Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Determining the relationship between loneliness and internet addiction among adolescents during the covid-19 pandemic in Turkey

Arzu Saralioğlu,*, Tutku Atay, Duygu Arikan

* Department of Child Health and Diseases Nursing, Atatürk University, Erzurum, Turkey
b Department of Medical Microbiology, Atatürk University, Erzurum, Turkey

ABSTRACT

Purpose: This study was conducted to determine the relationship between the levels of loneliness adolescents feel during the pandemic, and their respective levels of internet addiction.

Design and methods: The sample of the study consists of 482 adolescents who volunteered to participate in the study. All participants had the cognitive competence to express themselves, and had access to the Internet. Participants filled out a Google Docs form including the “Descriptive Information Form”, “ULS-SF” and “IASA”, which were used to collect data.

Results: As a result of the multiple regression analysis, it was found that family income, mothers’ education status, fathers’ education status, the duration of Internet use before and during the pandemic, and the total score of ULS-SF had statistically significant effects on the total score of IASA (p < 0.05).

Conclusions: It was concluded that adolescents’ internet addiction increases with the increasing level of loneliness. Adolescents who reported feeling moderately lonely had a low level of Internet addiction. There were certain variables that were also found to be influential on adolescents' average levels of loneliness and Internet addiction during the Covid-19 pandemic.

Practice implications: Protecting adolescents' mental health during the pandemic is dependent on taking measures to reduce the risks, while strengthening the protective factors. These protective factors include providing adolescents the access to the appropriate information resources and encouraging the rational use of the Internet, which will support the individual and the individual’s social development.

A R T I C L E  I N F O

Article history:
Received 24 May 2021
Revised 8 November 2021
Accepted 9 November 2021

Keywords:
Adolescents
Covid-19 pandemic
Internet addiction
Loneliness

Introduction

Adolescence is defined as the transition period from childhood to adulthood, which is a rapid and continuous development phase that includes biological, psychological, mental, and social development, and maturation. During this transition, adolescents enter a different period in terms of physical, sexual, social, and emotional changes. They may feel different due to the changes they experience in these developmental areas, and often have difficulties in communicating with their family and the individuals around them (Yavuzer, 2016).

Loneliness is a universal and complex emotion arising from being subjectively or objectively alone and/or perceiving oneself alone in society (Kahyaoğlu et al., 2016). The two types of loneliness are social and emotional. Social loneliness can be defined in terms of a lack of social communication, or not belonging to a group that participates in activities together. Emotional loneliness, on the other hand, is the inability to establish close and intimate relationships with other individuals. In this context, individuals tend to retreat into their shell and become lonely when their social relations are not at a desired level. The feeling of loneliness can be experienced at every stage of life; however, the feelings may get more intense, especially in adolescence and young adulthood (Ümmet & Eksi, 2016). In fact, most students reported feeling alone at home during the COVID-19 pandemic (Karataş, 2020). It is further suggested that adolescents are more likely to spend time on the Internet because of social loneliness (Çakır & Öğuz, 2017). It is thought that adolescents who cannot receive the necessary social support become increasingly lonely, and spend too much time on the Internet to deal with their feelings. Consequently, it leads to an addictive use of the Internet (Büyüksahin & Yildiz, 2017). Studies in the literature also report that loneliness is an important factor in the development of Internet addiction (Anlı, 2018; Kaynak et al., 2018).

Addiction is defined as abnormal behaviors that negatively affect the biological, mental, and physical functions and daily life activities of the
Moreover, it is known that the introduction of technological devices early in childhood, the continuing habit of the harmful use of technological devices during adolescence and adulthood, and the long-term internet use can cause deteriorations in sleep quality, obesity, negative emotional and social development, and difficulties in emotion regulation, in addition to the threat of addiction. It is yet unclear how using these devices in different positions for a long time affects the posture of children; however, it is likely that it will cause postural disorders, chronic pain, anomalies, or discomfort as well in the following years (Balci et al., 2021).

The following questions were explored in this study

• What is the level of loneliness adolescents feel during the Covid-19 pandemic?
• What is adolescents' level of Internet addiction during the Covid-19 pandemic?
• What are the factors affecting the loneliness and Internet addiction levels of adolescents during the Covid-19 pandemic?
• Is there a relationship between the level of loneliness adolescents feel and their level of Internet addiction during the Covid-19 pandemic?

Method

Design

This study was carried out as a descriptive-correlational study with the participation of adolescents living in Erzurum, Turkey who were contacted electronically between April and May of 2021.

Sample and setting

Adolescents living in Erzurum, Turkey constituted the population of the study. The sample of the study consists of 482 adolescents who volunteered to participate in the study. All participants had the cognitive competence to express themselves, and had access to the Internet. Participants filled out a Google Docs for data collection. As a result of the G Power 3.19.2 power analysis, the effect size of the study was determined to be 0.331, the power was determined as 95%, and the α type error estimation was 0.05. These values indicate that the sample size is sufficient (Çapkı, 2014).

Research inclusion criteria included: a) aged between 10 and 18; b) have the cognitive competence to express themselves; c) have Internet access; and d) uses Whatsapp. The exclusion criteria of the study were: a) age is not within the age range; b) have cognitive limitations; c) do no have access to the Internet; and d) does not use Whatsapp.

Measures

Descriptive Information Form, UCLA Loneliness Scale-Short Form, and Internet Addiction Scale for Adolescents were used to collect the data of the study.

Descriptive information form

The questionnaire was prepared by the researchers in accordance with the related literature (Anlı, 2018; Çakıcı, 2020; Çakır & Öğuz, 2017; Gülacı, 2020; Yiğit, 2019), and contained questions for determining the personal characteristics of the adolescents (age, gender, income status, parents’ education status, etc.). In addition, there were questions on loneliness and the internet use during the Covid-19 pandemic period.

UCLA loneliness scale-short form (ULS-SF)

The UCLA Loneliness Scale was originally developed by Hays and DiMatteo (1987). The validity and reliability analysis of the scale was conducted by Yıldız and Duy (2014), and the Cronbach’s alpha
coefficient of the scale was found to be 0.74. The scale is a four-point Likert type scale consisting of seven questions with the answers of “(1) Never, (2) Rarely, (3) Sometimes, and (4) Often”. The 5th item of the scale is reverse scored. The general loneliness score is obtained by adding the numerical equivalents of the answers given to the items. While the lowest score that can be obtained from the scale is 7, the highest possible score is 28. Accordingly, a low score indicates that the felt level of loneliness is low, and a high score indicates that the felt level of loneliness is high. In this study, the Cronbach alpha coefficient of the scale was found to be 0.73, which shows the reliability of the scale.

**Internet addiction scale for adolescents (IASA)**

Internet Addiction Scale for Adolescents (IASA) was developed by Taş (2019). The scale is a five-point Likert-type scale consisting of nine questions with the answers of “(1) Never, (2) Rarely, (3) Sometimes, (4) Often, and (5) Always”. There are no reverse items on the scale. A high score indicates that the level of Internet addiction is high, and vice versa. The Cronbach’s alpha coefficient of the scale was previously found to be 0.81 (Taş, 2019). In this study, the Cronbach alpha coefficient of the scale was found to be 0.88, which shows the reliability of the scale.

**Data collection**

After obtaining legal permissions, the questionnaire link including Sociodemographic Characteristics Form, UCLA Loneliness Scale Short Form, and Internet Addiction Scale for Adolescents was created by the researchers using Google Forms. The questionnaire link was sent to the WhatsApp groups used by the participants and the participants were asked to fill out the questionnaire. In line with the snowball method, the participants were asked to share the questionnaire link with other adolescents. Completing the questionnaires took an average of 10 to 15 min. Repeated entries were prevented and data security was ensured by clicking the send only once button from the Google Docs settings.

**Data analysis**

The data obtained from the study were analyzed in the SPSS 20 packaged software. Descriptive statistics and mean values, as well as Kurtosis and skewness coefficients for the determination of compliance of data to normal distribution, were used to analyze the data. Independent groups t-test and ANOVA were used for normal distributions, and the Kruskal Wallis test was used in non-normal distributions. The Pearson correlation analysis, multiple regression analysis and the Cronbach’s alpha coefficient calculation were used to analyze the data. The Tukey HSD and Dunnnett’s C-tests were further applied to determine the source of the difference in groups. The threshold for the level of significance was accepted as p < 0.05.

**Ethical considerations**

Permissions for using the scales were obtained from the developers of the scales before starting the study. In order to conduct the research, the ethics committee permission was obtained from the Human Research Ethics Committee, as well as written permission from the Ministry of Health.

Before starting the study, in line with the principle of “Respect for Autonomy”, the participants were informed that they were free to participate in the study and stop any time. Additionally, in line with the principle of “Confidentiality and the Protection of Confidentiality”, the participants were informed that their information would be kept confidential. Informed consent was obtained from the participants electronically. Those who were willing to participate in the study were included in the study. Since individual rights must be protected in the research, the Human Rights Declaration of Helsinki was adhered to during the study.

**Results**

The descriptive characteristics of the participants revealed that 36.5% (n = 176) of the participants were in the 13–15 years age group, 52.7% (n = 254) were female, 64.3% (n = 310) had 1 to 3 siblings, 81.7% (n = 394) were living in a nuclear family, 71.4% (n = 344) were living in the city center, 78% (n = 376) had social security, 53.5% (n = 258) had a moderate level of family income, 49.4% (n = 248) of the mothers had primary school degree and 80.5% (n = 388) of them were unemployed, and 41.9% (n = 202) of the fathers had a faculty degree and 48.1% (n = 232) of them were working as officers (Table 1).

It was further found that 41.9% (n = 202) of the adolescents defined their level of academic success as “good”. In terms of Internet use, 55.6% (n = 268) of the adolescents reported using the Internet for 0 to 2 h a day before the pandemic and 67.4% (n = 163) used the Internet for homework before the pandemic. However, responses to more recent questions revealed that 51.4% (n = 248) of the adolescents have been using the Internet for 6 h or more during the pandemic, and that 82.2% (n = 199) have been using the Internet for homework during the pandemic. Moreover, 72.7% (n = 176) of the adolescents communicated with their friends by phone, and 67.4% (n = 163) used the Internet to relieve loneliness during the pandemic (Table 1).

The minimum mean score of the adolescents in the ULS-SF was 7, and their maximum mean score in the ULS-SF was 25. The general mean score of the scale was 14.38 ± 4.42. The minimum mean score in the IASA was 9 and the maximum mean score in the IASA was 25. The general mean score of the scale was 22.21 ± 8.14. Table 2 compares the ULS-SF and IASA mean scores of the adolescents in terms of their descriptive characteristics. The examination of the ULS-SF reveals no significant differences in the variables of age, gender, family type, place of residence, number of siblings, social security status, father’s occupation, and the duration of Internet use before and during the pandemic in terms of mean scores (p > 0.05). However, family income, mother’s education and employment status, fathers’ education status, and school success were found to be significant factors on the ULS-SF mean scores (p < 0.05).

The examination of IASA reveals no significant differences in the variables of age, gender, family type, place of residence, social security status, number of siblings, mother’s employment status, and father’s occupation in terms of mean scores (p > 0.05). However, the effects of family income, mother’s and father’s education status, school success, and the duration of Internet use before and during the pandemic were found to be significant factors on the means scores of the IASA (p < 0.05).

A statistically positive, low-level significant relationship was found between the levels of loneliness the adolescents have been feeling during the Covid–19 pandemic and their respective levels of Internet addiction. According to this relationship, as the level of loneliness increases, the level of Internet addiction increases (Table 3).

According to the results of the regression analysis in Table 4, the significance level corresponding to the F value shows that the model established is statistically significant (F = 8.673; p < 0.05). Considering the beta coefficient value, t-value and significance level of the independent variable, it can be stated that family income, mother’s education status, fathers’ education status, the duration of Internet use before and during the pandemic, and the total scale of ULS-SF had statistically significant effects on the total scale of IASA (t = −2.611, p < 0.05; t = 1.837, p < 0.05; t = 2.437, p < 0.05; t = 3.873, p < 0.05; t = 5.733, p < 0.05; t = 3.826, p < 0.05 respectively). The family income, mother’s education status, fathers’ education status, the duration of Internet use before and during the pandemic, and the total scale of ULS-SF explained 17.2% of the change in the total score of IASA (Revised R² = 0.172).
Table 1
Distribution of the Adolescents in terms of Their Descriptive Characteristics.

| Descriptive characteristic | n (482) | % |
|----------------------------|---------|---|
| **Age**                    |         |   |
| 10–12 age                  | 58      | 12|
| 13–15 age                  | 176     | 36.5|
| 16–18 age                  | 248     | 51.5|
| **Gender**                 |         |   |
| Female                     | 254     | 52.7|
| Male                       | 228     | 47.3|
| **Number of siblings**     |         |   |
| 0                          | 16      | 3.3|
| 1–3                        | 310     | 64.3|
| 4 and above                | 156     | 32.4|
| **Family type**            |         |   |
| Nuclear family             | 394     | 81.7|
| Extended family            | 88      | 18.3|
| **Living place**           |         |   |
| City center                | 344     | 71.4|
| District                   | 80      | 16.6|
| Village                    | 58      | 12|
| **Social security status** |         |   |
| Available                  | 376     | 78|
| No                         | 106     | 22|
| **Family income**          |         |   |
| Less than expenditure      | 134     | 27.8|
| Equal income and expenditure| 258   | 53.5|
| More than expenditure      | 90      | 18.7|
| **Mother’s education status** |       | |
| Primary school             | 248     | 49.4|
| Secondary school           | 142     | 29.5|
| Faculty                    | 92      | 19.1|
| **Father’s education status** |       | |
| Primary school             | 92      | 19.1|
| Secondary school           | 188     | 39|
| Faculty                    | 202     | 41.9|
| **Mother’s employment status** |     | |
| Unemployed                 | 388     | 80.5|
| Employed                   | 94      | 19.5|
| **Father’s occupation**    |         |   |
| Unemployed                 | 14      | 9.1|
| Civil servant/worker       | 232     | 48.1|
| Self-employment            | 144     | 29.9|
| Retired                    | 62      | 12.9|
| **School success status**  |         |   |
| Bad                        | 18      | 3.7|
| Middle                     | 172     | 35.7|
| Good                       | 202     | 41.9|
| Very good                  | 90      | 18.7|
| **Internet usage time before the pandemic period** | | |
| 0–2 h                      | 268     | 55.6|
| 3–5 h                      | 172     | 35.7|
| 6 h and more               | 42      | 8.7|
| **The purpose of using the internet before the pandemic period** | | |
| Homework                   | 163     | 67.4|
| Game                       | 97      | 40.1|
| Social media               | 133     | 55|
| Music, movies              | 108     | 44.6|
| **Internet usage time during the pandemic period** | | |
| 0–2 h                      | 52      | 10.8|
| 3–5 h                      | 182     | 37.8|
| 6 h and more               | 248     | 51.4|
| **Communication with friends during the pandemic period** | | |
| Meeting at home            | 76      | 31.6|
| Meeting outside            | 102     | 42.2|
| Telephone                  | 176     | 72.7|
| Social media               | 140     | 57.9|

What are you doing to relieve loneliness during the pandemic period?
- Reading books: 114 (47.1%)
- To watch TV: 110 (45.5%)
- Internet: 163 (67.4%)
- Listen to music: 133 (55%)

Table 1 (continued)

| Descriptive characteristic | n (482) | % |
|----------------------------|---------|---|
| **Activity with family or siblings** | | |
| Play a game                | 114     | 47.1|
| Play with family            | 110     | 45.5|
| Play with friends           | 163     | 67.4|
| **Communication with friends during the pandemic period** | | |
| Meeting at home             | 76      | 31.6|
| Meeting outside             | 102     | 42.2|
| Telephone                   | 176     | 72.7|
| Social media                | 140     | 57.9|
| **What are you doing to relieve loneliness during the pandemic period?** | | |
| Reading books               | 114     | 47.1|
| To watch TV                 | 110     | 45.5|
| Internet                    | 163     | 67.4|
| Listen to music             | 133     | 55|

Table 2
Comparison of the ULS-SF and IASA Mean Scores of the Adolescents in terms of Their Descriptive Characteristics.

| Descriptive Characteristics | ULS-SF | IASA | Test and p | Test and p |
|-----------------------------|--------|------|------------|------------|
| **Age**                     |        |      |            |            |
| 10–12 age                   | 13.48 ± 3.40 | 20.68 ± 7.91 | F = 2.482 | p = 0.085 |
| 13–15 age                   | 14.12 ± 4.63 | 21.82 ± 8.51 | F = 1.949 | p = 0.144 |
| 16–18 age                   | 14.77 ± 4.45 | 22.83 ± 7.89 |            |            |
| **Gender**                  |        |      |            |            |
| Female                      | 14.29 ± 4.47 | 21.94 ± 7.44 | t = −0.432 | p = 0.666 |
| Male                        | 14.47 ± 4.37 | 22.50 ± 8.86 | t = −0.751 | p = 0.453 |
| **Number of siblings**      |        |      |            |            |
| 0                           | 12.25 ± 2.56 | 21.25 ± 9.19 |            |            |
| 1–3                         | 14.52 ± 4.64 | 21.72 ± 8.21 |            |            |
| 4 and above                 | 14.32 ± 4.07 | 23.26 ± 7.84 | KW = 4.422 | p = 0.110 |
| **Family type**             |        |      |            |            |
| Nuclear family              | 14.38 ± 4.38 | 22.06 ± 8.25 |            |            |
| Extended family             | 14.36 ± 4.62 | 22.86 ± 7.62 |            |            |
| **Living place**            |        |      |            |            |
| City center                 | 14.47 ± 4.62 | 22. 65 ± 8.30 |            |            |
| District                    | 14.20 ± 3.93 | 22.30 ± 8.61 |            |            |
| Village                     | 14.10 ± 3.89 | 21.03 ± 6.36 | F = 3.170 | p = 0.043 |
| **Social security status**  |        |      |            |            |
| Available                   | 14.07 ± 4.41 | 22.22 ± 7.99 | t = 2.187 | p = 0.029 |
| No                          | 14.45 ± 4.33 | 22.16 ± 8.70 | t = −2.841 | p = 0.053 |
| **Family income**           |        |      |            |            |
| Less than expenditure       | 14.85 ± 4.68 | 19.93 ± 6.91 |            |            |
| Equal income and expenditure| 14.48 ± 4.40 | 21.61 ± 8.38 |            |            |
| More than expenditure       | 13.37 ± 3.96 | 23.31 ± 8.24 | F = 3.170 | p = 0.043 |
| **Mother’s education status** |       | |
| Primary school              | 14.87 ± 4.55 | 21.32 ± 7.79 | F = 3.988 | p = 0.053 |
| Secondary school            | 13.91 ± 4.31 | 23.00 ± 8.45 | t = −2.187 | p = 0.032 |
| Faculty                     | 13.76 ± 4.12 | 23.25 ± 8.41 | t = −2.841 | p = 0.053 |
| **Father’s education status** |       | |
| Primary school              | 15.10 ± 4.27 | 20.04 ± 7.32 | F = 4.020 | p = 0.016 |
| Secondary school            | 13.95 ± 4.36 | 22.37 ± 8.88 | t = −2.187 | p = 0.032 |
| Faculty                     | 13.84 ± 4.69 | 23.04 ± 7.62 | t = −2.841 | p = 0.053 |
| **Mother’s employment status** |     | |
| Unemployed                  | 13.48 ± 3.96 | 22.36 ± 8.04 | F = 3.170 | p = 0.043 |
As excessive internet use pushes people to loneliness, on the other hand, loneliness pushes people to use the internet more (Meral & Bahar, 2016). Studies in the literature report that loneliness is an important factor in the development of Internet addiction (Anlı, 2018; Kaynak et al., 2018). It was found that excessive use of technological devices during the COVID-19 outbreak has significantly increased the likelihood of Internet addiction, especially as the duration of use increases (Winther & Byrne, 2020).

In the current study, it was found that adolescents have been feeling moderately lonely during the Covid-19 pandemic. In similar studies conducted by Yiğit, Arslan, and Çakır & Oğuz, adolescents were found to feel moderately lonely as well. Protective measures taken against the pandemic such as the closing of schools, social restrictions and curfews which deprived adolescents of interactions with their peers (Kanbur & Akgül, 2020; Oosterhoff & Palmer, 2020; Wanger, 2020; Yektaş, 2020). In this study, it was further found that the fact that adolescents feel moderately lonely is related to decreased peer interaction and increased isolation. A comforting aspect of these findings is that adolescents have not been feeling high levels of loneliness during the pandemic.

An interesting finding in this regard was that the average loneliness scores of adolescents whose mothers are working were found to be higher, which was different from the previous studies, which found no difference in the loneliness scores of adolescents based on the working status of their mothers (Boz, 2021; Yiğit, 2019). The findings of this study, however, found that the adolescents whose mothers are unemployed have been feeling less lonely during the Covid-19 pandemic as they spend more time with their mothers at home.

Furthermore, in this study, the loneliness score averages of adolescents with low family income were found to be higher. This was consistent with the existing literature considering a recent study by Madsen et al. (2019) that found socioeconomic status is inversely proportional to the level of felt loneliness. Similarly, in Çakır’s study, the loneliness score averages of adolescents with low family income was also found to be higher. In this study, the low level of loneliness of adolescents with high income may have been due to the wider circle of friends they have as they had the chance to be more active in different social and sports activities before the pandemic.

Another result of this study was that the loneliness score averages of adolescents whose mothers’ education status was low were found to be higher. Similarly, in Çakır’s study, the loneliness scale score averages of adolescents whose mothers’ education status was low were found to be higher. Several studies found no statistically significant relationship between the mothers’ education status and the level of adolescent loneliness (Gülaçtı, 2020; Yiğit, 2019). The fact that the adolescents whose mothers’ education level is high have been feeling less lonely during the Covid-19 pandemic may be a result of the extra knowledge these mothers have regarding the characteristics of adolescence. Their positive effect on their children’s loneliness may be interpreted in terms of their ability to communicate with their children, and support them accordingly.

The current study found that the loneliness score averages of adolescents whose fathers’ education level is low were similar to those in Çakır’s study that explored the association of fathers’ education level with measurement of adolescent loneliness. In addition, mean loneliness scores of adolescents with poor academic success levels were found to be higher as reported in Yiğit’s study. The finding that adolescents with low levels of academic success feel lonelier was interpreted in terms of the adverse effect of low success levels on their communication with their family. Moreover, it is further argued that the low levels of academic success may negatively affect social relationships with friends.

The results of the current study also showed that, overall, adolescents had low levels of Internet addiction during the Covid-19 pandemic. Several studies found the adolescent Internet addiction level was found to be low (Anlı, 2018; Boz, 2021). It was recently found that the excessive use of technological devices during the COVID-19 outbreak has significantly increased the likelihood of Internet addiction, especially as the duration of use increases (Winther & Byrne, 2020). Protective measures against the Covid-19 pandemic such as schools’ transition to distance education, social restrictions, and curfews have led to an increase in screen exposure, and increased Internet use in adolescents.

Table 2 (continued)

| Father’s occupation | ULS-SF: UCLA Loneliness Scale-Short Form | IASA: Internet Addiction Scale for Adolescents |
|---------------------|-----------------------------------------|-----------------------------------------------|
| X ± SD              | X ± SD                                  |                                               |
| Test and p           | Test and p                              |                                               |

| School success status | ULS-SF: UCLA Loneliness Scale-Short Form | IASA: Internet Addiction Scale for Adolescents |
|-----------------------|-----------------------------------------|-----------------------------------------------|
| X ± SD                | X ± SD                                  |                                               |
| Test and p            | Test and p                              |                                               |

Internet usage time before the pandemic period

| 0–2 hours | 14.03 ± 4.32 | 20.79 ± 8.18 |
| 3–5 hours | 14.76 ± 4.96 | 22.95 ± 7.20 |
| 6 h and more | 14.82 ± 4.41 | 28.23 ± 8.50 |
| F = 1.837 | F = 17.395  | p = 0.016    |
| a-b-c > d** | a-b-c > d** | 1.495        |

Internet usage time during the pandemic period

| 0–2 h | 13.30 ± 3.72 | 16.65 ± 6.19 |
| 3–5 h | 14.19 ± 4.41 | 20.90 ± 6.84 |
| 6 h and more | 14.74 ± 4.53 | 24.33 ± 8.63 |
| F = 2.525 | F = 25.225 | p = 0.081    |
| b-c > a   | b-c > a   | 1.425        |

According to these relationships, the model presented the following results, and the respective beta coefficients: A 1-unit increase in the family income variable led to an increase of 1.495 (β = 1.495) in the total score of IASA, a 1-unit increase in the mother’s education status led to an increase of 1.162 (β = 1.162), a 1-unit increase in the fathers’ education status led to an increase of 1.425 (β = 1.425), 1-unit increase in the duration of Internet use before the pandemic led to an increase of 2.175 (β = 2.175), a 1-unit increase in the duration of Internet use during the pandemic led to an increase of 3.147 (β = 3.147), and a 1-unit increase in the ULS-SF total score led to an increase of 0.301 (β = 0.301). There was no autocorrelation problem in the established model. The Durbin-Watson was between 1.5 and 2.5 (DW = 2.07).

Discussion

As excessive internet use pushes people to loneliness, on the other hand, loneliness pushes people to use the internet more (Meral & Bahar, 2016). Studies in the literature report that loneliness is an important factor in the development of Internet addiction (Anlı, 2018; Kaynak et al., 2018). It was found that excessive use of technological devices during the COVID-19 outbreak has significantly increased the likelihood of Internet addiction, especially as the duration of use increases (Winther & Byrne, 2020). Protective measures against the COVID-19 pandemic such as schools’ transition to distance education, social restrictions, and curfews have led to an increase in screen exposure, and increased Internet use in adolescents.
Our regression analysis supports this result as well. It was also previously found in studies conducted by Yayan et al. (2017) and Gulaçta (2020) that the Internet addiction of adolescents increased as the time spent on the Internet increased. Although the use of the Internet makes life easier, especially during the pandemic, and it seems to be the best method available to continue the children’s education, the risks it brings are just as substantial. In today’s world, children use the Internet for 6 to 7 h in order to continue their distance education in addition to their usual Internet usage. Therefore, the increased amount of time adolescents spend using the Internet during the Covid-19 pandemic is an expected result.

In this study, a significant low-level relationship was found in the positive direction between the levels of loneliness the adolescents have been feeling, and their levels of Internet addiction. The findings of the study suggested that for adolescents, as the level of loneliness increases the level of Internet addiction also increases. In particular, in our regression analysis, it was found that the total ULS-SF score and Internet addiction had a significant relationship. There are studies in the literature with similar findings that found a positive relationship between Internet addiction and loneliness in adolescents (Anlı, 2018; Boz, 2021; Gulaçta, 2020; Parashkouh et al., 2018; Yayan et al., 2019). The relation between loneliness and Internet use is mutually effective in the sense that just as the Internet pushes individuals to loneliness, loneliness pushes individuals into spending more time on the Internet (Meral & Bahar, 2016). In fact, it has been reported in the current study that 67.4% of the adolescent participants used the Internet to relieve the loneliness they have been feeling during the pandemic. Hence, it is argued that when adolescents feel that they cannot meet their social needs, they resort to digital means to satisfy these needs without any obstacles. This is one of the many reasons why the digital environment has become indispensable for adolescents over time, and reached to the point where it leads to dependency and addiction.

Practical implications

Protecting adolescents’ mental health during the pandemic is dependent on taking measures to reduce the respective risks, and strengthening the protective factors. These measures include providing adolescents access to the appropriate information resources, encouraging the rational use of the Internet, which will support the individual and the individual’s social development alike, conducting educational activities for adolescents and their families to raise awareness on this issue, and providing alternative ways and support groups for peer interaction by reducing isolation and loneliness. In addition, it is recommended that parents are informed of practices that will help them have their adolescent children spend less time online for arbitrary reasons, apart from the time they spent on the Internet for homework.

Finally, 82.2% have been using the Internet for homework during the pandemic. Our regression analysis supports this result as well. It was also previously found in studies conducted by Yayan et al. (2017) and Gulaçta (2020) that the Internet addiction of adolescents increased as the time spent on the Internet increased. Although the use of the Internet makes life easier, especially during the pandemic, and it seems to be the best method available to continue the children’s education, the risks it brings are just as substantial. In today’s world, children use the Internet for 6 to 7 h in order to continue their distance education in addition to their usual Internet usage. Therefore, the increased amount of time adolescents spend using the Internet during the Covid-19 pandemic is an expected result.

In this study, a significant low-level relationship was found in the positive direction between the levels of loneliness the adolescents have been feeling, and their levels of Internet addiction. The findings of the study suggested that for adolescents, as the level of loneliness increases the level of Internet addiction also increases. In particular, in our regression analysis, it was found that the total ULS-SF score and Internet addiction had a significant relationship. There are studies in the literature with similar findings that found a positive relationship between Internet addiction and loneliness in adolescents (Anlı, 2018; Boz, 2021; Gulaçta, 2020; Parashkouh et al., 2018; Yayan et al., 2019). The relation between loneliness and Internet use is mutually effective in the sense that just as the Internet pushes individuals to loneliness, loneliness pushes individuals into spending more time on the Internet (Meral & Bahar, 2016). In fact, it has been reported in the current study that 67.4% of the adolescent participants used the Internet to relieve the loneliness they have been feeling during the pandemic. Hence, it is argued that when adolescents feel that they cannot meet their social needs, they resort to digital means to satisfy these needs without any obstacles. This is one of the many reasons why the digital environment has become indispensable for adolescents over time, and reached to the point where it leads to dependency and addiction.

Practical implications

Protecting adolescents’ mental health during the pandemic is dependent on taking measures to reduce the respective risks, and strengthening the protective factors. These measures include providing adolescents access to the appropriate information resources, encouraging the rational use of the Internet, which will support the individual and the individual’s social development alike, conducting educational activities for adolescents and their families to raise awareness on this issue, and providing alternative ways and support groups for peer interaction by reducing isolation and loneliness. In addition, it is recommended that parents are informed of practices that will help them have their adolescent children spend less time online for arbitrary reasons, apart from the time they spent on the Internet for homework.
and exams, and that parents are guided towards new ways of communication within the family that are entertaining so as to reach their adolescent children.

Limitations

The results of this research are limited to the adolescents who were reached with the snowball sampling method at a specified time. The only communication medium used for reaching adolescents was via social media, which is another limitation of the study.

Conclusion

Internet addiction among adolescents increase with increasing levels of loneliness. Overall, it has been reported that adolescents are moderately lonely, and have only low levels of Internet addiction. Importantly, it has been determined that certain variables are especially influential on loneliness levels and the Internet addiction scores of adolescents during the Covid-19 pandemic.

Author contributions

1. Study design: A.S., D.A.
2. Data collection: A.S., T.A., D.A.
3. Data analysis: A.S.
4. Study supervision: A.S., T.A., D.A.
5. Manuscript writing: A.S., T.A., D.A.
6. Critical revisions for important intellectual content: A.S., T.A., D.A.

Ethical approval

This study received 14/04/2021 dated and 2021-1/1 numbered approval was taken from Erzurum Atatürk University Faculty of Nursing Ethical Board.

Funding information

The authors received no financial support for the research, authorship, and/or publication of this article.

Authorship statement

All listed authors meet the authorship criteria and that all authors are in the agreement with the content of the manuscript.

Conflict of interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Acknowledgment

The authors gratefully would like to thank the adolescents participating in the research.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pedn.2021.11.011.

References

Anıl, G. (2018). Internet addiction: Social and emotional loneliness. Journal of the International Scientific Researches, 3(2), 389–397. https://dx.doi.org/10.21733/ibad.414862.

Arslan, G. (2020). School belongingness, well-being, and mental health among adolescents: Exploring the role of loneliness. Australian Journal of Psychology, 1–10. https://doi.org/10.1111/ajpy.12274.

Balç, E., Durmuş, H., & Sezer, L. (2021). Does distance education create a risk in the development of addiction in corona days? Journal of Dependence, 22(1), 100–102.

Boz, B. G. (2021). Loneliness and Internet addiction in the children of healthcare professionals. Kafkas University Health Sciences Institute Master Thesis.

Brannoninho, K., Kelly, C., Aniya, C., Santos, A., & Gaspar, M. (2020). “Hey, we also have something to say”: A qualitative study of Portuguese adolescents’ and young people’s experiences under COVID 19. Journal of Community Psychology, 48(8), 2740–2752. https://doi.org/10.1002/jcop.22346.

Biyikoglu, C., & Volde, M. A. (2017). The roles of perceived social support, coping, and loneliness in predicting internet addiction in adolescents. Journal of Education and Practice, 8(12), 64–73.

Çakıcı, A. (2020). An examination of variables affecting the state of loneliness in high school students. Academic Social Studies, 4(11), 20–38. https://dx.doi.org/10.31455/asya.626180.

Çakır, Ö., & Öğuz, E. (2017). The correlation between high school students’ loneliness levels and smart phone addiction. Mersin University Journal of the Faculty of Education, 46(12), 418–429. https://dx.doi.org/10.12986/muje.60156.

Çapçı, C. (2014). Statistical power analysis and it’s use in nursing studies: Basic information. Journal of Anatomy and Health Sciences, 17(4), 268–274.

Dong, H., Yang, F., Lu, X., & Hao, W. (2020). Internet addiction and related psychological factors among children and adolescents in China during the coronavirus disease 2019 (COVID-19) epidemic. Frontiers in Psychiatry, 11, 1–9. https://doi.org/10.3389/fpsyg.2020.00751.

Feger, J. M., Vitiello, B., Plerner, P. L., & Clemens, V. (2020). Challenges and burden of the coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health services: A narrative review to highlight clinical and research needs in the acute phase and the long return to normality. Child and Adolescent Psychiatry and Mental Health, 14(20), 1–11. https://doi.org/10.1186/s13034-020-00329-3.

Ferrara, P., Franceschini, G., Cornello, G., Me-Strovic, J., Giardino, L., Vural, M., ... Petroello-Mantovani, M. (2021). The dark side of the web—a risk for children and adolescents challenged by isolation during the covid-19 pandemic. The Journal of Pediatrics, 228, 324–325. https://doi.org/10.1016/j.jpeds.2020.10.088.

Gökçay, R., Dubey, M. J., Chattopadhyay, S., & Dubey, S. (2020). Impact of COVID-19 on children: Special focus on psychosocial aspect. Minerva Pediatrica, 72(3), 226–235. https://dx.doi.org/10.23736/50026-4946.202050887-9.

Gilaçt, F. (2020). The relationship between loneliness and internet addiction. TÜRK SOSYOBİLGİLER, 5(2), 213–229.

Güleç, G., Köşeler, G., & Esioğlu, A. (2015). Alcohol and substance use disorders in DSM-5. Current Approaches in Psychiatry, 7(4), 448–460. https://doi.org/10.5455/cap.2015032508109.

Hays, R. D., & DiMattteo, M. R. (1987). A short-form measure of loneliness. Journal of Personality Assessment, 51(1), 69–81. https://dx.doi.org/10.2190/s32775jps1-01u66.

Kahyaoglu, S. H., Kurt, S., ULaç, O., & Özdi̇lek, S. (2016). Effects of smartphone addiction level on social and educational life in health sciences students. Euraian Journal of Family Medicine, 5(1), 13–19.

Kambu, N., & Akiloglu, S. (2020). Quarantineners: A single country pandemic curbew targeting adolescents in Turkey. Journal of Adolescent Health, 67(2), 296–299. https://dx.doi.org/10.1016/j.jadohealth.2020.05.007.

Karataç, Z. (2020). Investigation of covid-19 pandemic process reflections on the psychology of children and adolescents in the preparation process for LGS and YKS exam. In B. Çęncędğań (Ed.), Child and adolescent psychology during pandemic period (pp. 54–741). Ankara: Türkiye Klinikleri.

Kaynak, S., Duran, S., & Karadağ, A. (2018). Determination of the relationship between internet addiction and the level of loneliness among the students. Journal of Health and Nursing Management, 5(1), 27–35. https://dx.doi.org/10.522/SHVD.2018.027.

Kuss, D. J., Rood, A. J. V., Shorter, C. W., Griffiths, M. D., & Mhee, D. V. (2013). Internet addiction in adolescents: Prevalence and risk factors. Computers in Human Behavior, 29(5), 1987–1996.

Lee, J. (2020). Mental health effects of school closures during COVID-19. The Lancet Child & Adolescent Health, 4(5), 397–404. https://doi.org/10.1016/S2352-4642(20)30109-7.

Lin, M. P. (2020). Prevalence of internet addiction during the covid-19 outbreak and its risk factors among junior high school students in Taiwan. International Journal of Environmental Research and Public Health, 17(22), 1–12. https://doi.org/10.3390/ijerph17228547.

Madsen, K. R., Holstein, B. E., Damsgaard, M. T., Rayce, S. B., Jespersen, L. N., & Due, P. (2019). Trends in social inequality in loneliness among adolescents 1991–2014. Journal of Public Health, 41(2), 133–140. https://doi.org/10.1093/pubmed/fdy133.

Malak, M. Z., Khalifeh, A. H., & Shuaibala, A. H. (2017). Prevalence of internet addiction and associated risk factors in Jordanian school students. Computers in Human Behavior, 70, 556–563. https://doi.org/10.1016/j.chb.2017.01.011.

Meral, D., & Bahar, H. H. (2016). Investigating the relationship between problematic internet use and psychological well being and loneliness in secondary education students. EU Journal of Faculty Education, 19(2), 1117–1134. https://doi.org/10.14687/ijfes. v19i2.1131.

Oosterhof, B., & Palmer, C. (2020). Attitudes and psychological factors associated with news monitoring, social distancing, disinfecting, and hoarding behaviors among adolescents during the COVID-19 pandemic. JAMA Pediatrics, 174(12), 1184–1190. https://doi.org/10.1001/jamapediatrics.2020.1876.

Orgiles, M., Morales, A., Delvecchio, E., Mazzeschi, C., & Pedro, J. (2020). Immediate psychological effects of the covid-19 quarantine in youth from Italy and Spain. Frontiers in Psychology, 6(11), 1–10. https://doi.org/10.3389/fpsyg.2020.579038.
Özdemir, S., Bülbül, F., Balcí, S., & Türköz, A. (2020). Internet addiction levels of adolescents aged between 11 and 18 years. Balıkesir Health Sciences Journal, 9(2), 83–92.

Parashkouh, N. N., Mirhadlan, L., Emanisigaroudi, A., Leili, E. K., & Karimi, H. (2018). Addiction to the internet and mobile phones and its relationship with loneliness in Iranian adolescents. International Journal of Adolescent Medicine and Health, 33(1). https://doi.org/10.1515/ijamh-2018-0035.

Park, S. K., Kang, M., & Kim, E. (2014). Social relationship on problematic internet use (PIU) among adolescents in South Korea: A moderated mediation model of self-esteem and self-control. Computers in Human Behavior, 38, 340–357.

Taş, İ. (2019). Internet addiction scale for adolescents: Validity and reliability study. Kirşehir Journal of Faculty Education, 20(2), 875–905. https://dx.doi.org/10.29299/kefad.2019.20.02.011.

Uludağ, A., Ertekin, H., Tekin, M., & Ertekin, Y. H. (2016). Internet addiction among eighth grade students: Çanakkale sample. Turkish Journal of Family Practice, 20(2), 72–76.

Ümme, D., & Eksi, F. (2016). Internet addiction in young adults in Turkey: Loneliness and virtual-environment loneliness. Addicta: The Turkish Journal on Addictions, 3(1), 29–53. https://dx.doi.org/10.15805/addicta.2016.3.0008.

Wagner, K. D. (2020). Addressing the experience of children and adolescents during the COVID-19 pandemic. Journal of Clinical Psychiatry, 81(3). https://doi.org/10.4088/JCP.20d11394.

Winther, D. K., & Byrne, J. (2020). Rethinking screen-time in the time of COVID-19. UNICEF for every child. Retrieved from: https://www.unicef.org/globalinsight/stories/rethinking-screen-time-time-covid-19.

Yang, X., Zhu, L., Chen, Q., Song, P., & Wang, Z. (2016). Parent marital conflict and internet addiction among Chinese college students: The mediating role of father-child, mother child, and peer attachment. Computers in Human Behavior, 59, 221–229. https://doi.org/10.1016/j.chb.2016.01.041.

Yavuzer, H. (2016). Child psychology. İstanbul: Remzi Bookstore.

Yayan, E. H., Ankan, D., Saban, F., Bağ, N. G., & Özcan, Ö.O. (2017). Examination of the correlation between internet addiction and social phobia in adolescents. Western Journal of Nursing Research, 39(9), 1240–1254. https://doi.org/10.1177/0193945916665820.

Yayan, E. H., Dağ, Y. S., & Dükên, M. E. (2019). The effects of technology use on working young loneliness and social relationships. Perspectives in Psychiatric Care, 55, 194–200. https://doi.org/10.1111/ppc.12318.

Yektaç, Ç. (2020). Impact of COVID-19 pandemic on adolescent mental health. In E. S. Ercan, Ç. Yektaç, A. E. Tufan, & Ö. Bilaç (Eds.), COVID-19 pandemic and child and adolescent mental health (pp. 13–18). Ankara: Türkiye Klinikleri.

Yılmaz, M. A., & Duy, B. (2014). Adaptation of the short-form of the UCLA loneliness scale (ULS-8) to Turkish for the adolescents. The Journal of Psychiatry and Neurological Sciences, 27(3), 194–202. https://doi.org/10.5530/DAPJN2014270302.