ORIGINAL RESEARCH

Internet Addiction and Stressors Causing Internet Addiction in Primary School Children during the COVID-19 Pandemic: A Descriptive and Cross-Sectional Study from Turkey

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Main Points

- None of our participants were "internet addicts" according to the score they obtained on the scale, and only 9.7% of the participants showed "limited symptoms" in terms of internet addiction.
- When the total scale scores of the children were compared with the descriptive characteristics, a significant difference was found in terms of the child's sex, the child's age, the child having own computer, and the child having own room.
- When the activities of the children and their parents during the COVID-19 pandemic were compared with their scale scores, a significant difference was found between the terms of the frequency of playing games with the mother, the frequency of playing with the father, the status of parents watching the news about COVID-19 with the child, and the parents frequently warning the child about the COVID-19 precautions.

Abstract

In this study, we aimed to examine the status of internet addiction in children and the stress factors causing it during the coronavirus disease 2019 (COVID-19) pandemic. This study was a descriptive and cross-sectional study. The study sample included 154 parents of 7- to 10-year-old students. Participant information form and the Family-Child Internet Addiction Scale were used as data collection tools. The data of the study were collected with a questionnaire (via Google Forms) between July 15 and December 15, 2020. Of the children participating in the study, 90.3% (n=139) showed no symptoms and 9.7% (n=15) showed limited symptoms in terms of internet addiction. The total mean score that the children obtained from the scale was found to be 24.6±16.9. It was observed that the frequency of a child playing games with parents, the parents watching news about COVID-19 with the child, and the child being frequently warned about the COVID-19 precautions increased the children's internet addiction scores (p<0.05). This study demonstrated that if the pandemic process was prolonged, internet addiction in children could be further triggered.

Keywords: Child, COVID-19, internet addiction, pandemics, primary schools

Introduction

The 2019 novel coronavirus outbreak (coronavirus disease 2019 [COVID-19]) emerged in China at the end of 2019 and was transmitted from person to person by droplet or direct contact, and it was declared as a pandemic by the World Health Organization (WHO) on March 11, 2020 (WHO, 2020). To protect

the health of the population and prevent the spread of infection, many governments began to introduce measures such as physical distancing, quarantine, and isolation (Jovic et al., 2020). School closure, one of the most effective ways to restrict the spread of infection of COVID-19, has been among these measures (Petretto et al., 2020).

Schools play an important role in children's lives in terms of social interaction and development. It is also one of the places where a wide range of physical activities are performed and health/mental health services are provided (Golberstein et al., 2020). Along with school closures and home confinement, an increase in the length of time spent by the children at home may cause a reduction in their physical activities and social interactions, thus leading to a deterioration in their mental health (Wang et al., 2020). However, the uncertainty of the pandemic process is also an important stress and anxiety factor (Centers for Disease Control and Prevention (CDC), 2020a). In a study on the psychological effects of quarantine measures during previous outbreaks, it was indicated that 30% of the children suffered from posttraumatic stress disorders (Sprang & Silman, 2013). A study examining the effects of school closure on children's mental health because of the COVID-19 pandemic in China has shown that the three most common symptoms in children were anxiety (24.9%), depression (19.7%), and stress (15.2%; Tang et al., 2021). To reduce the stress and anxiety and alleviate their feeling of depression, the children tend to spend time on the internet for education, online games, shopping, movies, and social media (Dong et al., 2020).

Moderate internet use has some benefits, such as coping with emotional difficulties (Bowditch et al., 2018) and increasing self-esteem (Brailovskaia & Margraf, 2019); however, excessive and uncontrolled internet use can turn into addiction (Dong et al., 2020). Internet addiction has physical (Tepecik Böyükbaş et al., 2019), academic (Islam et al., 2020), and psychological (Cheng et al., 2018; El Asam et al., 2019) effects on children. Situations such as pandemics where the home confinement duration is necessarily increased can trigger this addiction. Research data are needed to develop evidence-based strategies to decrease the negative psychological effects of internet addiction on children. Therefore, this study was conducted to examine the status of internet addiction in children and the stress factors causing it during the COVID-19 pandemic.

Methods

Design, Setting, Population, and Sample Size
This study was a descriptive and cross-sectional study. The population of the study included parents of 7- to 10-year-old primary school students studying at a public school affiliated to the Directorate of National Education in the city center of Zonguldak located in the Western Black Sea Region of Turkey. According to the information received from the institution, the number of students aged 7-10 years was 176. Education is compulsory for children up to 12th grade in Turkey (primary school [4 years] + secondary school [4 years] + high school [4 years]). The age of children in primary school is 7-10 years. Children at primary school level were included in this study. The reasons for the selection of the school where the study was conducted were that it was a public school, the socioeconomic level of the families was in the average of Turkey, and it had the highest population of students in the city center.

In this study, we aimed to reach the whole population, not choosing the sample. Twenty-two parents who did not agree to participate in the study were excluded. The study group consisted of 154 parents of 7- to 10-year-old students studying in this state school between July 15 and December 15, 2020 (the rate of participation was 87.5%).

Data Collection Tools

Participant Information Form
Participant information form, which consisted of 34 questions related to the sociodemographic characteristics of parents and their children and information about COVID-19 and habits of internet use, was prepared by the researchers in accordance with the literature (Duan et al., 2020; Moore et al., 2020; Tanir et al., 2020; Wang et al., 2020).

Family-Child Internet Addiction Scale
The Family-Child Internet Addiction Scale was developed by Young (1998) who adapted the Diagnostic and Statistical Manual of Mental Disorders IV's (DSM-IV) "Pathological Gambling" criteria to determine parents' opinions about their children's internet use. Turkish adaptation and validity and reliability study were carried out by Eşği (2014). This Likert-type scale consisted of 20 items and four sub-dimensions. Each of the items in the sub-dimensions was scored as never (0), rarely (1), occasionally (2), mostly (3), very often (4), and always (5). In terms of internet addiction, a score of 80 or above obtained on this scale represented "internet addiction," a score between 50 and 79 represented "limited symptoms," and a score of 49 and below represented "no symptoms." The Cronbach alpha internal consistency coefficient of the scale was 0.91. In our study, this value was found to be 0.93.

Data Collection
The data of the study were collected using a questionnaire (Google Forms) between July 15 and December 15, 2020. The questionnaire forms were delivered through social media groups that the parents were using to communicate during the pandemic. The online survey took an average of 10 minutes to complete. During the planning phase of the study, one of the parents (either mother or father) of the children was asked to participate in the study as a parent. However, it was observed that all the parents who filled out the questionnaire forms were mothers.

Statistical Analysis
Data were analyzed using the IBM Statistical Package for Social Sciences version 22.0 (IBM SPSS Corp.; Armonk, NY, USA) program. Descriptive analysis were presented as number, percentage, mean, standard deviation, and minimum and maximum values. To compare differences between groups, one-way analysis of variance test was used for data showing normal distribution, and Mann-Whitney U and Kruskal-Wallis H tests were used for data that did not show normal distribution. Statistical significance was evaluated as $p < 0.05$.

Ethical Considerations

Before starting the research, necessary permissions were obtained from the Turkish Republic Ministry of Health General Directorate of Health Services (Protocol number: 2020-06-21T16_02_26) and the Zonguldak Bülent Ecevit University Human Research Ethics Committee (Protocol number: 07072020/824). On the first page of the online questionnaire, the participants were provided with an electronic consent form regarding the purpose of the study and the confidentiality of the data. The participants were also informed that participation was on a voluntary basis and that they could leave the study at any time.

Results

The mean age of the children in the study was 8.52±1.20 (min:7, max:10), the mean age of the mothers was 38.54±4.18 (27-52 years), and the mean age of the fathers was 41.23±4.58 (min:32, max:54). Of the mothers, 49.4% (n=76) were university graduates, and 41.6% (n=64) of them were civil servants. Of the fathers, 57.8% (n=89) were university graduates, and 39.6% (n=61) of them were civil servants. Of the parents, 59.1% (n=91) had two children, and 98.7% (n=152) of them lived with their children in the same house. Of the children, 91.6% (n=141) had no one living with them, except their parents, and 82.5% (n=127) of them did not have a caregiver before the pandemic. It was observed that 70.8% (n=109) of the children played games with their siblings, 97.4% (n=150) played with their mothers, and 88.3% (n=136) played with their fathers at home. The average frequency of the children's weekly internet use was found to be 5.85±1.58 (min:1, max:7) days, and the frequency of their daily internet use was 3.40±2.18 (min:1, max:10) hours. Of the children participating in the study, 90.3% (n=139) showed no symptoms in terms of internet addiction and 9.7% (n=15) showed limited symptoms. The total mean score that the children obtained on the scale was 24.6±16.9. When the children's sub-dimension mean scores of the scale were examined, it was determined that the social isolation sub-dimension was 7.24±4.93, the dysfunction sub-dimension was 6.86±4.25, the deprivation sub-dimension was 4.09±3.92, and the control difficulty sub-dimension was 6.4±5.34 (Table 1).

When the total scale scores of the children were compared with the descriptive characteristics, a significant difference (p<0.05) was found in terms of the child's sex (p=0.001), the child's age (p=0.005), the child having own computer (p=0.015), and the child having own room (p=0.02; Table 2).

When the activities of the children and their parents during the COVID-19 pandemic were compared with their scale scores, a significant difference (p<0.05) was found between the terms of the frequency of playing games with the mother (p=0.002), the frequency of playing with the father (p=0.000), the status of parents watching the news about COVID-19 with the child (p=0.022), and the parents frequently warning the child about the COVID-19 precautions (p=0.026; Table 3).

When the total scale scores were compared according to the purpose of internet use of the children, no statistically significant difference was found between them (Table 4).

Discussion

Among the criteria of internet addiction, the length of time spent on the internet was longer than planned (Young, 1998). Guan et al. (2020) have stated that the daily screen time should not exceed 2 hours for children aged 5-17 years. The children included in our study spent an average of 3.40 hours per day on the internet in the pandemic period. One limitation of our study was that we did not know the duration of our participants' internet use before the pandemic. However, in a survey conducted on children aged 6-17 years between January 2019 and January 2020 in Turkey (just before the pandemic), it was found that the average length of time spent on the internet was 2.41 hours (Basay et al., 2020). Considering these data, we could say that the potential of children's addiction to the internet has increased. However, none of our participants were "internet addicts" according to the score they obtained on the scale, and only 9.7% of the participants showed "limited symptoms" in terms of internet addiction. In the study conducted with children and adolescents aged between 6 and 18 years by Dong et al. (2020), it was found that 2.68% of the participants were internet addicts, and 33.37% of the participants showed limited symptoms. In this study, it was found that daily and weekly duration of internet use increased in all children and adolescents during the pandemic period compared with the period before the pandemic (Dong et al., 2020). Likewise, in a study conducted in three Southern European countries, it was determined that 35.7% of the children aged 3-18 years spent 30-60 minutes on the internet per day before quarantine; however, the duration of internet use increased to more than 3 hours in 30.1% of the same children after quarantine (Francisco et al., 2020).

Table 1.
General and Sub-Dimension Mean Scores of the Family-Child Internet Addiction Scale

Variables	n	%
Internet addiction status		
Showing no symptoms (0-49)	139	90.3
Showing limited symptoms (50-79)	15	9.7

	Number of items	Mean scores X̄±SD (min-max)	Mean scores of items* X̄±SD
Sub-dimensions of the scale			
Social isolation	5	7.24±4.93 (0-21)	1.44±0.99
Dysfunction	5	6.86±4.25 (0-18)	1.37±0.85
Deprivation	4	4.09±3.92 (0-20)	1.02±0.98
Control difficulty	6	6.4±5.34 (0-24)	1.07±0.89
Total score of the scale	20	24.6±16.9 (0-76)	1.20±0.84

* The highest score to be obtained from each item is 5.

Table 2.
Comparison of the Descriptive Characteristics and Scale Scores of the Children and Their Parents

Variables	n	%	X⁻±SD (min-max)	Test	p
Age of mother					
20-29	2	1.3	11.0±0.0 (11-11)		
30-39	97	63.0	23.94±16.74 (0-76)	2.412ᵃ	0.299
40-49	53	34.4	26.83±17.53 (2-71)		
50-59	2	1.3	11.0±0.0 (11-11)		
Age of father					
30-39	60	39.0	22.43±14.0 (2-55)		
40-49	80	52.0	26.42±18.63 (0-76)	0.840ᵃ	0.359
50-59	14	9.0	23.5±18.35 (11-71)		
Employment status of mother					
Full-time	48	31.2	25.39±15.07 (0-61)		
Part-time	16	10.4	25.5±14.34 (5-47)	2.509ᵇ	0.61
Working at home	60	39.0	20.66±15.1 (5-63)		
Not working	30	19.5	30.73±22.45 (2-76)		
Employment status of father					
Full-time	62	40.3	24.32±17.17 (0-75)		
Part-time	32	20.8	27.46±16.49 (2-76)	3.255ᵃ	0.354
Working at home	38	24.7	20.81±13.65 (5-60)		
Not working	22	14.3	27.77±21.36 (2-71)		
Income level of parents					
Income > expenses	40	26.0	23.17±16.3 (0-71)		
Income=expenses	89	57.8	23.33±15.05 (2-61)	2.488ᵃ	0.288
Income < expenses	25	16.2	31.4±22.6 (2-76)		
Sex of the child					
Female	73	47.4	20.26±14.77 (2-71)	−3.233ᶜ	0.001*
Male	81	52.6	28.51±17.89 (0-76)		
Age of the child					
7	46	29.9	18.08±10.52 (2-47)		
8	26	16.9	27.73±14.9 (2-50)	12.925ᵃ	0.005*
9	37	24.0	20.56±12.45 (5-57)		
10	45	29.2	32.77±22.36 (0-76)		
Presence of the internet at home					
Yes	146	94.8	24.46±16.53 (0-76)	−0.98ᶜ	0.922
No	8	5.2	27.12±24.61 (11-71)		
Academic success					
Very good	74	48.1	22.47±16.18 (2-76)		
Good	75	48.7	26.46±17.4 (0-63)	1.757ᵃ	0.415
Average	5	3.2	28.2±20.78 (0-76)		
Presence of child's own computer					
Yes	73	47.4	27.95±17.72 (2-71)	−2.436ᶜ	0.015*
No	81	52.6	21.58±15.72 (0-76)		

Table 2.
Comparison of the Descriptive Characteristics and Scale Scores of the Children and Their Parents (Continued)

Variables	n	%	X̄±SD (min-max)	Test	p
Presence of child's own mobile phone					
Yes	56	36.4	26.17±17.32 (2-71)	−0.953[c]	0.341
No	98	63.6	23.7±16.75 (0-76)		
Presence of child's own tablet					
Yes	87	56.6	24.49±16.16 (5-71)	−0.137[c]	0.891
No	67	43.5	24.74±18.03 (0-76)		
Presence of child's own room					
Yes	144	93.5	23.62±16.31 (2-76)	−2.327[c]	0.02*
No	10	6.5	38.7±20.43 (0-61)		

*p<0.05.
[a]Kruskal-Wallis H test.
[b]one-way analysis of variance.
[c]Mann-Whitney U test.

Table 3.
Comparison of the Scale Scores and Activities of Children and Their Parents During the COVID-19 Pandemic

Variables	n	%	X̄±SD (min-max)	Test	p
Frequency of playing games with siblings					
Never	4	2.6	32.75±25.11 (11-55)	2.083[a]	0.353
Occasionally	54	35.1	26.46±17.87 (0-76)		
Usually	55	35.7	21.29±14.58 (2-71)		
No sibling	41	26.6	25.80±17.69 (5-60)		
Frequency of playing games with mother					
Never	4	2.6	67.00±9.89 (57-76)	12.546[a]	0.002*
Occasionally	90	58.4	25.02±16.33 (0-63)		
Usually	60	39.0	21.15±14.24 (2-71)		
Frequency of playing games with father					
Never	8	5.2	26.75±17.28(8-63)	15.485[a]	< 0.001*
Occasionally	101	65.6	27.59±17.15 (0-76)		
Usually	45	29.2	17.51±14.46 (2-60)		
Parents watching the news about COVID-19					
Yes	139	90.3	24.97±17.06 (0-76)	−0.793[b]	0.428
No	15	9.7	21.13±15.99 (2-50)		
Parents watching the news about COVID-19 with the child					
Yes	115	74.7	26.33±17.4 (0-76)	−2.285[b]	0.022*
No	39	25.3	19.48±14.54 (2-63)		
Parents having conversations with each other about COVID-19 next to the child					
Yes	101	65.6	24.93±18.54 (0-76)	−0.699[b]	0.485
No	53	34.4	23.98±13.53 (5-71)		
Parents frequently warning the child regarding COVID-19 precautions					
Yes	153	99.4	24.75±16.9 (0-76)	−1.689[b]	0.026*
No	1	0.6	2.0±0 (2-2)		

*p<0.05.
[a]Kruskal-Wallis H test.
[b]Mann-Whitney U test.
COVID-19: coronavirus disease 2019.

Table 4.

Comparison of Reasons for Internet Use in Children and Their Scale Scores During the COVID-19 Pandemic

Variables	n	%	X̄±SD (min-max)	Test	p
Studying/doing homework					
No	26	16.9	20.57±14.47 (5-60)	−1.289[a]	0.197
Yes	128	83.1	25.42±17.34 (0-76)		
Listening to music					
No	96	62.3	25.69±17.85 (0-76)	−0.801[a]	0.423
Yes	58	37.7	22.79±15.3 (5-63)		
Playing games					
No	26	16.9	19.19±14.77 (0-60)	−1.784[a]	0.074
Yes	128	83.1	25.7±17.2 (5-76)		
Watching television/cartoons					
No	63	40.9	22.71±18.21 (0-76)	−1.756[a]	0.079
Yes	91	59.1	25.91±15.98 (2-71)		
Accessing social media					
No	137	89.0	23.62±15.82 (0-76)	−1.082[a]	0.279
Yes	17	11.0	32.47±23.3 (5-63)		

[a]Mann-Whitney U test.
COVID-19=coronavirus disease 2019.

In our study, the mean internet addiction scores of boys were found to be higher than those of girls. This result is compatible with the literature (Basay et al., 2020; Chi et al., 2020; Dong et al., 2020). It is also reported in the literature that boys preferred games played with sports equipment, such as football and basketball, whereas girls preferred games that required the use of imagination and creation (Hyndman & Chancellor, 2015). As a result of the pandemic, it is believed that the potential of internet addiction may be higher among boys, as they can play these games less at home.

Our study found that the mean internet addiction scores of the children whose parents worked at home during the pandemic were lower than the mean internet addiction scores of the children whose parents did not work. In both cases, parents spent more time at home than parents working in a full/part-time job. It has been reported that parents being at home increases the participation of children in home activities and enables the maintenance of their routines (Marques de Miranda et al., 2020). Of the families in our study, 74.0% had average and low income levels. Therefore, the lower scores of internet addiction in children whose parents work at home can be explained by the limited number of internet access tools at home and the parents having to work at home. However, higher scores of internet addiction in children whose parents do not work can be associated with the effect of low socioeconomic status on parental stress. In the literature, it has been stated that families with low socioeconomic status have higher stress levels because of financial difficulties, and this situation also increases the stress level of their children (Ursache et al., 2017).

In this study, it was observed that the mean scores of internet addiction in children increased as their academic performance decreased (according to parental assessment), which was not statistically significant. This result is compatible with the literature (Chi et al., 2020). It has been stated in the literature that students with poor academic performance may have low self-esteem, and the internet can be the best way for them to achieve satisfaction and pleasure by realizing their potential somewhere else (Gencer & Koç, 2012).

In this study, we determined that children having their own computer had significantly higher internet addiction scores. In addition, it was found that the mean scores of internet addiction in children who did not have their own room and were exposed to news about COVID-19 were significantly higher, which was an expected result of the study. It is stated that the lack of personal space at home during COVID-19 can adversely affect the psychological health of children (Wang et al., 2020). There is a high flow of information on television broadcasts and social media about the phenomena that affect the whole world, such as pandemics. However, this kind of news is not suitable for children to watch and can trigger unwanted psychological consequences in children. Király et al. (2020) recommended parents follow the public health advice from WHO and reliable news sources and limit excessive exposure of their children to such news during the pandemic period. In a study conducted in Turkey, anxiety scores of adolescents using television as a source of information for COVID-19 disease were found to be 2.41 times higher (Kılınçel et al., 2020).

It is an expected result for children who cannot perform their routine activities due to the pandemic to turn to video games (Ko & Yen, 2020). It has been stated that social media is a tool to cope with the lack of social interaction and can help protect mental health by allowing children to express themselves (Hamilton et al.,

2020). Although it is stated in the consensus guide, which includes recommendations for the prevention of problematic internet use during the COVID-19 pandemic, that the internet can be used as a "time-saver" to reduce the psychological effects of isolation, it is emphasized that participating in some online activities such as video games and social media can increase the addictive effect of the internet (Király et al., 2020). We observed in our study that the mean scores of the participants increased when they used the internet to access social media and play games, but it was not statistically significant. Because of school closures, children communicate with their relatives who are away and their friends or make online friends via social media, which may seem like a favorable outcome, although increased time spent on the internet may expose children to inappropriate content. The mean internet addiction scores of children in our study who used the internet to study/do homework were found to be higher. This could be owing to education being imparted online in Turkey during the pandemic, as in many countries in the world. It should also be considered that home-based digital learning is no longer an additional activity but a necessity during the COVID-19 pandemic, and parents allow increased screen time for children (Wai Wong et al., 2020).

In this study, the internet addiction scores in children whose frequency of playing games with their families, including siblings, increased were found to be lower (but was not statistically significant). It is stated that during childhood difficulties, parents and children playing games together reduced stress because of mutual joy and harmony (Yogman et al., 2018). It is also expected that children who do not play games with their family members access social media and turn to online games to interact with their friends and have fun. The results of our study are compatible with this finding. A study on the effects of COVID-19 on game behaviors and attitudes of 1,472 Canadian children and adolescents found that the use of social media increased in all the children compared with the period before the pandemic, and 10.2% of them turned to video games more; however, parental support and participation encouraged physical activities of children more (Moore et al., 2020).

Individual hygiene practices play an important role in the prevention of the spread of COVID-19. The CDC emphasizes the importance of parents being role models in adopting protective measures for school-age children (CDC, 2020b). WHO advises parents to be honest when talking to their children about the COVID-19 outbreak and the measures to be taken, to communicate with them according to their age, and to alleviate their concerns about the disease (WHO, 2020). Of the parents in our study, 99.4% frequently warned their children of COVID-19 precautions, and these children had higher internet addiction scores. Fear of infection has also been reported in the literature as a risk factor for depressive symptoms in primary school students (Xie et al., 2020). In our study, we believe that children who were frequently exposed to these warnings tend to spend more time in front of the internet as a way of escape from their parents. Open communication between the parents and children can have protective effects on children's mental health. Tang et al. (2021) also emphasizes that children discussing the pandemic with their parents are less likely to show symptoms of depression, anxiety, and stress, and this is a significantly protective factor on their mental health.

Limitations and Suggestions for Future Research

This study has some limitations that need to be addressed. The generalization of the study was limited because of its cross-sectional design and small sample size. Information regarding the children's internet use was collected during the pandemic. Therefore, we could not compare the habits of children's internet use during the pandemic with those before the pandemic. Self-evaluation of the children could not be included in the study, as the data were filled out by their parents.

By cooperating with parents, nurses can ensure that they avoid the attempts of parents to increase their children's stress and anxiety levels. Nurses could train parents on how to explain the pandemic period to their children and preventive measures related to the disease and how they can be role models for their children. The parents can be given information regarding the effects of the pandemic on the mental health of children and how to detect these effects at an early stage. Limiting the amount of news watched with children and children using social media to interact with their family elders and friends should be encouraged by parents. In addition, internet games that may encourage physical activity during family gatherings and can be played with the whole family are recommended.

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