<0.001
Stranger	2 (1%)	195 (12.6%)	54.515	<0.001
First-degree relative	18 (8.5%)	204 (13.2%)	4.810	<0.001
Recurrent sexual abuse	154 (72.6%)	713 (46.2%)	28.909	<0.001
Multiple offenders	56 (26.4%)	143 (9.3%)	49.238	<0.001
Threatening	212 (100%)	374 (24.2%)	132.212	<0.001
Physical violence	71 (33.5%)	275 (17.8%)	22.592	<0.001
Psychiatric disorder subtype			52.917	<0.001
• PTSD + depression	117 (55.2%)	346 (22.4%)	—	—
• Depression	44 (20.8%)	234 (15.2%)	—	—
• PTSD	23 (10.8%)	341 (22.1%)	—	—
Suicide attempt	24 (11.3%)	60 (3.9%)	20.991	<0.001

Group differences were assessed using Pearson's chi-square test. A p-value of <0.05 was considered statistically significant. CSA: Child sexual abuse, PTSD: Post-traumatic stress disorder

Table 3. Factors predicting the development of psychopathology

	B	SE	Wald	df	Sig.	OR	95% CI
<12 years old	0.506	0.142	12.645	1	0.000	1.658	1.25-2.20
Female gender	0.725	0.148	23.992	1	0.000	2.065	1.55-2.75
Penetration	0.519	0.125	17.169	1	0.000	1.680	1.31-2.15
Physical violence and threats	2.367	0.196	146.239	1	0.000	10.67	7.26-15.68
Multiple offenders	0.917	0.252	13.285	1	0.000	2.501	1.53-4.09
Incest	0.620	0.205	9.101	1	0.003	1.858	1.24-2.78
Involvement of digital technology	0.633	0.286	4.904	1	0.027	1.883	1.07-3.31
Recurrence of abuse	0.013	0.124	0.011	1	0.917	0.987	0.78-1.25

Logistic regression identified independent predictors of psychopathology; exp (B) values represent odds ratios. Significance was set at $p < 0.05$. OR: Odds ratio, CI: Confidence interval, SE: Standard error, Sig.: Significance

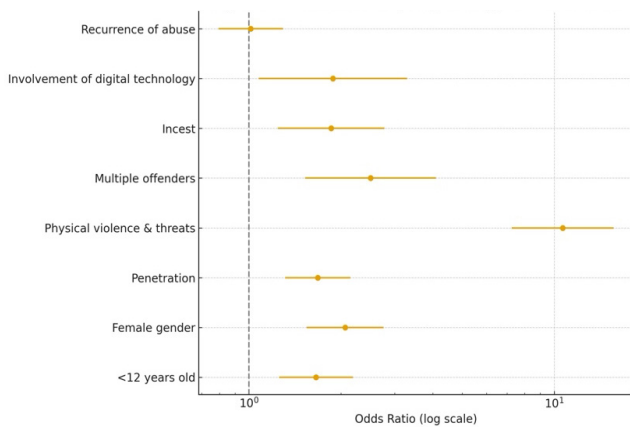


Figure 2. Predictors of psychopathology in CSA victims
CSA: Child sexual abuse

Discussion

This study explored the unique characteristics of online-facilitated CSA cases and compared them with cases without digital technology involvement. The study examined the association of offenders’ technology utilization with the severity of contact sexual abuse and with the incidence of psychopathology among victims. Furthermore, we aimed to investigate whether the involvement of technology in contact CSA was associated with the development of psychopathology.

In this study, the proportion of offenders who incorporated digital technologies into offline abuse was 12%. In a previous research, the rate of online-facilitated CSA was found to be similarly 14% among victims of CSA under the age of 18.⁴ This comparable prevalence rate underscores the growing significance of digital tools as adjuncts to traditional forms of CSA, reflecting a persistent and evolving risk in the digital era.

One striking finding of the study is that 55.7% of victims of online-facilitated contact CSA had encountered the perpetrator online. Online grooming, a process enabled by technology, involves an adult perpetrator intentionally befriending a vulnerable young individual with the explicit aim of initiating sexual abuse and exploitation.⁵ A comprehensive survey investigating the

online behaviors of children and adolescents across European countries revealed that 16% of adolescents reported having met someone in person whom they had initially encountered online. Among the adolescents who engaged in offline meetings, 11% disclosed instances of inappropriate sexual conduct.⁸ In a recently published study, it was reported that 8.5% of adults who experienced childhood sexual abuse had encountered their abusers through social media or online platforms.⁹ These results suggested that online communication provides offenders with easy access to victims, acting as a gateway that facilitates the transition from online relationships to face-to-face contact and ultimately leads to offline sexual abuse of the child. These results highlight that online communication not only facilitates initial contact but also is a high-risk vector for the transition to offline abuse. This finding suggests that prevention strategies should address the “continuum of victimization,” starting from the first digital interaction through to potential offline contact. Moreover, the accessibility and anonymity provided by digital platforms lower the barriers for offenders, enabling them to reach multiple potential victims simultaneously, which may increase the scope and frequency of abuse attempts.

Approximately half of the cases of exploitation through digital technologies involved online sexual abuse in addition to contact CSA, primarily through sexually explicit messages and images. Moreover, 45% of the online-facilitated CSA victims indicated that the offender recorded images of contact sexual abuse, 38% reported being threatened with these images, and 15% stated that these images were shared with others in the online environment. Furthermore, 7% of the online-facilitated contact CSA victims reported that they were threatened by individuals who knew the records, and 11% reported that they were sexually abused by other offenders who knew the records. This pattern reveals the multilayered victimization inherent in digitally facilitated CSA, where initial abuse is compounded by ongoing threats, coercion, and secondary abuse by third parties. Such dynamics extend the duration and complexity of trauma, often preventing psychological closure for the victim. These findings indicate that the recording and dissemination of CSA material sustains the victimization of children. Once the material is recorded and shared online, it becomes subject to replication, downloading, and widespread distribution, leading to the child’s

ongoing victimization as the material continues to circulate. This underscores the need for integrated interventions that combine law-enforcement actions, digital forensics, and victim-support services, all aimed at the rapid removal of abusive content from online platforms.

Compared with victims of offline CSA, those who experienced online-facilitated contact CSA exhibited significant differences on all variables examined in the study. The online-facilitated CSA group primarily consisted of adolescents aged 12 and above, with a significantly higher proportion of female victims. Similar to our results, several studies in the literature indicated that girls and adolescents are more prone to experiencing online sexual abuse compared to boys and children under the age of 12.¹⁰ These age and gender disparities are crucial for targeted intervention planning. Adolescents, particularly females, appear to be at greater risk due to higher digital engagement and increased susceptibility to online social validation. This underlines the necessity of age-appropriate digital literacy education and gender-sensitive prevention programs.

One noteworthy finding was that a significant proportion of individuals who engaged in online-facilitated contact CSA were identified as boyfriends. Cyber dating abuse encompasses a range of harmful behaviors perpetrated within romantic relationships through digital means. This includes not only emotional and psychological manipulation but also sexual aggression. This category of violence extends to various actions, such as pressuring a partner into engaging in face-to-face or online sexual activities, sending unsolicited sexual content, using coercion or threats to obtain sexual media, and distributing this content to a wider audience.^{11,12} The framing of abuse within a romantic context can normalize coercive behaviors, making victims less likely to identify themselves as abused and more hesitant to disclose their experiences. Victims may not recognize the coercive nature of the interaction due to emotional attachment, resulting in delayed help-seeking and heightened psychological consequences such as guilt, confusion, and betrayal trauma. The study sheds light on the broader issue of how technology can be used to perpetrate sexual aggression within adolescents' intimate relationships, highlighting the blurred lines between offline and online forms of abuse. This underscores the need for educational campaigns that help adolescents recognize the signs of abuse even in romantic relationships they perceive as consensual.

Victims of online-facilitated contact CSA were more likely to endure penetrative, repetitive forms of abuse, as well as physical violence and threats, than victims of offline CSA. This suggests that digital facilitation not only increases access but also escalates the intensity of abuse, possibly because offenders feel emboldened by the psychological control they establish before physical contact. The use of digital technologies by offenders appears to increase the severity of abuse by providing them with a platform to perpetrate more invasive and persistent harm. Moreover, the online environment enables offenders to exert control and coercion over their victims through various means, including threats and intimidation.

A higher incidence of psychiatric disorders and suicide attempts was noted in this group. From a clinical perspective, these findings suggest that the involvement of digital technology in CSA may not only increase the quantitative burden of trauma but also qualitatively alter the nature of the traumatic experience. Digitally facilitated CSA often transforms abuse from a time-limited event into an ongoing process, as abusive images, messages, or videos can be stored, copied, and disseminated indefinitely.^{6,13-15} The awareness or even suspicion that such material may still be circulating online maintains a chronic sense of threat and uncontrollability, which are central mechanisms in the development and persistence of PTSD.^{6,13,14} This persistent perceived danger can exacerbate core PTSD symptoms such as intrusive re-experiencing, hypervigilance, avoidance, and negative alterations in cognitions and mood.

Furthermore, the existence of a digital record of the abuse introduces a powerful and enduring social-evaluative component. Victims may fear being recognized by peers, family members, or strangers who might have seen or could potentially see the material, leading to pervasive shame, humiliation, and self-blame.^{6,14-17} These emotions are well-established contributors to the development of depression and other internalizing disorders following CSA.^{7,15,16} The sense of irreversible damage to one's reputation and identity in the digital sphere can fuel hopelessness, social withdrawal, and feelings of worthlessness, thereby increasing vulnerability to major depressive episodes and suicidal ideation.

The recurrent and potentially lifelong possibility of re-exposure to the abuse material also creates what has been described as "recurrent digital traumatisation," whereby victims experience ongoing retraumatisation through reminders of the abuse, the threat of rediscovery, or renewed dissemination of the images.¹³⁻¹⁵ Unlike traditional offline CSA, where the abusive event is temporally bound, online-facilitated CSA may be experienced by the victim as "never fully over," sustaining a chronic state of anticipatory anxiety and undermining the natural recovery process. Taken together, these mechanisms provide a plausible explanation for why psychiatric disorders, particularly PTSD and depression, are observed at higher rates among victims of online-facilitated CSA compared with those exposed to offline CSA only.^{4,6,13-16}

The logistic regression analysis offers valuable insight into the connection between digital technology involvement in CSA and the development of psychiatric disorders. Although previous studies,^{4,7,14-16} have linked digital documentation to heightened psychological harm, few have quantified its independent predictive power after controlling for abuse severity and victim demographics, as in our study. This positions our findings as an important step toward establishing digital facilitation as a distinct risk factor in CSA psychopathology research. Even after controlling for age, gender, penetration, threats, physical violence, incest, and multiple perpetrators, digital technology remained a significant risk factor, nearly doubling the likelihood of psychiatric disorders. This finding emphasizes that the digital dimension of CSA may represent a qualitatively distinct subtype

of abuse, with unique mechanisms of psychological harm—such as persistent fear of exposure, shame associated with image circulation, and continuous retraumatization through online reminders—that warrant specialized therapeutic approaches. This indicates that online-facilitated CSA may not merely be an extension of traditional offline CSA but a distinct and potent risk factor in itself. The digital environment provides offenders with unique opportunities and mechanisms to exert control, manipulate, and escalate abuse, potentially leading to more severe psychological trauma for the victims. A study has shown that victims who are aware of the existence or distribution of abusive images online experience elevated levels of posttraumatic stress symptoms compared to those who have been exposed to CSA without digital documentation.¹³ Children and adolescents who were subjected to sexual abuse that incorporated digital elements were found to be 4.21 times more likely to develop various forms of psychopathology. Specifically, they exhibited a 3.77-fold higher likelihood of experiencing depression and a 2.14-fold increased risk of developing PTSD as a consequence of the sexual abuse they endured.⁴ Previous investigations indicated that the digital aspect of abuse could potentially impact the psychological outcome, leading to revictimization through the further dissemination of images,¹⁴ heightened feelings of shame, self-blame, and betrayal,⁶ a decline in self-esteem, increased shame and isolation,¹⁵ as well as amplified experiences of depression and anxiety.¹⁶ These findings highlight the need for clinicians to systematically assess technology-related elements during evaluations and incorporate digital-trauma-specific components into treatment plans, such as addressing fears of exposure, shame linked to image circulation, and the victim's perceived loss of control over their digital identity.

The findings of the present study suggest that several factors may be associated with an increased risk of developing psychopathology among child abuse victims, including younger age, female gender, exposure to physical violence and threats, incestuous abuse, and multiple perpetrators. These results are consistent with previous literature emphasizing the role of victim characteristics and abuse severity in determining psychiatric outcomes.

Younger age at the time of abuse has been consistently linked to more profound and long-lasting mental health consequences, likely due to the limited cognitive and emotional capacity of younger children to process trauma.¹⁷ Female victims, in particular, are more likely to develop internalizing disorders such as depression, anxiety, and PTSD, possibly due to both biological and sociocultural factors.^{18,19}

The presence of physical violence and verbal threats during abuse has been shown to intensify the traumatic experience, increasing the likelihood of PTSD, hyperarousal, and dissociation.^{20,21} Furthermore, incestuous abuse is widely recognized as a particularly harmful subtype of sexual abuse, often associated with betrayal trauma and complex PTSD.²² The involvement of multiple perpetrators may exacerbate feelings of

helplessness and hopelessness in the child, contributing to more severe psychopathological outcomes.²³

Taken together, these psychiatric implications highlight a pressing need for trauma-focused therapies that specifically address components of digital exploitation. Such interventions should target shame, image-related anxiety, and the enduring fear of online exposure, while also accounting for the compounding effects of traditional high-risk abuse characteristics. This dual focus will allow clinicians to address both the unique harms of online-facilitated CSA and the broader psychosocial consequences of severe abuse.

Study Limitations

Several limitations of this study should be acknowledged. First, the study was designed as a retrospective chart review, and all data were obtained from existing medical and forensic records. Although face-to-face interviews were conducted at admission, these interviews were part of routine clinical and forensic evaluations and were not performed within a prospective research framework. No additional interviews were conducted specifically for this study. This retrospective design limits the ability to establish temporal relationships between exposure and outcome variables.

The assessment of digital technology involvement was based on documentation in clinical and forensic records, and was not conducted using a standardized assessment tool during the study period (2009-2019). Given the long study period and the rapid evolution of digital technologies, variations in documentation practices may have introduced information bias.

Psychiatric diagnoses were made according to DSM-IV criteria in earlier years and DSM-5 criteria in later years of the study period, reflecting routine clinical practice at the time of evaluation. Diagnoses were analyzed as recorded in the files and not retrospectively harmonized across DSM versions. Because diagnostic definitions and thresholds changed between DSM-IV and DSM-V, diagnostic inconsistency and potential misclassification cannot be excluded, particularly in the regression analyses.

Psychiatric diagnoses were based on clinical evaluations rather than standardized diagnostic instruments. Inter-rater reliability could not be assessed, and diagnostic practices may have varied across clinicians and over time. This limitation is inherent to retrospective chart reviews and should be considered when interpreting the findings.

All participants in the study were victims of CSA. The comparison was conducted only between abused children with and without documented digital technology involvement, and no non-abused or community control group was included. Therefore, the findings do not allow conclusions about psychiatric risk in the general population and should instead be interpreted as differences observed within a population already exposed to abuse.

Although logistic regression analyses were performed to examine associations between digital technology involvement

and psychiatric outcomes, these analyses demonstrate statistical associations and do not establish causality. Potential overlap between variables such as threats, physical violence, and digital recording cannot be fully ruled out, and formal model diagnostics were limited by the retrospective nature of the data. Accordingly, the regression results should be interpreted cautiously.

Digital technology involvement in CSA is a heterogeneous phenomenon. Although conceptual distinctions between online sexual abuse, online-facilitated offline abuse, and offline abuse with secondary digital elements such as recording or dissemination are clinically important, these categories may not always be clearly separable in retrospective records. In the present study, digital technology involvement primarily refers to offline sexual abuse cases with secondary digital elements; this should be taken into account when interpreting the results.

These limitations point to important directions for future research. Prospective longitudinal studies are critically needed to examine how digital technologies shape the trajectories of trauma, symptom development, and recovery. Such research could clarify whether digital facilitation contributes to delayed improvement, chronic PTSD, or long-term functional impairment. Additionally, cross-cultural comparative studies are needed to determine how sociocultural environments influence patterns of online grooming, disclosure behaviors, and mental health outcomes. Future work should also investigate how specific technological features—such as social media design, anonymity affordances, or algorithmic content exposure—affect risk and resilience among child and adolescent victims.

Conclusion

This study has illuminated the substantial role that digital technology plays in enabling and prolonging the offline sexual abuse of children. Moreover, our findings indicate a notable link between engagement with digital technologies in CSA and an elevated susceptibility to psychopathology.

The findings of this study have important implications for both immediate and long-term concerns related to child protection and mental health. In the short term, the high severity and complexity of online-facilitated CSA cases highlight the need for rapid identification of digital involvement during clinical and forensic assessments. Early detection of recorded material, threats, or online grooming can guide appropriate safety planning and urgent interventions.

The findings of this study highlight the critical importance of adopting a comprehensive and multidisciplinary approach to respond to online-facilitated CSA. From a clinical standpoint, mental health services must incorporate trauma-informed care models that directly address the unique psychological consequences of digital exploitation. These models should be sensitive to the persistent fear of exposure associated with the circulation of abusive images or videos, the chronic shame stemming from the victim's perceived loss of control over their digital identity, and the heightened anxiety resulting

from the ongoing potential for revictimization through online dissemination.

Routine psychiatric assessments of CSA survivors should be updated to include structured inquiries regarding the involvement of digital technologies in the abuse process. Identifying digital components early in the assessment process is vital, particularly because victims of online-facilitated CSA are more likely to have experienced repeated abuse, penetrative acts, and threats, and to have higher rates of suicide attempts and psychiatric comorbidity. Such risk factors necessitate timely referrals to specialized trauma-focused interventions. Evidence-based therapies, such as trauma-focused cognitive behavioral therapy and eye movement desensitization and reprocessing, should be adapted to incorporate components that specifically address digital trauma, including fears related to online permanence and image-based retraumatization.

Beyond the clinical setting, the study emphasizes the need for educational institutions to implement structured and age-appropriate digital safety programs. These should include digital literacy education, safe online behavior training, and relational awareness to help adolescents—especially girls—recognize manipulative behaviors, even when disguised as consensual or romantic interactions. Parents must also be included in the preventive framework. Public education campaigns and structured parental training should aim to increase awareness of online grooming tactics, sextortion, and signs of digital sexual abuse, empowering caregivers to intervene early and support victims effectively.

At the policy level, a coordinated response involving lawmakers, technology companies, child protection services, and law enforcement is essential. Legislative measures should establish strict responsibilities for digital platforms regarding the rapid identification and removal of CSA material, mandatory reporting obligations, and the enforcement of age-appropriate platform access. Policies must also ensure that child protection professionals receive specialized training in detecting and responding to online-facilitated CSA, including competencies in digital forensics, risk assessment, and inter-agency collaboration.

Beyond their role in facilitating CSA, digital technologies also possess significant potential as tools for prevention, early detection, and intervention. This dual capacity should be recognized when interpreting the study's findings. While offenders exploit features such as anonymity, unrestricted communication, and media-sharing functions to groom or coerce victims, the same technological infrastructure can be leveraged to protect children. Monitoring systems and algorithm-based detection tools used by technology companies can help identify grooming behaviors, flag suspicious communication patterns, and detect the circulation of illegal content in real time. Public awareness campaigns delivered through digital platforms can improve adolescents' knowledge of online risks, enhance their digital literacy, and empower them to recognize and report inappropriate interactions. Additionally, platform-level interventions—such as age verification mechanisms,

default privacy protections, rapid reporting tools, and automated blocking of suspected predators—offer scalable strategies for reducing opportunities for online-facilitated CSA. Understanding this dual role underscores the need for collaborative approaches involving mental health professionals, educators, policymakers, and technology companies. It also highlights the importance of developing prevention frameworks that harness the protective potential of digital technologies while mitigating their misuse.

In sum, this study reinforces the urgent need for an integrated clinical, educational, and policy framework that addresses both the psychological impacts and the systemic challenges of online-facilitated CSA. Recognizing the distinctive mechanisms of digital exploitation is fundamental to improving identification, intervention, and recovery outcomes for children and adolescents affected by this evolving form of abuse.

Ethics

Ethics Committee Approval: The study was approved by the Committee for Clinical Research Ethics of Ondokuz Mayıs University (approval number: 2024/454, date: 01.02.2024).

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: G.N.S., Concept: G.N.S., A.T., B.A., Design: G.N.S., A.T., B.A., Data Collection or Processing: G.N.S., A.T., B.A., U.T., Analysis or Interpretation: G.N.S., A.T., B.A., U.T., Literature Search: G.N.S., Writing: G.N.S.

Conflict of Interest: The authors declare no conflicts of interest.

Financial Disclosure: The authors declare that this study received no financial support.

References

1. Internet Watch Foundation. Annual Report 2023: the state of child sexual abuse online. Cambridge: IWF; 2023.
2. Europol. Internet Organised Crime Threat Assessment (IOCTA) 2023. The Hague: European Union Agency for Law Enforcement Cooperation (Europol); 2023. Available from: <https://www.europol.europa.eu/publication-events/main-reports/internet-organised-crime-threat-assessment-iocta-2023>
3. UNICEF. The State of the World's Children 2017: Children in a Digital World. New York: United Nations Children's Fund; 2017. Available from: https://www.unicef.org/media/48581/file/SOWC_2017_ENG.pdf
4. Say GN, Babadağı Z, Karabekiroğlu K, Yüce M, Akbaş S. Abuse characteristics and psychiatric consequences associated with online sexual abuse. *Cyberpsychol Behav Soc Netw*. 2015;18:333-336.
5. ECPAT International. Terminology guidelines for the protection of children from sexual exploitation and sexual abuse [Internet]. Luxembourg: ECPAT International; 2016.
6. Quayle E, Jonsson L, Lööf L. Online behaviour related to child sexual abuse: interviews with affected young people [Internet]. ROBERT (Risk-taking Online Behaviour Empowerment Through Research and Training); European Union, Council of the Baltic Sea States; 2012.
7. Drejer C, Riegler MA, Halvorsen P, Johnson MS, Baugerud GA. Livestreaming technology and online child sexual exploitation and abuse: a scoping review. *Trauma Violence Abuse*. 2024;25:260-274.
8. Livingstone S, Haddon L, Görzig A, Ólafsson K. Risks and safety on the internet: the perspective of European children. Full findings and policy implications from the EU Kids Online survey [Internet]. London: London School of Economics and Political Science; 2011.
9. Jeglic EL, Winters GM. The role of technology in the perpetration of childhood sexual abuse: the importance of considering both in-person and online interactions. *Children (Basel)*. 2023;10:1306.
10. Winters GM, Jeglic EL, Kaylor LE. Validation of the sexual grooming model of child sexual abusers. *J Child Sex Abus*. 2020;29:855-875.
11. Zweig JM, Lachman P, Yahner J, Dank M. Correlates of cyber dating abuse among teens. *J Youth Adolesc*. 2014;43:1306-1321.
12. Reed LA, Tolman RM, Ward LM. Gender matters: experiences and consequences of digital dating abuse victimization in adolescent dating relationships. *J Adolesc*. 2017;59:79-89.
13. Jonsson LS, Svedin CG, Priebe G, Fredlund C, Wadsby M, Zetterqvist M. Similarities and differences in the functions of nonsuicidal self-injury (NSSI) and sex as self-injury (SASI). *Suicide Life Threat Behav*. 2019;49:120-136.
14. Leonard MM. "I did what I was directed to do, but he didn't touch me": the impact of being a victim of internet offending. *J Sex Aggress*. 2010;16:249-256.
15. Whittle H, Hamilton-Giachritsis C, Beech A, Collings G. A review of young people's vulnerabilities to online grooming. *Aggress Violent Behav*. 2013;18:135-146.
16. Sigurjonsdottir S. Consequences of victims' mental health after internet-initiated sexual abuse: a sexual grooming case in Sweden [master's thesis]. Stockholm: Stockholm University; 2012.
17. Kaplow JB, Widom CS. Age of onset of child maltreatment predicts long-term mental health outcomes. *J Abnorm Psychol*. 2007;116:176-187.
18. Kendall-Tackett KA, Williams LM, Finkelhor D. Impact of sexual abuse on children: a review and synthesis of recent empirical studies. *Psychol Bull*. 1993;113:164-180.
19. Pereda N, Guilera G, Forns M, Gómez-Benito J. The prevalence of child sexual abuse in community and student samples: a meta-analysis. *Clin Psychol Rev*. 2009;29:328-338.
20. Finkelhor D, Browne A. The traumatic impact of child sexual abuse: a conceptualization. *Am J Orthopsychiatry*. 1985;55:530-541.
21. Anda RF, Felitti VJ, Bremner JD, Walker JD, Whitfield C, Perry BD, Dube SR, Giles WH. The enduring effects of abuse and related adverse experiences in childhood. A convergence of evidence from neurobiology and epidemiology. *Eur Arch Psychiatry Clin Neurosci*. 2006;256:174-186.
22. Courtois CA. Complex trauma, complex reactions: assessment and treatment. *Psychother Theory Res Pract Train*. 2010;41:412-425.
23. Arata CM. Child sexual abuse and sexual revictimization. *Clin Psychol Sci Pract*. 2002;9:135-164.