Investigation of the Relationship Between Internet Addiction, Food Addiction and Impulsivity in Adolescents Presenting at the Child Psychiatry Outpatient Clinic

Çağla Çelikkol Sadıç 1, Yekta Özkan 1, Hacer Gizem Gerçek 1, Aziz Kara 1

1 Department of Child and Adolescent Psychiatry, Faculty of Medicine, Afyonkarahisar Health Sciences University, Afyonkarahisar, Türkiye

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ABSTRACT

Objective: The purpose of this study was to investigate the relationship between Internet addiction, food addiction, and impulsivity in children and adolescents aged 12-18 years who presented at the child psychiatry outpatient clinic of a university hospital.

Methods: This study included 207 patients aged 12-18 years who presented at the child and adolescent psychiatry clinic. All the study participants completed the Internet Addiction Test (IAT), the Barratt Impulsivity Scale (BIS-11), and the Yale Food Addiction Scale for Children 2.0 (YFAS-C 2.0).

Results: The individuals who scored above the IAT total score cut-off point had substantially higher scores on the YFAS-C 2.0, BIS-11 total scores, and BIS-11 cognitive impulsivity and non-planning subscale than the participants who scored below the IAT total score cut-off point. According to the results of logistic regression analysis, the YFAS-C 2.0 and BIS-11 total scores were found to be related to Internet addiction.

Conclusion: The study’s findings indicate that impulsivity and food addiction might be significant risk factors for Internet addiction.

Keywords: Adolescents, Internet Addiction Disorder, Food Addiction, Impulsive Behavior.

INTRODUCTION

Problematic Internet use, which has been named Internet addiction, has become extremely common in recent years [1]. Internet addiction is defined as excessive and unlimited Internet use that can cause functionality disorders and significant problems in daily life, and this has now become an important public health problem with the continuously increasing use of the Internet [1,2]. Adolescence constitutes a risk for Internet addiction, and studies have shown a prevalence of 20%-26.5% for Internet addiction in adolescents [1,3]. There are studies in literature that have shown that Internet addiction could be associated with some psychiatric disorders, depression, attention deficit hyperactivity disorder (ADHD), substance addiction, and eating disorders [4-6].

Impulsivity can be defined as decisions taken rapidly by a person even if they result in negative outcomes and a tendency to translate these decisions into behaviours [7]. It has been...
Main Points:

- Internet addiction is defined as excessive and unrestricted internet use that can cause significant distress and functional impairment in daily life.
- Adolescence is a time when Internet addiction is risky.
- There are studies showing that there may be a connection between impulsivity, internet addiction and food addiction.
- The results of the study suggest that food addiction and impulsivity could be important risk factors for Internet addiction.
The Yale Food Addiction Scale for Children 2.0 (YFAS-C 2.0): This scale is used to evaluate symptoms of food addiction in children and adolescents [20]. Validity and reliability studies of the scale in Turkish have been performed [21]. The scale consists of 16 items with 5-point Likert-type responses. High points indicate a higher level of food addiction [20]. The internal consistency reliability coefficient of the Turkish version of the YFAS-C 2.0 has been found to be 0.90 [21].

Barratt Impulsivity Scale 11 (BIS-11): This scale, developed by Patton et al., is used in the evaluation of impulsivity [22]. It is formed of 30 items with 4-point Likert-type responses scored from 1-4 points, in 3 subscales of non-planning, motor impulsivity, and cognitive impulsivity. High points indicate a high level of impulsivity. Validity and reliability studies of the Turkish version of the scale have been conducted [23].

Statistical Analysis
SPSS version 26.0 was used to do a statistical analysis on the study’s data. Descriptive statistics were used to examine the sample’s demographic features. In the comparisons of the groups with total IAT points above and below the cutoff value, the Student’s t-test or Mann Whitney U-test were used depending on the normality of distribution of the data. To determine correlations between variables, Spearman correlation analysis was applied. Potential factors found in the earlier analyses were used in logistic regression analyses to evaluate independent predictors of Internet addiction in the multivariate study. The results were evaluated as statistically significant at Type 1 error level <5%.

RESULTS
Evaluation was made of a total of 207 adolescents, comprising 130 (62.8%) females and 77 (37.2%) males with a mean age of 14.6±1.7 years.

The whole study sample was separated into two groups as those with and without Internet addiction according to the cutoff value of the IAT. The group with Internet addiction (≥50 IAT points) included 52 (25.1%) adolescents and the group without Internet addiction (≤49 IAT points) included 155 (74.9%) adolescents. No significant difference was determined between the groups with and without Internet addiction in respect of gender (x²=0.378, p=0.776), or mean age (14.61±0.24 years vs. 14.61±0.13 years) (z=-0.022, p=0.983).

The IAT total points (p<0.001), YFAS-C 2.0 total points (p<0.001), BIS-11 total points (p<0.001), BIS-11 cognitive impulsivity subscale points (p<0.001) and the BIS-11 non-planning subscale points were determined to be statistically significantly higher in the Internet addiction group than in the group without Internet addiction. No significant difference was found between the groups in respect of the BIS-11 motor impulsivity subscale points (p=0.07) (Table 1).

<table>
<thead>
<tr>
<th></th>
<th>With Internet Addiction (n:52)</th>
<th>Without Internet Addiction (n:155)</th>
<th>z</th>
<th>p</th>
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<tbody>
<tr>
<td>IAT total points</td>
<td>62.88±1.32</td>
<td>27.57±1.00</td>
<td>-10.785</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>YFAS-C 2.0</td>
<td>30.82±2.01</td>
<td>15.82±1.14</td>
<td>-5.83</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BIS-11 total points</td>
<td>71.40±1.12</td>
<td>61.67±0.86</td>
<td>-5.789</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BIS-11 cognitive impulsivity subscale points</td>
<td>22.019±0.56</td>
<td>18.12±0.36</td>
<td>-5.184</td>
<td>&lt;0.001</td>
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<tr>
<td>BIS-11 Motor impulsivity subscale points</td>
<td>16.78±0.57</td>
<td>15.71±0.31</td>
<td>-1.814</td>
<td>0.070</td>
</tr>
<tr>
<td>BIS-11 non-planning subscale points</td>
<td>32.59±0.47</td>
<td>27.83±0.41</td>
<td>-6.042</td>
<td>&lt;0.001</td>
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SD: standard deviation - Mann Whitney U-test
YFAS-C 2.0: Yale Food Addiction Scale for Children 2.0, BIS-11: Barratt Impulsivity Scale-11, IAT: Internet Addiction Test
The Spearman correlation analysis’s findings indicate that a significant positive correlation was determined between the IAT total points and the BIS-11 cognitive impulsivity subscale points ($p<0.001$), the BIS-11 total points ($p<0.001$), BIS-11 non-planning subscale points ($p<0.001$) at a moderate level, between the IAT total points and the BIS-11 motor impulsivity subscale points ($p<0.001$) at a weak level, between the IAT total points and the YFAS-C 2.0 total points ($p<0.001$) at a moderate level, between the YFAS-C 2.0 total points and the BIS-11 total points ($p<0.001$) and the BIS-11 cognitive impulsivity subscale points ($p<0.001$) at a moderate level, and between the YFAS-C 2.0 total points and the BIS-11 motor impulsivity subscale points ($p<0.001$) and BIS-11 non-planning subscale points ($p<0.001$) at a weak level. The results of the correlation analyses are shown in Table 2.

Logistic regression analyses were used to determine relationships of age, gender, YFAS-C 2.0 total points, and BIS-11 total points with Internet addiction (Table 3). The analysis results showed a significant correlation of YFAS-C 2.0 total points ($p<0.001$) and BIS-11 total points ($p=0.001$) with Internet addiction.

### DISCUSSION

According to our study results, a significant relationship was found between food addiction, impulsivity and Internet addiction. Food addiction scores were higher in adolescents with internet addiction. Despite the fact that several research have been conducted and published in the literature demonstrating a connection between food and Internet addiction [6,24], to the best of our knowledge, there are very few studies that have examined the relationship between Internet addiction and food addiction in the adolescent age group. A study conducted in 2023 of 180 obese and non-obese children aged 8-18 years reported that there could be a relationship between Internet addiction and food addiction [12]. Some studies have shown that Internet addiction is associated with eating disorders [25,26]. In another study of eating behaviours in adolescents with Internet addiction, it was seen that high Internet usage could have an impact on negative eating behaviours such as skipping meals, and snacking [24]. It has been reported that increased frequency of Internet use can lead to a decrease in physical activity and the development of irregular eating habits [12]. When it is considered that there is an extremely limited number of studies related to Internet addiction and food addiction in the adolescent age group, the current

<table>
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<th>Table 2. Correlations between the IAT total points and the BIS-11 subscale points and the YFAS-C 2.0 (n=207)</th>
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<tr>
<td><strong>BIS-11 Total points</strong></td>
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<td><strong>r</strong></td>
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<tr>
<td>IAT total points</td>
</tr>
<tr>
<td>YFAS-C 2.0</td>
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</tbody>
</table>

Spearman correlation

YFAS-C 2.0: Yale Food Addiction Scale for Children 2.0, BIS-11: Barratt Impulsivity Scale-11, IAT: Internet Addiction Test

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<th>Table 3. Results of the Logistic Regression Analyses of the YFAS-C 2.0 and the BIS-11 subscale points to determine the factors related to Internet addiction</th>
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<tr>
<td><strong>Standard error</strong></td>
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<tr>
<td><strong>Gender</strong></td>
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<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td><strong>YFAS-C 2.0</strong></td>
</tr>
<tr>
<td><strong>BIS-11 total points</strong></td>
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</tbody>
</table>

YFAS-C 2.0: Yale Food Addiction Scale for Children 2.0, BIS-11: Barratt Impulsivity Scale-11
findings in literature of a relationship between food addiction and impulsivity has not been sufficiently understood [10]. Although the current study results support the relationship between food addiction and impulsivity, the above-mentioned information suggests that there remains a need for more comprehensive studies of the potential mechanisms of the relationship between impulsivity and food addiction.

No study could be found in the literature that has evaluated impulsivity, food addiction, and Internet addiction together at the same time in adolescents. Therefore, this can be accepted as a strong aspect of this study. The results of this study demonstrate that food addiction and impulsivity in adolescents aged 12-18 years could be a risk factor for Internet addiction. Further studies of the relationships between Internet addiction, food addiction, and impulsivity would be helpful for the better understanding of the mechanisms of these important problems in adolescence and for the development of intervention methods.

Limitations of this study were primarily the cross-sectional design and relatively small sample size, which prevent the generalisation of the results. Another limitation could be said to be that self-reported scales were used for the evaluation of food addiction, impulsivity, and Internet addiction, and that the mental capacity of the children was not evaluated with objective intelligence tests.

CONCLUSION

The results of this study demonstrated that food addiction and impulsivity were determined at higher rates in adolescents with Internet addiction compared to those without. In addition, significant positive correlations were determined between Internet addiction and impulsivity and food addiction, and between food addiction and impulsivity. In the logistic regression analysis, food addiction and impulsivity were seen to be correlated with Internet addiction at a significant level and could be significant risk factors. Nevertheless, there is a need for further studies to be able to better understand the underlying mechanisms of impulsivity, food addiction and Internet addiction which can be observed in adolescence, and the relationships between these.

Informed Consent: Verbal and written informed consent for participation in the study was provided by all the study participants and their parents.

Conflict of Interest Declaration: There is no conflict of interest between the authors.

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Ethics Committee Approval: Study procedures were performed in accordance with the Declaration of Helsinki. The study received ethical approval from the ethics committee of Afyonkarahisar Health Sciences University Faculty of Medicine. (date: 11.08.2023, ethics committee no: 2023/330).


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