

Investigation of Internet Addiction, Cyberbullying, and Cyber Victimization in Adolescents During the COVID-19 Pandemic and Their Relationship with Anxiety and Depression

Uğur Tekin

University of Health Sciences Turkey, İstanbul Bakırköy Dr. Sadi Konuk Training and Research Hospital, Clinic of Child and Adolescent Psychiatry, İstanbul, Turkey

ABSTRACT

Introduction: The present study examined the problems of internet addiction (IA) and cyberbullying in the use of digital technology, which has become the most important part of adolescents' lives during the pandemic period. These cyber problems are discussed in the context of their relationship with anxiety/depression.

Methods: Adolescents (n=111, female 67%, male 33%) aged 11-18 years (mean: 13.7±2.05) were included in the study. Internet Addiction scale (IAS), Cyberbullying scale (CBS), Cyberbullying Sensibility scale (CBSS), Cyber Victimization scale (CVS), and Revised child anxiety/depression scale-child version (RCADS-CV) scales were used. The scales were filled out online twice according to the participants' situations before and during the pandemic.

Results: The IAS, CBS, and CBSS scores were significantly higher during the pandemic period (respectively: $z=-7,227$, $p<0.001$, $z=-2,623$, $p=0.009$, $z=-2,382$, $p=0.017$). There was no significant difference in the CVS scores ($p=0.326$). The IAS, CVS, and CBSS scores were associated with RCADS-CV scores. The CBS scores showed a correlation with panic and social anxiety scores.

Conclusion: The findings indicate that the pandemic has negatively affected the behaviors of adolescents in cyberspace in terms of IAS and CBS. Moreover, anxiety and depression symptoms were associated with risky cyber behaviors such as addiction and bullying in cyberspace. Considering that adolescents are among the most important actors in the cyber world, they should be supervised and psychosocially supported in terms of increased cyber risks and anxiety and depression in a global stress period such as a pandemic.

Keywords: Internet addiction, cyberbullying, anxiety, depression, adolescent, COVID-19

Introduction

The Coronavirus disease-2019 (COVID-19) pandemic caused significant changes in the lives of people of all age groups. Social isolation measures have reduced face-to-face interactions and increased the time spent online (1). Some measures implemented during the pandemic were as follows: Education was suspended, online education was started, schools, gyms, places of worship, restaurants, shopping centers, entertainment venues, and restaurants were closed, and long and comprehensive quarantine and curfew were applied. These changes brought some risks. However, due to the maturation and transition period, adolescents are more vulnerable to the changes and effects of this period (2). A high rate of increase has been observed in the use of digital technologies among adolescents during the pandemic (3). In addition to the positive effects of the internet, there are some negative consequences of heavy internet use. With the increasing use of digital technology, adolescents' spending most of their time on the internet has exposed them to various potential

cyber problems. Especially, internet addiction (IA) and cyberbullying (CB) have an important place among these cyber problems.

IA is described as intense use of the internet despite the negative effects on the person's life, loss of control in internet use, an irresistible desire to use, the development of tolerance, unsuccessful attempts to reduce/quit using the internet, and feeling irritable, depressed, and nervous due to internet overuse (4). Children's increased online time because of the interruption of daily life-increased feelings of loneliness, and the school closures have increased the risk of IA. Among the studies reporting an increase in addictive behaviors associated with internet use during the pandemic, most of them are in the adult population (1). Merely, some studies have reported that IA in children and adolescents increased during the pandemic. For example, Dong et al. (5) reported that IA and problematic internet use increased among Chinese children and adolescents during the pandemic. The rate of IA in adolescents is higher than that in adults. The underdeveloped frontal cortex, which is



Address for Correspondence: Uğur Tekin MD, University of Health Sciences Turkey, İstanbul Bakırköy Dr. Sadi Konuk Training and Research Hospital, Clinic of Child and Adolescent Psychiatry, İstanbul, Turkey
Phone: +90 543 450 52 30 **E-mail:** drutekin@gmail.com **ORCID ID:** orcid.org/0000-0001-6720-4292

Cite this article as: Tekin U. Investigation of Internet Addiction, Cyberbullying, and Cyber Victimization in Adolescents During the COVID-19 Pandemic and Their Relationship with Anxiety and Depression. İstanbul Med J 2023; 24(1): 100-5.

Received: 05.12.2022
Accepted: 01.02.2023

responsible for executive control and emotional regulation, immature cognitive control, low problem-solving and coping skills, and finding a sense of belonging, autonomy, and power on the internet play a role in adolescents being riskier (6). It has been reported that there has been an increase of 8-38% in the use of digital technologies by adolescents worldwide from 2019 to 2021 (7). This increase may have positive effects on mental health and coping with negative emotions during the pandemic. It is argued that using digital technologies can reduce loneliness, feelings of insecurity and stress, and increase social connections and self-esteem (3). Although there are useful sides to using the internet, in the literature, more attention has been paid to the negative effects rather than the positive effects. However, a better understanding of the relationship between the pandemic and adolescent' IA is still needed.

Apart from IA, the online world contains risks that can affect human life and functionality just like the real world. In particular, CB and cyber victimization (CV) are some examples of them. Today, a new environment has emerged where adolescents can bully each other, and as a result, cyberbullies and CB victims have emerged. Looking at the effects of CB on young people, it has been shown that it is associated with an increased risk of suicide and depressive symptoms, and it can also have negative effects on confidence, self-esteem, and peer relationships (8). CB is described as offensive, intentional, and recurrent action by a person or a group using digital technologies against a victim who has difficulty defending himself (9). In line with this, CV is defined as being a victim of harassment, receiving offensive and/or threatening messages or emails, slandering, and sending embarrassing pictures through digital technologies (10). Studies have shown that CB is associated with more negative outcomes compared to traditional bullying due to its unique features such as anonymity and being targeted in front of a larger community (11,12). Studies have reported that the prevalence of CV ranged from 10% to 40% (13), and CV has been an increasingly serious handicap for young people (14,15). Researchers point out that the consequences of the pandemic may cause increased risks related to CB in children (16-18).

IA and CB have been shown to be associated with lower mental well-being (19). In adolescents, IA has been associated with anxiety and depression (20,21). Similarly, victims of CB experience more psychological, emotional, and social problems than their peers (22,23). The excessive use of digital technologies, which is reported to be a method of coping with the stress brought by the pandemic, may increase the symptoms of anxiety and depression by increasing the risk of adolescents in terms of IA and CB (24). The anxiety and depressive symptoms associated with CB and IA can cause significant functional disruption that may negatively affect daily life, adversely affect friend-family relationships, or lead to psychiatric problems that require treatment in the future (25). There is limited knowledge in the literature about risky cyber behaviors of adolescents and its relationship with psychiatric symptoms during the pandemic.

In our study, we assumed that the pandemic process increased risky cyber behaviors such as IA, CB, and CV in adolescents. We showed their changes during the pandemic by comparing them with the pre-pandemic period and to find the relationship between these behaviors and symptoms of anxiety and depression.

Methods

Ethical approval of the study was obtained from the University of Health Sciences Turkey, İstanbul Bakırköy Dr. Sadi Konuk Training and Research Hospital Clinical Research Ethics Committee (approval number: 2021-07-09, date: 05.04.2021). All participants and their parents provided written informed consent. This cross-sectional study was conducted as an online survey in April-May 2021. Middle and high school students aged between 11 and 18 were included in the study. After the participants were given detailed information about the research, the sociodemographic data form and scales were applied to the volunteers via Google e-forms. The participants were asked to fill out the applied scales twice: First, according to the pre-pandemic period, and second, according to the pandemic period.

With the sociodemographic data form prepared by the researchers, information about the participant's age, gender, school/education, economic status (classified according to the country's official poverty line), and family/parent characteristics were collected. The sociodemographic data form was filled in by the parents, and all other scales were filled in by the young people who participated.

Internet Addiction Scale

Internet Addiction scale (IAS) is a valid and reliable IAS developed by Young (Cronbach's alpha: 0.91) (26). Consisting of 20 items, this scale is a six-point Likert-type scale. Participants answer each item as "never," "rarely," "sometimes," "often," "very often" and "always" and the items are scored 0, 1, 2, 3, 4, and 5 points. Higher scores mean more risk for IA.

Cyberbullying Scale

The Cyberbullying scale (CBS) is a valid and reliable scale that evaluates CB behavior of adolescents (Cronbach's alpha: 0.86) (27). The CBS had 24 items. Participants answer each item as "always," "mostly," "sometimes" and "never, and the items are scored 4, 3, 2, and 1 point, respectively. Higher scores indicate greater levels of CB.

Cyberbullying Sensibility Scale

The Cyberbullying sensibility scale (CBSS) is developed to detect adolescents' sensibility for CB (Cronbach's alpha: 0.87) (28). The CBSS had 14 items. Participants answer each item as "yes," "sometimes" and "no", and the items are scored 3, 2, and 1 point, respectively. Higher scores indicate greater levels of CB sensibility.

Cyber Victimization Scale

The scale is designed to assess the CV level (Cronbach's alpha: 0.86) (29). The Cyber Victimization scale (CVS) had 24 items on the scale. Each item has binary options (no/yes), with "no" receiving 1 point and "yes" receiving 2. Higher scores indicate higher levels of CV.

Revised Child Anxiety/Depression Scale-child Version

The scale is a 47-item, 4-point Likert-type questionnaire designed to evaluate anxiety, obsessive-compulsive, and depressive symptoms in children and adolescents. The scale grants a total anxiety score and a total anxiety/depression score. The Cronbach's alpha values for the total scale were 0.95 (30).

Statistical Analysis

Statistical analyses were performed using the IBM Statistical Package for the Social Sciences Statistics 22 statistical software package program. The statistical data were expressed using the mean and standard deviation. Comparisons between the pre-pandemic and the pandemic periods were compared using the Wilcoxon signed-rank test. Correlations of

scale scores with revised child anxiety/depression scale-child version (RCADS-CV) scores in the pandemic were analyzed using Spearman's rank correlation coefficient for non-parametric variables. A value of $p < 0.05$ and $p < 0.01$ were considered statistically significant levels.

Results

The sample of the study consisted of 111 young people, 74 girls, and 37 boys. The sociodemographic characteristics of the sample are summarized in Table 1.

Scale scores of the pandemic and the pre-pandemic period were compared using the Wilcoxon signed-rank test since the data were not normally distributed. We observed that the IAS, CBS, and CBSS scores were significantly higher in the pandemic period compared with the pre-pandemic period. However, there was no significant difference in the CVS scores between the two periods. The mean values of the various scale scores are shown in Table 2.

The Spearman rho correlation coefficient was performed to evaluate the relationship between cyber scale and RCADS-CV scores during the pandemic period. The IAS scores showed moderate and strong positive correlations with all RCADS-CV sub-scores. While the CVS and CBSS scores showed low and moderate positive correlations with all RCADS-CV sub-scores (except the CVS and separation anxiety), CBS scores showed low positive correlations with some RCADS-CV sub-scores, including panic, social anxiety, total anxiety, and total anxiety and depression. The mean values of the RCADS-CV scores and their correlations with the various cyber scale scores are presented in Table 3.

	n (%)
Female gender	74 (67%)
Age (mean, year ± SD)	13.7±2.05 Min.: 11 Max.: 18
Education	
Middle school	70 (63%)
High school	41 (37%)
SES	
Low	52 (47%)
High	59 (53%)
Mother	
Age (mean ± SD)	41.7 ± 5.25
University education*	46 (41%)
Father	
Age (mean ± SD) (y)	45.2 ± 6.7
University education*	59 (53%)
Divorced Parents	4 (3.6%)

SES: Socioeconomic status, SD: Standard deviation, y: Years, Min.: Minimum, Max.: Maximum, *: Number of parents with university or higher education

	Pre-pandemic period	Pandemic period	z	p*
	Mean ± SD	Mean ± SD		
IAS scores	20±16.3	27.08±18.5	-7.227	<0.001
CBS scores	24.41±1.63	24.55±1.75	-2.623	0.009
CBSS scores	35.26±6.43	35.61±6.38	-2.382	0.017
CVS scores	24.78±2.65	24.88±2.69	-0.983	0.326

IAS: Internet Addiction scale, CBS: Cyberbullying scale, CBSS: Cyberbullying Sensibility scale, CVS: Cyber Victimization scale, SD: Standard deviation

	Mean ± SD	IAS scores	CBS scores	CBSS scores	CVS scores
		r	r	r	r
Separation anxiety	50.75±10.92	0.460**	0.123	0.246**	0.112
Generalized anxiety	47.95±13.38	0.408**	0.149	0.400**	0.318**
Panic	48.86±11.6	0.513**	0.289**	0.262**	0.353**
Social anxiety	44.36±13.32	0.573**	0.261**	0.254**	0.227*
OCD	48.09±11.65	0.540**	0.094	0.335**	0.207*
Depression	51.58±15.43	0.648**	0.182	0.292**	0.363**
Total anxiety	46.98±13.17	0.596**	0.252**	0.350**	0.313**
Total anxiety and depression	48.03±14.41	0.632**	0.243*	0.341**	0.342**

RCADS-CV: Revised Child Anxiety and Depression Scale-Child Version, IAS: Internet Addiction scale, CBS: Cyberbullying scale, CBSS: Cyberbullying Sensibility scale, CVS: Cyber Victimization scale, **: The correlation is significant at the 0.01 level (2-tailed), *: The correlation is significant at the 0.05 level (2-tailed)

Discussion

The psychological and behavioral effects of the COVID-19 pandemic on children have just begun to be understood. In the current study, we examined risky behaviors of adolescents related to the cyber environment such as IA and CB during the pandemic period. The widespread use of the internet as a strategy for coping with stress in such a stressful period is an expected outcome. In adolescence, the risks of the cyber environment are likely to increase as the time spent online increases. Moreover, it can be expected that depression and anxiety levels may be associated with these risky cyber behaviors. Our study has demonstrated relevant results on these issues. A significant increase was observed in the IA, CB, and CBS scores of adolescents compared with the pre-pandemic period. However, no significant change was found in the CV score. Additionally, it was shown in the current study that during the pandemic, IA was strongly associated with an increase in all kinds of anxiety and depressive symptoms. Moreover, it was found that, while CB was associated with only panic and social anxiety symptoms, CBS and CV were associated with all kinds of anxiety and depressive symptoms (excluding separation anxiety).

In recent decades, with the development of technology, communication and the use of media has evolved and become widespread through internet-based devices. These developments have made positive contributions to coping with the isolation caused by the measures taken during the pandemic (3). However, overuse can have some risks and negative consequences. In one study, adolescents spend 4-6 h a day in front of the screen for recreational activities and more than 6 h a day for educational purposes during the pandemic (31). In another study, it was shown that the total daily screen time increased from 87.1 to 334.3 min in children (32). In this way, while getting away from the negative experiences created by the pandemic, being more online in the cyber world caused children and adolescents to have internet-based addictive behaviors (1). The findings of our study support the reports in the literature that adolescents' IA has increased during the pandemic. However, our study found that all types of anxiety and depressive symptoms were strongly associated with increased IA during the pandemic. It has been argued that problematic internet use may be operating as a new type of emotion regulation method (33). Emotion regulation is a critical skill that develops during childhood and adolescence for coping with difficult life events and intense emotions (34). In this respect, it can be speculated that addictive internet use has been used as a method of the regulation (or dysregulation) of negative emotions by adolescents in the pandemic (35).

As a vicious circle, while real-life problems push the individual into the virtual world, the increase in the time spent in the virtual world and the decrease in the time spent offline cause more and more problems (36). CB and CV are other important aspects of this vicious circle. The increase in the rate of being online and having devices such as smartphones during the pandemic process has been considered a factor that increases interactions and bullying in the cyber world (18,37). However, there are studies have reporting different results in this regard. For example, a study from the US reported that school-age CB decreased in the pandemic compared with the pre-pandemic period (38). The authors attributed this finding to the reduction of in-person bullying with school

closures and argued that consistent with previous evidence referring that CB rarely occurs independently of personal bullying. However, in another study involving 240 youth aged 17 and over, no significant increases were found in CB during the pandemic (39). This study was interpreted as a decrease in face-to-face interaction with peers during periods of social isolation, making CB less attractive. Contrary to these studies, we found in our study that adolescents' CB and CBS increased, whereas CV did not change. These different results may be related to the fact that these two studies were conducted in older age groups compared with our study. In line with our results, another study reported that the frequency of CV did not increase among adolescents during quarantine due to the pandemic (40). Although there is no study in the literature on the CBS of adolescents during the pandemic, we interpreted the finding of increased CBS as consistent and supportive with the finding of increased CB and may contribute to the understanding of the reason for this increase. There may be different explanations for the increase in CB and the absence of a change in CV. Those who have experienced CV may have given up reporting it and seeking support because of the embarrassment they experienced (40). Our finding that can be interpreted in parallel and in support of this interpretation was that CB was not associated with most anxiety symptoms, whereas CV was associated with almost all anxiety and depression complaints.

Some of the key strengths of our work are as follows. First, the study focused on the adolescent age group. It is important to investigate the impact of the pandemic on adolescents since they are important actors in the cyber world and are in a vulnerable life period. The second point, the risky cyber behaviors evaluated in the study was attempted to be examined by taking the pre-pandemic period as the baseline. Finally, risky cyber behaviors have been extensively researched by examining CB, CBS, and CV as well as IA.

Study Limitations

Our study had some limitations. First, our study has a modest sample size. Compared to online surveys in the literature, the sample size of our study was relatively small. Second, not dealing with data such as the purpose and duration of screen use is one of the important limitations of our study. Since online surveys often carry biases, another limitation of the study is that the data were collected online. Additionally, the results of the study are based on correlational analysis, and a causal relationship cannot be established based on the data of this cross-sectional study. In future studies, there is a need to conduct follow-up studies in a large sample, to examine the effect of the pandemic on cyber behaviors, and to examine the course of these risky cyber behaviors after the pandemic.

Conclusion

The results of this study indicate that the COVID-19 pandemic and associated events have a negative impact on the risky cyber behaviors of adolescents. During the pandemic, an increase was observed in adolescents' IA and cyberbullying behaviors, as well as their sensitivity to cyberbullying levels compared to the pre-pandemic period. Risky cyber behaviors of adolescents during the pandemic period were associated with anxiety and depression symptoms. Consequently, our findings

point to the importance of supervising adolescents in cyberspace and providing them with psychosocial support during stressful global events such as pandemics.

Ethics Committee Approval: Ethical approval of the study was obtained from the University of Health Sciences Turkey, İstanbul Bakırköy Dr. Sadi Konuk Training and Research Hospital Clinical Research Ethics Committee (approval number: 2021-07-09, date: 05.04.2021).

Informed Consent: All participants and their parents provided written informed consent.

Peer-review: Externally peer-reviewed.

Financial Disclosure: The author declared that this study received no financial support.

References

- Masaeli N, Farhadi H. Prevalence of Internet-based addictive behaviors during COVID-19 pandemic: A systematic review. *J Addict Dis* 2021; 39: 468-88.
- Singh S, Roy D, Sinha K, Parveen S, Sharma G, Joshi G. Impact of COVID-19 and lockdown on mental health of children and adolescents: A narrative review with recommendations. *Psychiatry Research* 2020; 293: 113429.
- Marciano L, Ostroumova M, Schulz PJ, Camerini AL. Digital media use and adolescents' mental health during the Covid-19 pandemic: A systematic review and meta-analysis. *Front Public Health* 2022; 9: 793868.
- Young KS. Internet addiction: A new clinical phenomenon and its consequences. *Am Behav Sci* 2004; 48: 402-15.
- Dong H, Yang F, Lu X, Hao W. Internet addiction and related psychological factors among children and adolescents in China during the coronavirus disease 2019 (COVID-19) epidemic. *Front Psychiatry* 2020; 11: 00751.
- Kwon JH. Toward the prevention of adolescent internet addiction. *Internet addiction: A handbook and guide to evaluation and treatment*. 2017: 223-43.
- Dixon S. Social media platforms growth of MAU worldwide 2019-2021 Aug 1, 2022 Available from: <https://www.statista.com/statistics/1219318/social-media-platforms-growth-of-mau-worldwide/>
- Price M, Dalgleish J. Cyberbullying: Experiences, impacts and coping strategies as described by Australian young people. *Youth Studies Australia* 2010; 29: 51-9.
- Kowalski RM, Limber SP, Agatston PW. *Cyberbullying: Bullying in the digital age*: John Wiley & Sons; 2012.
- Dempsey AG, Sulkowski ML, Nichols R, Storch EA. Differences between peer victimization in cyber and physical settings and associated psychosocial adjustment in early adolescence. *Psychology Schools* 2009; 46: 962-72.
- Wang J, Nansel TR, Iannotti RJ. Cyber and traditional bullying: Differential association with depression. *J Adolesc Health* 2011; 48: 415-7.
- van Geel M, Vedder P, Tanilon J. Relationship between peer victimization, cyberbullying, and suicide in children and adolescents: a meta-analysis. *JAMA Pediatr* 2014; 168: 435-42.
- Garaigordobil M. Cyberbullying in adolescents and youth in the Basque Country: prevalence of cybervictims, cyberaggressors, and cyberobservers. *J Youth Studies* 2015; 18: 569-82.
- Lenhart A, Purcell K, Smith A, Zickuhr K. *Social Media & Mobile Internet Use among Teens and Young Adults. Millennials. Pew internet & American Life Project*; 2010.
- Slonje R, Smith PK, Frisén A. The nature of cyberbullying, and strategies for prevention. *Computers Human Behavior* 2013; 29: 26-32.
- Yang F. Coping strategies, cyberbullying behaviors, and depression among Chinese netizens during the COVID-19 pandemic: a web-based nationwide survey. *J Affect Disord* 2021; 281: 138-44.
- Babvey P, Capela F, Cappa C, Lipizzi C, Petrowski N, Ramirez-Marquez J. Using social media data for assessing children's exposure to violence during the COVID-19 pandemic. *Child Abuse Negl* 2021; 116: 104747.
- Shin SY, Choi YJ. Comparison of Cyberbullying before and after the COVID-19 Pandemic in Korea. *Int J Environ Res Public Health* 2021; 18: 10085.
- Bailin A, Milanaik R, Adesman A. Health implications of new age technologies for adolescents: a review of the research. *Curr Opin Pediatr* 2014; 26: 605-19.
- Lam LT, Peng Z, Mai J, Jing J. The association between internet addiction and self-injurious behaviour among adolescents. *Inj Prev* 2009; 15: 403-8.
- Yen JY, Ko CH, Yen CF, Wu HY, Yang MJ. The comorbid psychiatric symptoms of Internet addiction: attention deficit and hyperactivity disorder (ADHD), depression, social phobia, and hostility. *J Adolesc Health* 2007; 41: 93-8.
- Juvonen J, Gross EF. Extending the school grounds?--Bullying experiences in cyberspace. *J Sch Health* 2008; 78: 496-505.
- McLoughlin C, Meyricke R, Burgess J. Bullies in cyberspace: How rural and regional Australian youth perceive the problem of cyberbullying and its impact. *Improving Equity Rural Education* 2009; 178.
- Chen IH, Chen CY, Pakpour AH, Griffiths MD, Lin CY. Internet-related behaviors and psychological distress among schoolchildren during COVID-19 school suspension. *J Am Acad Child Adolesc Psychiatry* 2020; 59: 1099-102.
- Fazeli S, Zeidi IM, Lin CY, Namdar P, Griffiths MD, Ahorsu DK, et al. Depression, anxiety, and stress mediate the associations between internet gaming disorder, insomnia, and quality of life during the COVID-19 outbreak. *Addict Behav Rep* 2020; 12: 100307.
- Kutlu M, Savcı M, Demir Y, Aysan F. Turkish adaptation of Young's Internet Addiction Test-Short Form: a reliability and validity study on university students and adolescents. *Anadolu Psikiyatri Dergisi* 2016; 17: 69-77.
- Arcak O, Kinay H, Tanrıku T. Siber Zorbalık Ölçeği'nin İlk Psikometrik Bulguları. *HAYEF Journal Education* 2012; 9: 101-14.
- Tanrıku T, Kinay H, Arcak OT. Cyberbullying Sensibility Scale: Validity and Reliability Study. *Trakya University Journal of Education* 2013; 3: 38-47.
- Arcak OT, Tanrıku T, Kinay H. Initial Psychometric Findings of Cyber Victimization Scale. *Mediterranean Journal of Educational Research* 2012; 11: 1-6.
- Gormez V, Kılınçaslan A, Orengül AC, Ebesutani C, Kaya I, Ceri V, et al. Psychometric properties of the Turkish version of the Revised Child Anxiety and Depression Scale-Child Version in a clinical sample. *Psychiatry and Clinical Psychopharmacology* 2017; 27: 84-92.
- Salzano G, Passanisi S, Pira F, Sorrenti L, La Monica G, Pajno GB, et al. Quarantine due to the COVID-19 pandemic from the perspective of adolescents: the crucial role of technology. *Italian J Pediatr* 2021; 47: 40.
- Xiang M, Zhang Z, Kuwahara K. Impact of COVID-19 pandemic on children and adolescents' lifestyle behavior larger than expected. *Prog Cardiovasc Dis* 2020; 63: 531-2.
- Spada MM, Langston B, Nikčević AV, Moneta GB. The role of metacognitions in problematic Internet use. *Computers in Human Behavior* 2008; 24: 2325-35.
- Mennin DS, Heimberg RG, Turk CL, Fresco DM. Preliminary evidence for an emotion dysregulation model of generalized anxiety disorder. *Behaviour Research and Therapy* 2005; 43: 1281-310.
- Hoge E, Bickham D, Cantor J. Digital media, anxiety, and depression in children. *Pediatrics* 2017; 140: S76-80.

36. Strittmatter E, Parzer P, Brunner R, Fischer G, Durkee T, Carli V, et al. A 2-year longitudinal study of prospective predictors of pathological Internet use in adolescents. *Eur Child Adolesc Psychiatry* 2016; 25: 725-34.
37. Barlett CP, Simmers MM, Roth B, Gentile D. Comparing cyberbullying prevalence and process before and during the COVID-19 pandemic. *J Soc Psychol* 2021; 161: 408-18.
38. Bacher-Hicks A, Goodman J, Green JG, Holt MK. The COVID-19 pandemic disrupted both school bullying and cyberbullying. *American Economic Review: Insights* 2022; 4: 353-70.
39. Englander E. Bullying, cyberbullying, anxiety, and depression in a sample of youth during the coronavirus pandemic. *Pediatr Rep* 2021; 13: 546-51.
40. Schunk F, Zeh F, Trommsdorff G. Cybervictimization and well-being among adolescents during the COVID-19 pandemic: The mediating roles of emotional self-efficacy and emotion regulation. *Comput Human Behav* 2022; 126: 107035.