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Effects Of Covid-19 Outbreak On Internet Use Of Primary School Children

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Abstract

The research was carried out to determine the internet use of primary school children during the COVID-19 pandemic process.
941 parents, who have primary school children (between 1st and 8th grades) in Turkey, who approved participating in the study, and who answered the questionnaire online, constituted the scope of the descriptive research.
It was determined that the average age of the children within the scope of the study was 9.61±2.2 years, 52.5% of them were boys, and 64.2% went to public school. It was determined that 94.6% of the children had an internet connection at home and 56.5% of their parents did not use the "Internet Safety Program", 51.8% of the parents "frequently" checked their children while they were using the internet, 75.2% of the children had his own electronic device (tablet, mobile phone, computer etc.). Parents stated that during the COVID-19 pandemic, the internet use rates of their children increased (83.3%), their children developed behavioral changes due to internet use (31.5%), and that they encountered with unwanted contents on the internet (15.2%). It was determined that the daily internet use time of children was 2.06±1.33 hours before the pandemic while it increased to 4.39±2.31 hours during the pandemic period ($p < 0.001$).
As a result of the research, it was determined that the rate of internet use of primary school children increased during the COVID-19 process, and that age, gender and family attitude had a significant effect on this increase.

Keywords: COVID-19, Child, Internet Use, Social Isolation

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INTRODUCTION

After announcement of the first Covid-19 case in the world in December 2019 and in Turkey in March 2020, The Ministry of Health and the Ministry of Education started to take measures against the pandemic, and education was suspended in all institutions (1, 2). It was stated by UNESCO that as of March 27, 2020, more than 1.5 billion students in 165 countries were affected by the closure of schools and the transition to online intermittent education (3). Internet use rates also increased in children who spent the whole day at home after the interruption of education in schools (4). Verizon, a US-based telecommunication company, reported a 75% increase in online gaming use due to the requirement for staying at homes (5, 6).
American Academy of Pediatrics (AAP) advised something new to parents in this process, which is not to give a specific restriction for screen time due to the necessity of children to continue distance education and stay at home, and suggested that children could be allowed more in the situations such as doing school homework, communicating with their friends and playing games. However, they stated that children should stay away from their phones while eating, parents should supervise social media use, and 8-12 hours of sleep time should be considered (7).
Centers for Disease Control and Prevention (CDC) reported that due to the COVID-19 outbreak, tendency of children to the virtual world to cope with stress and anxiety increased (8). Especially children in the primary school period constitute the biggest risk group because they do not know the correct and efficient internet use (9). The risks of pornography, sexual messages, communication with unknown people, cyber-bullying, internet addiction, depression, anxiety disorder and suicide are also increasing, with the increase in internet use during the COVID-19 pandemic (10, 11, 12). Accordingly, the study was carried out to determine the internet use rates of primary school children who had to spend all day at home due to the COVID-19 pandemic.

MATERIALS AND METHODS

Research Type

The research was carried out by using descriptive and cross-sectional types.
Research questions was determined as,
During the Covid-19 pandemic in Turkey:

- What are the rates of children having internet access and an electronic device?
- For what purposes do children use the internet?
- What applications do children use the most on the Internet?
- Do parents supervise their internet use of children?
- Have attitudes of the parents towards the internet use of their children changed?
- Have children encountered any unwanted content on the Internet?
- How much time did children spend on internet?
- What are the factors affecting internet use behaviors of children?

Research Population/Sample
The population of the study consisted of 941 parents with primary school children (#1st and 8th grade), who answered the sample questionnaire online through the "google.docs" program, between the dates of 15-30 June 2020.

Data Collection Tools
The data collection form developed by the researchers in line with the literature (9, 13, 14) consisted of 29 questions about the socio-demographic characteristics of parents and students and the internet usage habits of children during the COVID-19 pandemic.

Data Collection Process
After obtaining the permission of the ethics committee, the Data Collection Form and the Informed Consent Form prepared through the "google.docs" program, were sent to the parents online. The application time of the online questionnaire was approximately 3 minutes.

Evaluation of Data
While evaluating the findings obtained in the study, SPSS (Statistical Package for the Social Sciences) version 25.0 (IBM Corp., Armonk, NY, USA) program was used for statistical analysis. Kruskal-Wallis and Mann-Whitney U tests were used to test the difference between groups while the Mc Nemar test was used before and during the COVID-19 process in categorical comparisons, and the Wilcoxon test was used in quantitative comparisons, as well as descriptive statistical methods (number, percentage, average, median, standard deviation, etc. The correlation level between the two variables was measured by using the Spearman Correlation test. In addition, Multiple Linear Regression analysis was used to determine the independent factors affecting the daily internet use duration of children during the pandemic process. The results were evaluated as the 95% confidence interval and the significance level as $p<0.05$.

Ethical Aspect of the Research
For the research, the Ministry of Health Scientific Research Studies on COVID-19 (Form Name: Burcu SELVI CALISKAN- 2020-05-12T11_14_59) and Istanbul University-Cerrahpasa Social and Human Sciences Ethical Committee (ethical number: 12/06/2020-29210) required permissions were obtained.
In addition, an “Informed Volunteer Consent Form” was sent to mothers along with the questionnaire form. At the beginning of the questionnaire “I read the Informed Volunteer Consent Form described above. Those who marked "Yes" box in “I agree to participate in the study" section was deemed to have approved the informed volunteer consent form.

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RESULTS

It was determined that the average age of the children within the scope of the study was 9.61±2.2 years, 52.5% of those were male, 64.2% went to state schools, 67.5% of them were being educated in the 1st-4th grade, the vast majority (86.4%) were in nuclear family structure, 47.8% had a sibling and the majority of the parents had graduate degree (Mother=49%), Father=51.9%) (Table 1).

Table 1. Introductory Features of the Children (N=941)

Features		
Age (year) (X ± SS) (Min-Max)	9,61 ± 2,2 (6-14)	
	n	**%**
Gender		
Female	447	47,5
Male	494	52,5
School		
State	604	64,2
Private	337	35,8
Grade		
1st-4th grade	635	67,5
5th-8th grade	306	32,5
Family Background		
Nuclear family	813	86,4
Extended family	84	8,9
Broken family	44	4,7
Number of Siblings		
None	187	19,9
1sibling	450	47,8
2 or more siblings	304	32,3
Educational Status of Parents		
Mother	467	49,6
Father	488	51,9

It was determined that most of the children had internet connection at home (94.6%) and they did not use Safe Internet Program (56.5%) when the information about internet use of children was examined. It was determined that 38.4% of the parents indicated that their children's internet usage skills were “very good” and they “frequently” (51.8%) control their children while using the internet, and 75.2% of the children had their own electronic device (tablet=41.8%, mobile phone=27%, computer=23.1% etc.) (Table 2).

Table 2. Information on Children's Internet Use (N=941)

Internet Use	**n**	**%**
Yes	890	94,6
No	51	5,4
Do you use Internet Safety Program?		
Yes	315	33,5
No	532	56,5
I have no idea about the program	94	10,0
How would you evaluate your Internet use skills of your child?		
A little	16	1,7
Little	45	4,9
Medium	216	23,0
Very much	361	38,4
I have no idea	301	32,0
Do you control your child while he/she is using the Internet?		
Yes	**884**	**93,9**
So often	458	51,8
Sometimes	378	42,8
Rarely	48	5,4
No	**57**	**6,1**
Does your child have his/her own electronic device?		
Yes	**708**	**75,2**
Mobile phone	325	27,0
Tablet	504	41,8
Computer	278	23,1
Control pad	96	7,9
Smart watch	2	0,2
No	**233**	**24,8**

When information on internet use of children during the COVID-19 pandemic is examined, it was determined that 83.3% of the children had an increase in internet use, 31.5% of the parents stated that their children had behavioral changes due to internet use, and 15.2% of the children encountered unwanted contents on the internet (Table 3).

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Table 3. Information on Internet Use of Children in the COVID-19 Period (N=941)

Internet use during COVID-19 outbreak	**n**	**%**
Has there been any change in your Internet use time of your child?		
Increased	784	83,3
Stable	141	15,0
Decreased	11	1,2
I have no idea	5	0,5
Do you think there is any behavioral difference in your child due to Internet use?		
Yes	296	31,5
No	645	68,5
Has your child encountered with any unwanted content on the Internet?		
Yes	143	15,2
No	649	69,0
I have no idea	149	15,8
What applications does your child usually log into on the Internet?		
Eba	924	19,0
Morpa	703	14,3
Okulistik	276	5,7
Game sites (Hello Neighbor, Roblox, Minecraft, Brawl Stars, Pubg mobile, Clash og Clans, Fortnite)	817	16,8
Social media (WhatsApp, Facebook, Instagram)	347	7,1
Communication (Zoom, Meet, Skype, Google Classroom, Microsoft Teams)	447	9,2
Music (Spotify, Fizy)	76	1,6
Videos-Movies (Youtube, TikTok, Metodbox, Google arama, Netflix)	1274	26,3

It was determined that the children used the internet for homework (86.7%), playing online games (76.9%) and watching videos (68.5%) in pandemic (Table 4). When the features of the comparison of the internet usage characteristics of children before and during COVID-19 were examined, a difference was observed in attitudes of the families towards internet use during the pandemic process compared to the pre-pandemic period, 22.7% (n=213) increase in "negligent-tolerant" family structure, 17.3% (n=163) decrease in "authoritarian" family structure, and 5.3% (n = 50) decrease in "democratic" family structure, were determined ($\chi 2$=194.062; p=<0.001). When the changes in internet use purposes of the children compared to pre-pandemic were examined, it was observed that internet usage increased by 20% for homework (*χ^2=134,388;*

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p=<0,001), 4% for games (*χ^2=8,692; p=0,003*), 21% for communication (*χ^2=169,235; p=<0,001*), 6% for videos (*χ^2=18,240; p=<0,001*), 11% for movies (*χ^2=75,942; p=<0,001*) and 3% for music (*χ^2=4,809; p=0,028*) (p<0,05). It was determined that the daily internet use time of children increased statistically significantly compared to the pre-pandemic period during the pandemic period (p <0.05), the daily internet use time of children during the weekdays increased to 4.59±2.47 hours during the pandemic process while it was 1.59±1.30 hours before the pandemic period (p<0.001), and internet use time increased to 4.19±2.56 hours at the weekends during the pandemic process while it was 2.53±1.66 hours before the pandemic period (p <0.001) (Table 4).

Table 4. Comparison of Internet Use Features of Children, Before and During the COVID-19 Process (N=941)

		Before COVID-19	**During COVID-19**	***Significance***	
Features	**Category**	**n (%)**	**n (%)**	***χ^2***	***p***
Attitude of the family	Negligent& Indulgent	227(24,1)	440(46,8)	**194,062[a]**	**<0,001***
	Authoritarian	331(35,2)	168(17,9)		
	Democratic	383(40,7)	333(35,4)		
The purpose for Internet use**	Homework	627(66,6)	816(86,7)	**134,388[b]**	**<0,001***
	Game	689(73,2)	724(76,9)	**8,692[b]**	**0,003***
	Communication	241(25,6)	441(46,9)	**169,235[b]**	**<0,001***
	Research	415(44,1)	424(45,1)	0,350[b]	0,554
	Videos	591(62,8)	645(68,5)	**18,240[b]**	**<0,001***
	Movies	247(26,2)	350(37,2)	**75,942[b]**	**<0,001***
	Music	363(38,6)	387(41,1)	**4,809[b]**	**0,028***
	Category	**$\overline{X}$ ±SS Median (range)**	**$\overline{X}$ ±SS Median (range)**	***Z***	***p***
Daily internet use time (hours)	Weekday	1,59±1,30 1(0-8)	4,59±2,47 4(0-10)	**-24,314[c]**	**<0,001***
	Weekend	2,53±1,66 2(0-10)	4,19±2,56 4(0-10)	**-21,546[c]**	**<0,001***
	Total	2,06±1,33 2(0-9)	4,39±2,31 4(0-10)	**-24,878[c]**	**<0,001***

***:**p<0,05; **a(χ^2)=** Mc Nemar-Bowker Test; **b(χ^2)=** Mc Nemar Test; **c(Z)=**Wilcoxon Test
**: More than one option is marked.

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When the average duration of daily internet use in the COVID-19 process was examined according to the demographic and family characteristics of children, it was detected that as the age of children increased, their daily internet use increased (r=0,360; p<0,00), male children had longer daily internet use times (U=-2.668; p=0.008), children studying in private schools had longer daily internet use than children in state schools (U=-6.122; p=<0.001), children in 1st-4th grades had a shorter daily internet use time than children in 5th-8th grades (U=-9.918; p=<0.001), the daily internet use time of children with nuclear family structure was shorter than the daily internet usage time of children with extended/broken family (U=-2.453; p=0.014), children with authoritarian family structure had shorter daily internet usage time (KW=95.830). It was observed that the daily internet use time of the children, whose parents had a graduate or higher educational level, was longer [(education of the mother U=-3.215; p=0.001), (education of the father U=-3.559; p=<0.001)]. It was stated that daily internet usage time of children of the families controlling internet use of their children was shorter (U=-6,372; p=<0.001), children who have their own electronic device had longer daily internet use time (U=-11.271; p=<0.001), children who experienced behavioral changes due to internet use during the pandemic period had longer daily internet use time (U=-6.890; p=<0.001) (Table 5).

Table 5. Average Daily Internet Use Time of Children in COVID-19 Process According to Their Demographic and Family Characteristics

			Daily Internet Use Time During COVID-19 Outbreak (Hours)	***Significance***	
Features	**Category**	**n**	**$\overline{X}$ ±SS**	***U/K-W/r***	***p***
Age	**All**	941	-	0,360[a]	**<0,001***
Gender	Female	447	4,16±2,17	-2,668[b]	**0,008***
	Male	494	4,59±2,41		
School	State	604	4,07±2,29	-6,122[b]	**<0,001***
	Private	337	4,94±2,24		
Grade	1st-4th grade	635	3,87±2,10	-9,918[b]	**<0,001***
	5th-8th grade	306	5,46±2,37		
Family background	Nuclear	813	4,32±2,28	-2,453[b]	**0,014***
	Extended/broken	128	4,82±2,48		
Attitude of the family	Negligent& Indulgent	440	5,05±2,40	95,830[c]	**<0,001***
	Authoritarian	168	3,11±1,84		
	Democratic	333	4,15±2,09		
Educational status of the mother	High school or less	298	4,09±2,42	-3,215[b]	**0,001***
	Graduate or more	643	4,52±2,25		

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Educational status of the father	High school or less	296	4,01±2,33	-3,559[b]	**<0,001***
	Graduate or more	645	4,56±2,28		
Secured Internet use	Yes	315	4,58±2,37	-1,647[b]	0,100
	No	626	4,29±2,27		
Control of Internet use by the family	Yes	884	4,26±2,25	-6,372[b]	**<0,001***
	No	57	6,37±2,31		
The child has her/his own electronic device	Yes	708	4,83±2,27	-11,271[b]	**<0,001***
	No	233	3,03±1,85		
Behavioral changes in the child due to Internet use	Yes	296	5,17±2,44	-6,890[b]	**<0,001***
	No	645	4,02±2,16		

When the factors affecting daily internet use time of children during the COVID-19 process are examined according to multiple linear regression results, it was detected that Independent factors that affect (increase) daily internet usage times of children during the pandemic process were "age" (B=0.24; t=4.58; p=<0.001), "male" gender status (B=0.34; t=2.57; p=0.010), "private school" education type (B=0.64; t=4.34; p=<0.001), "negligent& tolerant& democratic" family attitude (B=1.12; t=6.35; p=<0.001) "educational level of the mother (graduate and higher) "(B=0.45; t=2.43; p=0.015),"uncheck of families for the internet use of their children"(B=1.20; t=4.29; p=<0.001) and "an electronic device possession of children" (B=1.14; t=7.19; p=<0.001) (Table 6).

Table 6. Factors Affecting Daily Internet Use Time of Children in COVID-19 Process According to Multiple Linear Regression Results

Factors	**Reference (1)**	**Non-standardized Coefficients**		**Standardized Coefficients**	***t***	**p**
		B	**SE**	**Beta**		
(Constant)	-	-3,64	0,64	-	-5,70	**<0,001**
Age	-	0,24	0,05	0,23	4,58	**<0,001**
Gender *(female vs. male)*	Female (1)	0,34	0,13	0,07	2,57	**0,010**
School type *(state vs. private)*	State (1)	0,64	0,15	0,13	4,34	**<0,001**
Grade *(1st-4th grade vs. 5th-8th grade)*	1st-4th Grade (1)	0,15	0,25	0,03	0,60	0,552
Family background *(nuclear vs. extended/broken)*	Nuclear family (1)	0,32	0,19	0,05	1,67	0,094
Attitude of the family *(authoritarian vs other)*	Authoritarian family (1)	1,12	0,18	0,19	6,35	**<0,001**
Educational status of the mother	High school or less (1)	0,45	0,19	0,09	2,43	**0,015**

(high school or less vs. Graduate or more)						
Educational status of the father *(high school or less vs. graduate or more)*	High school or less (1)	0,36	0,18	0,07	1,96	0,051
Control of Internet use by the family *(yes vs. no)*	Yes (1)	1,20	0,28	0,12	4,29	**<0,001**
The child has his/her own electronic device *(yes vs. no)*	No (1)	1,14	0,16	0,21	7,19	**<0,001**

R^2 =0,264; **F**=34,74; p=<0,001; **Method:** Enter; **Dependent variable:** Daily internet use time (hours)

DISCUSSION

During the COVID-19 pandemic, children had to spend all their time at home due to the distant education process and lockdown, so the rate of internet use increased (15, 16). Since the information in literature on internet use in children in the period of COVID-19 is limited, this section is mostly discussed within the scope of research findings and the literature on general internet use in children.

According to the data of Turkish Statistical Institute, it has been reported that the majority of homes in our country have internet access (90.7%), and the number of internet users is increasing day by day (17). In our research, it was determined that during the pandemic period, almost all of the children had internet access at home and had an electronic device (tablet, mobile phone, computer etc.). Accordingly, it was determined that during the COVID-19 period, the rate of internet use of children increased, and the increase in the duration of internet use on weekdays and weekends was statistically significant compared to the pre-COVID-19 pandemic period ($p<0.001$). Since children are involved in the distance education during the pandemic period, internet access and the existence of an electronic device of their own has become mandatory today, and as a result, the frequency of internet use has increased. When the literature is reviewed, it is reported in the study of Dong et al. (2020) that the duration of internet use in children increased during the COVID-19 period, similar to our findings (18).

The American Academy of Pediatrics (APA) did not restrict the screen time of children in this period due to the obligation to continue distance education and stay at home, but emphasized the importance of parental control in protecting children from the harmful effects of the internet (7). In our study, it was determined that during the pandemic period, authoritarian attitudes of parents about internet use decreased and negligent attitudes increased ($p\leq0.001$), concordantly, children with parents who display a "negligent" attitude towards internet use have higher internet use time ($p\leq0.001$). During the pandemic period, the duration of internet use of children increased as a result of parents not being able to control their children in the internet

environment and not using the safe internet program sufficiently due to the fact that their workload increased.

During the COVID-19 pandemic, it has been reported that internet use rates of children increased due to reasons such as starting distance education, conducting research, communicating with friends, watching videos and playing video games (5, 6, 11). Similarly, in our study, it was determined that during the pandemic period, children mostly used the internet for homework, playing games and watching videos, and the rate of internet use to communicate with their friends almost doubled during the pandemic period ($p \leq 0.001$). During the pandemic period, children are exposed to social isolation due to the necessity of being at home and this situation prepares the ground for socializing with their friends only on the internet.

Finally, in our study, it was determined that male children, those who were educated in private schools, those in the 5^{th}-8^{th} grade, those who live in extended families, those who have parents who display a "negligent" attitude towards internet use, those who have a high parental education level, those whose internet use is not controlled by their parents, those who have their own electronic device and who have behavioral changes due to internet use have higher internet use times ($p \leq 0.001$). In our study, it is observed that the rate of internet use of children in the older age group is higher. Similarly, it is reported that the rate of internet use is higher in the adolescent group, when the literature is reviewed (19). This situation is thought to be due to the adolescent group using social media and online games more. Similar to our study findings, studies have reported that males have higher internet use times compared to females (20, 21). It has been reported that this difference is due to the high frequency of playing online games for males, and the fact that self-control mechanisms of females are completed better, and their emotional, physical and psychological maturation processes are completed earlier (22, 23). According to our findings, it was examined that behavioral changes are more common in children who use the internet for a long time. When the literature is reviewed, it is reported that there is a relationship between long-term internet use/internet addiction and mental health problems, similar to our study data (24, 25, 26).

CONCLUSION AND RECOMMEDATIONS

As a result, it was determined that during the pandemic period, the rate of internet use of primary school children increased and age, gender and family attitude were effective in this increase when there was social isolation, curfews were imposed, and children moved away from their friends and natural habitats. Since the increase in internet use is a big risk in terms of the development of various health problems such as obesity, behavioral change, depression and vision problems, it is recommended that parents observe their children's internet use behaviors, make rules and direct their children to different pursuits, especially during the pandemic period.

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