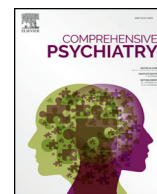




Contents lists available at ScienceDirect

Comprehensive Psychiatry

journal homepage: www.elsevier.com/locate/comppsy

Parenting styles, perceived social support and emotion regulation in adolescents with internet addiction

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ARTICLE INFO

Available online xxxx

Keywords:

Adolescent
Internet addiction
Parenting
Social support
Emotional availability
Emotion regulation

ABSTRACT

Aim: The aim of this study is to investigate parental attitudes, perceived social support, emotion regulation and the accompanying psychiatric disorders seen in adolescents who, having been diagnosed with Internet Addiction (IA), were referred to an outpatient child and adolescent psychiatric clinic.

Methods: Of 176 adolescents aged 12–17, 40 were included in the study group. These scored 80 or higher on Young's Internet Addiction Test (IAT) and met Young's diagnostic criteria for IA based on psychiatric interviews. Forty adolescents who matched them in terms of age, gender and socio-economic level were included in the control group. The Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS-PL), the Parenting Style Scale (PSS), the Lum Emotional Availability of Parents (LEAP), the Social Support Appraisals Scale for Children (SSAS-C), the Difficulties in Emotion Regulation Scale (DERS) and the Toronto Alexithymia Scale-20 (TAS-20) were applied.

Results: The results showed that the parents of adolescents with IA were more frequently inadequate in acceptance/involvement, supervision/monitoring and they had less emotional availability. The adolescents with IA had less perceived social support, greater difficulty in the identification and verbal expression of their feelings and emotion regulation. Lower parental strictness/supervision, higher alexithymia and the existence of an anxiety disorder were found to be significant predictors of IA. Internet addicted adolescents with comorbid major depressive disorder had higher levels of alexithymia and lower levels of emotional availability in their parents.

Conclusion: It can be concluded that strategies for the prevention and treatment of IA in adolescents should focus on improving the quality of parenting parent-adolescent relationships, enhancing perceived social support and emotion regulation while reducing the associated psychiatric symptoms in adolescents.

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1. Introduction

Internet Addiction (IA) is a condition where functioning is adversely affected due to excessive Internet use and cognitive, psychological or physical damage arises. IA is defined as staying on the Internet for longer than planned, experiencing withdrawal symptoms such as nervousness, depression or restlessness when deprived of the Internet unsuccessfully attempting to control or stop using the Internet, lying about Internet use and the gradual deterioration of the school, family and social life of the affected person [1].

Internet use in the world and Turkey has shown a sustained and rapid growth in recent years. The number of people using the Internet in the world has increased by 1052% between 2000 and 2018 and 54.4% of the world population and 68.4% of people living in Turkey use the Internet according to Internet World Statistics data [2]. The maximum increase in Turkey occurred in young people between the ages of 16 and 24. The 26.6% utilization rate for this age group in 2004 is reported to

have reached 90.7% by 2018 [3]. As Internet use increases, IA also increases. A meta-analysis of data from 31 nationwide studies in seven regions of the world found that the overall prevalence of IA was 6%, the highest prevalence (10.9%) was in the Middle East and the lowest prevalence (2.6%) was in Western and Northern Europe [4]. The prevalence of pathological Internet use among adolescents in 11 European countries was found to be 4.4% [5]. The prevalence of IA in adolescents in Turkey ranged from 1.6% to 19% depending on the region [6,7].

IA in adolescents is associated with many psycho-social factors. Parental attitudes, family and peer relationships, level of perceived social support and emotion regulation are among the researched factors. In these studies, inadequacies in parenting skills (neglectful, rejecting, protective, demanding and authoritarian parenting) [8–12], failure to control, monitor and participate in children's Internet use [5,13–15], negative parent-adolescent relationships [16–18], low perceived social support [8,11,19,20], alexithymia and difficulties in emotion regulation [21–24] are found to be related to IA in adolescents. However, community samples were used in all of these studies, IA was evaluated only by self-report scales and no clinical evaluation was done. Studies evaluating parental attitudes/family relationships, perceived social support

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and emotion regulation in adolescents with clinically diagnosed Internet addiction are quite limited [25–27]. In addition, although comorbid psychiatric disorders in adolescents with IA are common [27–29], the associations of these comorbidities with the investigated factors have been overlooked. Therefore, the aim of this study is to investigate parental attitudes, perceived social support and emotion regulation and the relationships between these factors and the psychiatric disorders occurring in adolescents diagnosed with IA who have been referred to a child and adolescent psychiatric outpatient clinic.

2. Materials and methods

2.1. Participants

The study included one hundred and seventy-six adolescents between the ages of 12 and 17 who had been referred by pediatricians to the Hacettepe University Child and Adolescent Psychiatric Outpatient Clinic for the first time. Sixteen of them were excluded from the study because of the incompleteness of their scales. Thirty five (21.9%) of the remaining 160 adolescents came forward with complaints related to IA and 125 adolescents (78.1%) presented with psychiatric complaints other than IA symptoms. Of the 160 adolescents (103 girls, 57 boys) who voluntarily agreed to participate in this study, those who scored 80 or more on Young's IA Test (IAT) were clinically assessed according to the diagnostic criteria recommended by Young for IA, and the adolescents meeting these diagnostic criteria were included in the study group. Forty adolescents (25% of the total sample) were diagnosed with IA and made up the study group. IA was diagnosed in 16 of the 35 adolescents with complaints related to IA (45.7%) and in 24 of the 125 adolescents with complaints other than IA symptoms (19.2%). Adolescents with mental retardation, psychotic disorder, bipolar disorder, autism spectrum disorder, accompanying neurological or chronic medical illness were excluded from the study.

Among the 160 adolescents with psychiatric complaints, those who scored less than 50 on Young's IAT and did not meet Young's IA diagnostic criteria were used to create the control group of 40 adolescents who matched the study group with respect to age, gender and socio-economic level. The sample selection in the study has been given as a flow chart in Table 1.

2.2. Data collection tools

2.2.1. Socio-demographic and clinical information form

Questions were asked regarding socio-demographic characteristics, medical and family history and Internet use habits.

2.2.2. Hollingshead - Redlich scale

This scale was translated into Turkish from the Comprehensive Assessment of Symptoms and History (CASH) [30]. Based on the occupational and educational status of the parents, the scale reflects the highest socio-economic level reached for a certain period of time. Five different socio-economic levels are defined in the scale.

2.2.3. Young's Internet Addiction Test (IAT)

This 20-item measurement was developed by Young from the criteria of Psychoactive Substance Addiction of DSM-IV to determine pathological Internet use [31]. Those who score 80 or more on the 6-point Likert-type scale are described as "pathological Internet users" and those who score less than 50 are classified as "have control of screen usage". The Turkish version had a standardized alpha value of 0.91 and a Spearman-Brown value of 0.87 [32].

2.2.4. Young's Internet addiction diagnostic criteria

Young identified diagnostic criteria for IA by taking DSM-IV's pathological gambling diagnostic criteria as an example [33]. These criteria have been frequently used in diagnosing IA in adolescents in the literature and were assessed using clinical psychiatric interviews in this study.

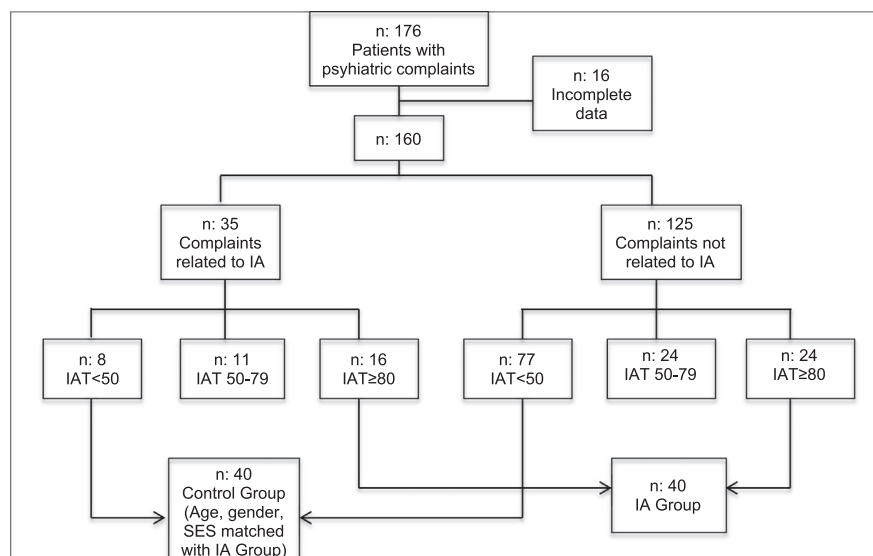
2.2.5. Schedule for affective disorders and schizophrenia for school-age children - present and lifetime version, (K-SADS-PL)

This is a semi-structured clinical psychiatric interview for diagnosing the present and lifetime psychopathologies of children and adolescents [34]. The validity and reliability study of the Turkish version of the scale was conducted by Gökler et al. [35]. K-SADS-PL was applied to the adolescents and their parents in the study and control groups in this study.

2.2.6. Parenting Style Scale (PSS)

This scale, developed by Lamborn et al. [36], consists of 26 items which are grouped into three factors (Acceptance/Involvement; Strictness/Supervision and Psychological Autonomy). In the study of

Table 1
The sample selection for the IA and control groups.



IA: Internet Addiction, IAT: Internet Addiction Test, SES: Socio-economic Status.

adaptation to Turkish done by Yılmaz [37]: test-retest reliability and Cronbach's alpha internal consistency coefficients for high school students were 0.82 and 0.70 for the acceptance/involvement, 0.88 and 0.69 for the strictness/supervision, and 0.76 and 0.66 for the psychological autonomy subscales, respectively. "Democratic", "Neglectful", "Authoritarian" and "Permissive" parenting styles are distinguished from the intersection of acceptance/involvement and strictness/supervision dimensions [37].

2.2.7. Lum Emotional Availability of Parents (LEAP)

The scale consists of 15 items in which respondents are asked to consider their parents separately and give a score between 1 and 6 [38]. Higher scores indicate higher levels of parental emotional availability. In the validity and reliability study of the Turkish version, the Cronbach alpha coefficients were found to be 0.95 for the mother form and 0.97 for the father form. The item test correlations of the scale were between 0.65 and 0.83 for the mother form; and between 0.76 and 0.86 for the father form [39].

2.2.8. Social Support Appraisals Scale for Children (SSAS-C)

This is a 41-item, 5-point Likert type questionnaire designed to assess children's and adolescents' perceptions of their social support from friends, families and teachers [40]. It measures how the child perceives himself as a loved, concerned, valued and accepted person. Higher scores reflect higher levels of perceived social support. The Cronbach alpha coefficient of the scale is 0.93. The Turkish adaptation, validity and reliability study was carried out by Gökler [41].

2.2.9. Difficulties in Emotion Regulation Scale (DERS)

This is a 5-point Likert type self-report scale which contains 36 items and six dimensions [42]. "Awareness" evaluates the state of being unaware of emotional responses; "Clarity" is related to the lack of emotional clarity; "Non-acceptance" evaluates the acceptability of negative emotions; "Strategies" means limited access to effective emotion regulation strategies; "Impulse" evaluates the difficulty in controlling the impulsive behaviors evoked by negative emotions; "Goals" refers to disengagement in a goal-directed behavior while experiencing negative emotions. Higher scores indicate greater difficulties in emotion regulation. The scale was adapted to Turkish by Rugancı and the Cronbach coefficient of the scale was 0.94 [43].

2.2.10. Toronto Alexithymia Scale (TAS-20)

This scale was originally developed by the University of Toronto in 1985 and consisted of 26 items and four factors. It was then rearranged by Taylor et al. [44] to include 20 items and three factors: "Difficulty Identifying Feelings", "Difficulty Describing Feelings" and "Externally-Oriented Thinking". It is a 5-point Likert type scale and higher scores indicate higher levels of alexithymic features. The validity and reliability

study of the 20-item scale was carried out by Beştepe [45] and the Cronbach alpha coefficient was found to be 0.81.

2.3. Procedure

The study protocol was approved by the Institutional Review Board of Hacettepe University with decision number GO 17/285. Written informed consent was obtained from all the adolescents and their parents. The first investigator completed the IAT by questioning the participants and then assessed the presence of Young's IA diagnostic criteria and other psychiatric disorders, through a clinical psychiatric interview with the adolescents and their parents. The other scales were filled in by the adolescents.

2.4. Statistical analysis

The statistical analysis of data was carried out using the Statistical Package for the Social Sciences (SPSS) v15.0 software. In the evaluation of the data determined by measurement, Student's *t*-test or Mann-Whitney *U* test were used based on whether parametric test assumptions were met or not, respectively. The chi-square (χ^2) test was used to compare the nominal data between groups. The Pearson correlation analysis was applied to investigate the relationships between two continuous variables in the groups. Multiple logistic regression analysis was performed to determine factors predicting IA. The level of statistical significance was accepted to be lower than 0.05 in all analyses.

3. Results

3.1. Demographics

One hundred sixty adolescents, 103 girls (65.4%) and 57 boys (34.6%) were admitted to the study. There were 40 adolescents including 29 (72.5%) girls and 11 (27.5%) boys in both the study and control groups. There was no statistically significant difference between the two groups in terms of age, the duration of education of the adolescents and their parents and the socio-economic level of the families (Table 2).

3.2. Descriptive analysis

The duration of Internet use was 480 (Min: 60 - Max: 1020) min/day in the study group and 120 (Min: 10 - Max: 300) min/day in the control group (Mann-Whitney *U* test, $U = 56.5$, $p < .01$). There was a strong positive correlation between the duration of daily Internet use and the IAT scores (Pearson correlation analysis, $r = 0.734$, $p < .01$) over the whole group. No significant correlation was found between age and the IAT scores ($r = 0.034$, $p > .05$).

Table 2

Socio-demographic variables in the study and control groups.

| Socio-demographic variable | IA group Mean \pm SD | Control group Mean \pm SD | Statistics |
|--|---------------------------|--------------------------------|-------------------------------|
| Age (year) | 15.4 \pm 1.3 | 15.4 \pm 1.1 | $t = 0.27$ ^{NS} |
| Duration of education (year) | 9.9 \pm 1.3 | 9.6 \pm 1.1 | $t = 0.86$ ^{NS} |
| Age of mother (year) | 42.4 \pm 6.1 | 41.4 \pm 6.4 | $t = 0.68$ ^{NS} |
| Age of father (year) | 47.4 \pm 7.8 | 45.3 \pm 6.0 | $t = 1.35$ ^{NS} |
| Duration of education of mother (year) | 8.7 \pm 3.6 | 9.0 \pm 4.2 | $t = 0.31$ ^{NS} |
| Duration of education of father (year) | 9.4 \pm 4.0 | 9.5 \pm 3.5 | $t = 0.03$ ^{NS} |
| Socio-economic level | n | n | % |
| Upper-middle | 11 | 10 | 25.0 |
| Middle | 16 | 16 | 40.0 |
| Lower-middle | 4 | 6 | 15.0 |
| Lower | 9 | 8 | 20.0 |
| | | | $\chi^2 = 0.51$ ^{NS} |

IA: Internet Addiction, NS: Not Significant ($p > .05$).

Table 3
Psychiatric diagnoses in the study and control groups.

| Psychiatric diagnoses | IA group | | Control group | | Statistics |
|-------------------------------|----------|------|---------------|------|---------------------|
| | n | % | n | % | |
| Major depressive disorder | 26 | 65 | 20 | 50 | $\chi^2 = 1.85$ NS |
| Anxiety disorders | 29 | 72.5 | 15 | 37.5 | $\chi^2 = 10.12$ ** |
| SAD | 5 | 12.5 | 0 | 0 | $\chi^2 = 7.26$ ** |
| Social phobia | 10 | 25 | 4 | 10 | $\chi^2 = 3.20$ NS |
| GAD | 15 | 37.5 | 10 | 25 | $\chi^2 = 1.46$ NS |
| Specific phobia | 13 | 32.5 | 2 | 5 | $\chi^2 = 10.89$ ** |
| OCD | 12 | 30 | 4 | 10 | $\chi^2 = 5.19$ * |
| Disruptive behavior disorders | 22 | 55 | 10 | 25 | $\chi^2 = 7.64$ ** |
| ADHD | 15 | 37.5 | 8 | 20 | $\chi^2 = 3.03$ NS |
| ODD | 12 | 30 | 3 | 7.5 | $\chi^2 = 7.03$ ** |
| CD | 14 | 35 | 1 | 2.5 | $\chi^2 = 16.06$ ** |
| Tic disorders | 3 | 7.5 | 0 | 0 | $\chi^2 = 4.28$ * |
| ASUD | 1 | 2.5 | 0 | 0 | $\chi^2 = 1.39$ NS |

NS: Not Significant ($p > .05$), * $p < .05$, ** $p < .01$. IA: Internet Addiction, SAD: Separation anxiety disorder, GAD: Generalized anxiety disorder, OCD: Obsessive compulsive disorder, ADHD: Attention deficit hyperactivity disorder, ODD: Oppositional defiant disorder, CD: Conduct disorder, ASUD: Alcohol/substance use disorders.

According to the K-SADS-PL, 39 (97.5%) adolescents in the study group and 31 (77.5%) adolescents in the control group had at least one psychiatric diagnosis during the evaluation ($\chi^2 = 7.31, p < .01$). The mean number of psychiatric diagnoses was 3.2 ± 1.5 in the study group and 1.5 ± 1.2 in the control group ($t = -5.69, p < .01$). In the study group, the mean number of psychiatric diagnoses was significantly higher in females (3.5 ± 1.2) than in males (2.2 ± 1.6 ; $t = 2.80, p < .01$). The current psychiatric diagnoses for the two groups are given in Table 3.

3.3. Differences between IA and control groups

Although there were no significant differences between the subscale scores of the PSS in the study and control groups, a significant difference in terms of parenting style was observed. While the proportion of democratic families was significantly lower (15.5% versus 42.5%), the proportion of neglectful families was higher (37.5% versus 17.5%) in the study group ($\chi^2 = 8.45, p < .05$). Among the two groups, there were statistically significant differences between the mean scores of the LEAP; the Perceived Social Support From Friends and total scores of the SSAS-C; the Clarity, Strategies, Impulse and total scores of the DERS and the Difficulty Identifying Feelings, Difficulty Describing Feelings and total scores of the TAS-20 (Table 4).

3.4. Relationships with accompanying psychiatric disorders

In the study group, total scores of the LEAP for both parents were found to be significantly lower ($t = 2.153, p < .05$ for the mother and $t = 2.043, p < .05$ for the father) and the total score of the TAS-20 was higher ($t = -2.587, p < .05$) in adolescents with a major depressive disorder than in the ones who did not have a major depressive disorder. There were no statistically significant differences between the scores of the scales based on the presence or absence of comorbid anxiety disorder or disruptive behavior disorder.

3.5. Predictors of Internet addiction

Multiple logistic regression analysis with the backward stepwise method was performed to investigate the factors that predict IA in adolescents. The scores of the PSS subscales, the total scores of the SSAS-C and TAS-20, and the presence of major depressive disorder, anxiety disorders and disruptive behavior disorders were included as independent variables in this model. A test of the full model against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished the presence of IA ($\chi^2 = 25.619, p < .001$).

Table 4
PSS, LEAP, SSAS-C, DERS and TAS-20 scores in the study and control groups.

| Scales | IA group Mean \pm SD | Control group Mean \pm SD | Statistics |
|---------------------------------|------------------------|-----------------------------|----------------|
| Parenting Style Scale | | | |
| Acceptance/involvement | 25.8 \pm 5.4 | 27.0 \pm 5.6 | $t = 0.99$ NS |
| Strictness/supervision | 27.0 \pm 3.9 | 28.5 \pm 3.1 | $t = 1.91$ NS |
| Psychological autonomy | 22.5 \pm 4.0 | 22.2 \pm 4.2 | $t = -0.33$ NS |
| LEAP-Mother | 64.4 \pm 21.8 | 75.1 \pm 17.1 | $t = 2.45$ * |
| LEAP-Father | 50.5 \pm 21.9 | 63.7 \pm 21.7 | $t = 2.66$ * |
| SSAS-C-Total score | 110.9 \pm 18.5 | 122.0 \pm 17.0 | $t = 2.78$ ** |
| SSAS-C-friends | 66.4 \pm 12.8 | 72.8 \pm 12.6 | $t = 2.25$ * |
| SSAS-C-family | 44.4 \pm 10.2 | 48.4 \pm 10.4 | $t = 1.72$ NS |
| DERS-Total score | 103.3 \pm 20.4 | 87.5 \pm 25.2 | $t = -3.07$ ** |
| Awareness | 17.5 \pm 5.8 | 15.3 \pm 4.2 | $t = -1.89$ NS |
| Clarity | 15.1 \pm 4.3 | 11.5 \pm 5.6 | $t = -3.22$ ** |
| Non-acceptance | 13.3 \pm 5.9 | 11.7 \pm 5.8 | $t = -1.24$ NS |
| Strategies | 23.0 \pm 7.7 | 18.1 \pm 8.2 | $t = -2.72$ ** |
| Impulse | 17.9 \pm 6.7 | 15.0 \pm 6.2 | $t = -2.0$ * |
| Goals | 16.6 \pm 5.1 | 15.4 \pm 5.6 | $t = -1.0$ NS |
| TAS-20-Total score | 60.7 \pm 10.6 | 52.2 \pm 10.1 | $t = -3.67$ ** |
| Difficulty identifying feelings | 21.4 \pm 6.4 | 17.2 \pm 6.6 | $t = -2.86$ ** |
| Difficulty describing feelings | 15.3 \pm 3.9 | 12.3 \pm 4.0 | $t = -3.36$ ** |
| Externally-oriented thinking | 23.7 \pm 4.7 | 22.7 \pm 3.9 | $t = -1.04$ NS |

NS: Not Significant ($p > .05$), * $p < .05$, ** $p < .01$. IA: Internet Addiction, PSS: Parenting Style Scale, LEAP: Lum Emotional Availability of Parents, SSAS-C: Social Support Appraisals Scale for Children, DERS: Difficulties in Emotion Regulation Scale, TAS-20: Toronto Alexithymia Scale.

The model explained 36.5% of the variance (Nagelkerke $R^2 = 0.365$) and the overall prediction success was 72.5% (72.5% for no IA and 72.5% for IA). The PSS-Strictness/supervision scores, total TAS-20 scores and the presence of any anxiety disorders were significant predictors of IA. Lower parental strictness/supervision, higher alexithymia and the presence of an anxiety disorder were found to be associated with IA in adolescents (Table 5).

4. Discussion

In this study, among the adolescents who were referred to the child and adolescent psychiatry clinic, 25% were diagnosed with IA. The higher prevalence of IA observed in this study can be attributed to the rising use of Internet, especially in adolescents, in recent years in Turkey [3] and to the recruitment of the study population from clinically referred adolescents. IA was diagnosed in 28% of the girls and 19% of the males in this study. Although IA is reported to be more common among males in some studies with adolescents [5,7-9,19,20,46,47], there are other studies reporting no gender predilection [6,11,12,48]. More frequent IA in girls in this study may be due to the fact that girls who are addicted to the Internet are more likely to be admitted to the psychiatry outpatient clinic because they have higher rates of psychopathologies than Internet addicted boys. In this study, it was also shown that the duration of daily Internet use was significantly higher in adolescents with IA and it was related to pathological Internet use. Consistent with this result, one of the important predictors of IA in adolescents was given as the duration of Internet use in several studies [5,7,47].

Although the Acceptance/Involvement and Strictness/Supervision subscale scores of PSS were lower in adolescents with IA, there were no statistically significant differences between the two groups. However, the ratio of democratic families was significantly lower and the ratio of neglectful families was higher in adolescents with IA. These results show that, although acceptance/involvement and strictness/supervision of all the parents of adolescents with IA are not low, parents with both low acceptance/involvement and low strictness/supervision are more frequent. In this study, lower parental strictness/supervision was also demonstrated to be a significant predictor of IA. In addition, the perception of their parents' emotional availability was lower in adolescents with IA. In studies conducted with a community sampling, adolescents with IA were found to perceive their parents as emotionally distant, rejecting, poor in caregiving, supervising and monitoring, as

Table 5
Predictors of IA in adolescents.

| | B | Standard error | Wald | p | Exp (B) | 95% CI for Exp (B) | |
|----------------------------|--------|----------------|-------|-------|---------|--------------------|--------|
| | | | | | | Lower | Upper |
| PSS-Strictness-supervision | -0.177 | 0.088 | 4.054 | 0.044 | 0.838 | 0.705 | 0.995 |
| TAS-20 | 0.076 | 0.026 | 8.385 | 0.004 | 1.079 | 1.025 | 1.137 |
| Anxiety disorders | 1.734 | 0.571 | 9.214 | 0.002 | 5.663 | 1.848 | 17.349 |
| Constant | 0.514 | 2.760 | 0.035 | 0.852 | 1.671 | | |

IA: Internet Addiction, PSS: Parenting Style Scale, TAS-20: Toronto Alexithymia Scale.

well as over-intrusive and punitive [11–13]. Their families' communication, cohesion, intimacy and relationships were considered weak and conflict was high [14,16,17,49]. In this case, adolescents who cannot find emotional responsiveness, adequate care and attention in their families, who are not properly supervised and monitored, and who do not have access to open communication tend to use Internet more. These results show that promoting parenting skills and strengthening the quality of the parent-adolescent relationship are crucial in preventing and treating IA in adolescents.

Adolescents with IA in this study were found to have lower perceived social support, especially from their friends, than adolescents who did not have IA. There are studies reporting that IA is negatively related to perceived social support in adolescents [11,19,20,46]. In other studies, different from the findings of this study, as a source of perceived social support, the family is related to IA, but not friends [19,46]. However, friendship is increasingly becoming important in meeting social needs during healthy adolescence, and friends play a crucial role in the emotional and social development of adolescents. When adolescents fail to make close friendships, they feel more lonely and their self-esteem decreases. Therefore, it can be considered that adolescents who do not get enough social support from their friends use Internet more to meet their social needs, to develop alternative social relationships and to increase their self-esteem.

In this study, it was found that adolescents with IA had more difficulty in identifying and describing emotions, understanding emotional reactions, controlling their impulsive behaviors in response to negative emotional experiences and were less able to use effective emotion regulation strategies than adolescents without IA. In addition, deficiencies in identifying and describing emotions, namely alexithymia, significantly predicted IA. In a few studies available in the literature, the difficulties in adolescents' emotion regulation are shown to be related to IA [21,22,50]. Adolescents with IA also have inadequate prefrontal cognitive control to suppress their negative emotions, which may result in impulsivity [51]. In a recent study, it has been shown that a good parent-adolescent relationship can reduce IA by increasing the emotion regulation skills of adolescents [50]. In addition, in school-based studies with adolescents, alexithymia and especially the difficulty in identifying emotions were shown to be associated with IA [24,52]. These results emphasize that adolescents' emotion recognition, expression and regulation skills might be important targets in preventing and treating IA.

The adolescents with IA in this study were more likely to have anxiety disorders, particularly separation anxiety disorder, specific phobias and obsessive-compulsive disorder and disruptive behavior disorders, particularly oppositional defiant disorder and conduct disorder. However, the high prevalence of comorbidities in adolescents with IA (97.5%) in this study should be interpreted with caution, since most of the patients in our sample were referred to the outpatient clinic with psychiatric symptoms other than IA. Indeed, it has been shown that the presence of an anxiety disorder increases the risk of IA 5.7 times. In line with this finding, anxiety has been found to predict IA in adolescents in recent studies [6,53,54]. These data emphasize the necessity for a careful evaluation to diagnose IA in adolescents with anxiety symptoms and the importance of improving their skills to cope with anxiety in the treatment of adolescents with IA. Additionally, this study indicates that the emotional availability of parents was lower and

alexithymia was higher only in Internet addicted adolescents with accompanying major depressive disorder. Other studies have reported that the emotional awareness of adolescents [55] and the emotional availability of their parents [56] are lower in adolescents with depression symptoms. As a result, the higher alexithymia and the lower emotional availability of parents might make the adolescents susceptible to both IA and depression. These results indicate that the parent-adolescent relationship and the adolescents' emotion recognition and expression skills should be better evaluated in adolescents with IA and accompanying symptoms of depression.

This study has several strengths and limitations. Although most of the studies investigating IA in adolescents used school-based samples, this study was carried out in adolescents with a psychiatric referral. Thus, the findings of this study can contribute to the treatment of clinically referred adolescents with IA. However, the recruitment of a control group from a clinical sample might have underestimated the findings and prevented more robust results. Therefore, the lack of a healthy control group is a limitation. In this study, the diagnoses of IA and other psychopathologies were based not only on self-report scales filled in by the adolescents but also on clinical psychiatric interviews. However, establishing a cause-and-effect relationship between IA and the variables investigated were not possible due to the cross-sectional design of the study. It might be another limitation that an evaluation of parental psychopathology was not performed in this study. Furthermore, the fact that the sample has a high female-to-male ratio limits the generalizability of the results. In order to better explain the results of this study, follow up studies including parental assessment and larger samples are required.

In conclusion, the prevalence of IA in this clinical sample was found to be high. The adolescents with IA showed more comorbid psychiatric disorders; less perceived social support; more difficulty in identification and verbal expression of their feelings and emotion regulation. Their parents were more frequently inadequate in acceptance/involvement, supervision and monitoring and were less emotionally available. Lower parental strictness/supervision, higher alexithymia and an anxiety disorder were significant predictors of IA in adolescents. Internet addicted adolescents with comorbid major depressive disorder had higher levels of alexithymia and lower levels of parental emotional availability. Considering the high prevalence of IA, it might be advisable to include Internet use measurements in routine psychiatric evaluations, both in clinical and community samples. These results also show that interventions for the prevention and treatment of IA in adolescents should focus on improving parental skills and enhancing the quality of parent-adolescent relationships, perceived social support and emotion regulation in order to reduce the associated psychiatric symptoms of adolescents. Future studies should explore the implications of these interventions.

Disclosure statement

No competing financial interests exist.

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