

Treatment Outcomes of Acceptance and Commitment Therapy on Severity of Internet Gaming Disorder Comorbid with ADHD in Adolescents

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Abstract

Aims: Internet gaming disorder (IGD) is an increasingly concerning mental health problem which has the highest prevalence among adolescents. In the DSM-5, a diagnostic criteria are proposed for this disorder for the first time, and it is placed in the position of a potential behavioral addiction. No standard treatment for the disorder has been identified yet. The acceptance and commitment therapy (ACT) is shown to be effective in some behavioral addictions in different age groups. Given the high association between IGD and attention-deficit hyperactivity disorder (ADHD), we assessed the effect of ACT on the severity of IGD comorbid with ADHD in adolescents. **Materials and Methods:** Twenty adolescents aged 12–18 years with IGD comorbid with medically-controlled ADHD underwent ACT weekly for 8 weeks. For each individual, two separate questionnaires for IGD and ADHD were filled out, once at the beginning, and once at the end of treatment. The results before and after treatment were compared together. **Results:** The mean scores of the IGD questionnaire before and after the intervention were 37.25 and 30.30, respectively, and the mean difference was statistically significant ($P < 0.001$). The mean score of ADHD index and its three subscales were under the diagnostic cut-point of the disorder before and after the treatment. However, the mean score of ADHD index, hyperactivity, inattention, and oppositional behavior decreased by 1.80 ($P = 0.0013$), 1.45 ($P = 0.114$), 1.90 ($P = 0.027$), and 2.05 ($P = 0.023$), respectively. **Conclusion:** The results showed a significant effect by the ACT on reducing the severity of IGD in adolescents with underlying medically controlled ADHD.

Keywords: Acceptance and commitment therapy, adolescent, attention deficit-hyperactivity disorder, Internet gaming disorder

INTRODUCTION

Internet gaming disorder (IGD) is an entity that has received much research attention recently. It is defined as a pattern of excessive and protracted Internet gaming which leads to cognitive and behavioral symptoms, including progressive loss of control over gaming, tolerance, and withdrawal symptoms.^[1] Since the problematic use of online games is similar to most traditional addictions, the DSM-5 proposed diagnostic criteria for IGD and placed it in the position of a potential behavioral addiction. This condition is included in the section of the DSM-5 containing disorders warranting additional study, suggesting that it is not yet intended for

clinical use, but research on this topic is encouraged.^[2-4] The prevalence of IGD is reported from 0.3% to 12%, and it is an increasing public health concern.^[5]

The IGD has some psychiatric comorbidities, one of them is attention-deficit hyperactivity disorder (ADHD). Both of these disorders are associated with impulsivity and hostility.^[6] Some studies suggest that ADHD, especially with impulsivity and attention deficit, is a predictor of IGD development.^[7-9] While addictive behaviors are common among people with ADHD,

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some studies have shown that excessive gaming causes ADHD symptoms to disappear temporarily, providing an escape route to avoid real-life problems.^[10]

Although currently, there is no general agreement on a standard treatment protocol for IGD, Meta-analyzes have shown that both pharmacological and psychological therapies are effective in improving addictive behaviors, reducing the length of online time, depression, and anxiety in IGD patients.^[11,12] The psychological therapies used for this disorder mainly included cognitive-behavioral therapies that have been used due to the compulsive nature of this disorder and the existence of maladaptive cognition in these people.^[4,13]

Acceptance and commitment therapy (ACT) uses acceptance, mindfulness, commitment, and behavior change strategies to reduce the effect of many inner emotions on abnormal behaviors, and to increase psychological flexibility. The effectiveness of ACT in adolescents with obsessive-compulsive disorder has been shown.^[14-17] It also has satisfactory results in examination-induced anxiety, anorexia nervosa, social anxiety disorder, and generalized anxiety disorder.^[18,19]

Currently, there are very limited data on the effectiveness of ACT on IGD. Given the high comorbidity of IGD and ADHD, in this study, we evaluated the effectiveness of ACT on adolescents with IGD who have underlying ADHD.

MATERIALS AND METHODS

On IRB approval, this study was performed over 4 months (January to April 2020) in the outpatient clinic of Kargarnejad Hospital, Kashan, Iran. Adolescents aged 12–18 years who had IGD comorbid with ADHD were considered eligible for our prospective study. The diagnosis of ADHD in all patients was made by a child and adolescent psychiatrist based on the DSM-5 criteria. The patients were all under treatment of methylphenidate within the standard range of doses which was not changed during the past 3 months. IGD diagnosis was also based on proposed criteria by DSM-5, which is indicated by meeting at least five (out of nine) criteria in 12 months.^[3] Patients with psychiatric disorders other than ADHD or those who had received psychological intervention in the past year were not included in the study. Informed consent from patients' parents was obtained, and an overview of the study and its goals was drawn for the patients. Regarding these criteria, 23 patients were enrolled which were selected consecutively. Absence more than twice in the treatment sessions led to exclude the patient from the study. Ultimately, 20 patients completed the sessions as the final study subjects.

For each patient, two questionnaires (one for IGD and one for ADHD) were filled by the psychiatrist, once at the beginning of the first treatment session (week 1) and the other at the end of the last session (week 8).

The nine-item Internet Gaming Disorder Scale – Short-Form questionnaire was used to assess IGD score.^[20] This questionnaire is based on the IGD diagnostic criteria presented

in DSM-5. It consists of a 5-point Likert-type scale, with the following options: never = 1, rarely = 2, sometimes = 3, often = 4, and very often = 5, providing a total score ranging between 9 and 45 which is an indicator of IGD severity.

The internal consistency of this questionnaire was very good (Cronbach alpha = 0.87). It was validated by Wu *et al.* in Iran,^[21] with the following validation results: Internal consistency: very good (Cronbach's alpha = 0.90), reliability of test–retest: sufficient ($r = 0.87$).

The Conners' Parent Rating Scale–Short-Form Revised questionnaire was used for the assessment of ADHD.^[22] This questionnaire has 27 items, which are defined into three subscales of hyperactivity, inattention, and oppositional behavior. A general index of ADHD is also estimated using the questionnaire. The scale consists of a 4-point Likert-type scale with the following scored responses: never = 0, sometimes = 1, often = 2, and many = 3. In each subscale, the scores are added together to provide a raw total score, which is then converted to a standardized T-score for final interpretation.

Internal consistency for all three subscales and the ADHD index was reported as very good (Cronbach's alpha >0.85). The validity of this questionnaire by the Institute of Cognitive Sciences of Iran was 0.85.^[23]

The ACT was performed according to the standard protocol mentioned in the book “*ACT made simple*” by R. Harris from New Harbinger Publications, first edition.^[24]

Treatment sessions were performed in groups, weekly for 8 weeks. These sessions were conducted by a trained child and adolescent clinical psychologist at the Psychology Clinic of (*Kargarnejad Hospital, Kashan, Iran*). Medical treatment of ADHD was also continued simultaneously.

At each session, metaphors and age-appropriate examples consistent with the goals of the session were used. Each session involved reviewing the previous session, and homework was assigned between the sessions based on the personalized values.

Session 1 focused on discussing the limitations in family/educational and social areas caused by the gaming disorder, description of the therapy, and agreement on treatment goals. Furthermore, the paradoxical nature of the fight against urges to gaming was clarified, as many of their attempts to control internal urges for gaming can be detrimental to their well-being.

Sessions 2 and 3 focused on acceptance and values. It was expressed to the adolescents that instead of controlling the unpleasant feelings related to the immediate urge to gaming, acceptance of experiences is the key. Valuable activities such as spending time on schoolwork or with family/friends were also discussed.

Sessions 4 and 5 continued in acceptance and focused on defusion and being in the present moment. It was explained

that the individual does not choose what inner feelings occur, but he/she can choose what to do with them.

Sessions 6 and 7 focused on clarifying the values (discussed in previous sessions), personalizing them, and determining what behavioral commitments are in the direction of the values and effective in approaching the goals.

In session 8, the commitment was emphasized, and all previous sessions were reviewed.

Paired *t*-test was used to compare the mean scores of the questionnaires before and after the intervention. Demographic information of patients was expressed based on number and percentage. The effect size was also calculated using Cohen's *d* for paired sample *t*-test (mean differences divided by the standard deviation of differences), which can be interpreted based on Table 1.^[25] All data were analyzed using SPSS v22 (SPSS Inc., Chicago, IL, USA) software.

The study protocol was approved with the ethics codes of IR.KAUMS.MEDNT.REC.1399.224 and IRCT20200118046168N1.

RESULTS

The study population was composed of 16 boys (80%) and 4 girls (20%), with a mean age of 14.4 ± 1.5 years. All patients were at age-appropriate school grades.

To evaluate the outcome of the intervention, the scores of ADHD and IGD questionnaires were recorded before starting and after completing the ACT sessions; the results of which are presented in Table 2.

The mean score obtained from the IGD questionnaire at the beginning of the study was 37.25 ± 3.13 . The mean T-score obtained from the ADHD questionnaire in the subscales of hyperactivity/impulsivity, inattention, and oppositional behavior were 51.55 ± 6.05 , 63.70 ± 9.82 , and 59.70 ± 7.55 , respectively, with the highest mean T-score in the attention deficit subscale. The mean ADHD index before the intervention was 59.85 ± 7.42 .

The mean score obtained from the IGD questionnaire after the intervention was 30.30 ± 3.06 . The mean T-score obtained from the ADHD questionnaire in the subscales of hyperactivity/impulsivity, inattention, and oppositional behavior were 50.10 ± 5.15 , 61.80 ± 8.37 , and 57.65 ± 5.88 , respectively, with the highest mean score related to the attention deficit subscale, just like at the beginning of the

intervention. The mean ADHD index after the intervention was 58.05 ± 6.78 .

The results showed that the difference between the mean score of the IGD questionnaire before and after the intervention was 6.95 (95% confidence interval [CI]: 5.90–8.00), which was statistically significant ($P < 0.001$). Respecting the ADHD questionnaire, the difference between the mean T-score of hyperactivity/impulsivity, inattention, and oppositional behavior subscales before and after treatment was -1.45 (95% CI: -3.06 to $+0.16$) ($P = 0.114$), -1.90 (95% CI: -3.07 to -0.73) ($P = 0.027$), and -2.05 (95% CI: -2.99 to -1.11) ($P = 0.023$), respectively. In the ADHD index, the mean differences of the T-scores before and after treatment was -1.08 (95% CI: -2.42 to -1.18) ($P = 0.0013$). The data are also listed in Table 2.

DISCUSSION

In this study, we found that ACT has a statistically significant effect on reducing the severity of IGD. The IGD questionnaire used in this study was designed only to determine the severity of the disorder and not to diagnose it, and as mentioned earlier, the diagnosis of this disorder is based on DSM-5 criteria. There is no proposed cut-off point for grading the severity of IGD in this questionnaire, but it is mentioned that higher scores indicate a more severe disorder.^[20,21] Therefore, we used the comparison of the mean score of the IGD questionnaire before and after ACT to express the effectiveness of treatment. In the study by Pontes and Griffiths, It is suggested that a cut-off point of 36 (i.e., patients who have answered “often” and “very often” to all nine questions) could be used for research purposes to distinguish gamers with IGD from other gamers (disordered gamers from nondisordered).^[20] Because the mean IGD scores in our study before and after treatment were 37 and 31, respectively, we concluded that patients with IGD have probably become nondisordered gamers following ACT treatment; therefore, the clinical therapeutic goal has been achieved.

Two participants of our study missed more than two sessions, so they were excluded from the research. When we asked the reason, they told they were not comfortable with being in groups for treatment. This can highlight the fact that many adolescents want to preserve their privacy and prefer not to answer questions well when other peers are present.

Another aspect of our study was the effect of ACT on the underlying ADHD of the patients. The mean T-score of ADHD index and two of the three ADHD subscales (inattention and oppositional behavior) were reduced statistically significantly after treatment of IGD, while the reduction in mean T-score of hyperactivity/impulsivity was not statistically significant. Although the reduction in these items was statistically significant, it needs more discussion in terms of clinical significance. In the questionnaire used for the assessment of ADHD, a T-score of 65 is considered the cutoff point for an elevated score. The mean T-scores of the ADHD index and its

Table 1: Interpretation of the effect size

Relative size	Effect size	Percentage of the control group below the mean of experimental group
No effect	0.0	50
Small	0.2	58
Medium	0.5	69
Large	0.8	79

Table 2: Summary of the data obtained by questionnaires before and after the treatment

Questionnaire/dimension of the questionnaire	Study stage		Mean of differences (95% CI)	P	Effect size
	Mean of scores/T-scores±SD before treatment	Mean of scores/T-scores±SD after treatment			
Internet gaming disorder	37.25±3.13	30.30±3.06	-6.95 (-8.00—-5.90)	<0.001	3.55
Hyperactivity/impulsivity	51.55±6.05	50.10±5.15	-1.45 (-3.06—+0.16)	0.114	0.37
Inattention	63.70±9.82	61.80±8.37	-1.90 (-3.07—-0.73)	0.027	0.54
Oppositional behavior	59.70±7.55	57.65±5.88	-2.05 (-2.99—-1.11)	0.023	0.55
ADHD index	59.85±7.42	58.05±6.78	-1.80 (-2.42—-1.18)	0.0013	0.84

CI: Confidence interval, SD: Standard deviation, ADHD: Attention-deficit hyperactivity disorder

three subscales were all under 65 before starting the treatment of IGD, which is attributed to the effect of ongoing medical treatment of ADHD. After the treatment, it was kept under the cut-point, with a lower mean T-score than at the beginning of the therapy. Therefore, it cannot be concluded that ACT for IGD was able to treat the underlying ADHD, but it just mitigated the symptoms. The effect of ACT on ADHD has been evaluated in other studies.^[26,27] It is also worth mentioning that even though the reduction in mean T-score of inattention and oppositional behavior was statistically significant, the calculated effect size was medium.

As discussed earlier, there is a strong association between IGD and ADHD, particularly in the inattention subscale, which itself is a risk factor for IGD. This finding is justified by the fact that people turn to play as a means of maintaining concentration to reduce dysphoria and distress caused by attention deficit and to provide small rewards^[28] The target group of our study was adolescents 12–18-year-old; in ADHD patients within this age group, the attention deficit is more pronounced than hyperactivity.^[7] This can justify the higher mean T-score of inattention than other ADHD subscales in our study.

Studies have shown that mindfulness is effective in reducing the symptoms of ADHD, especially attention deficit.^[26] Since one of the six elements of ACT is mindfulness, it was not unexpected that the mean T-score of inattention decreased more than the other two subscales, although with a moderate effect size.

The results of this study are in line with studies in which the therapeutic effect of cognitive behavioral therapy (CBT) on IGD has been investigated.^[12] Several studies have used ACT as an alternative to CBT in some psychiatric disorders and finally reported a favorable outcome so that the therapeutic results were similar to CBT.^[19] Studies have also evaluated ACT specifically in adolescents with, for example, those with obsessive-compulsive disorder or anorexia nervosa, with successful results.^[15,16,19,29]

In a study by Young, family therapy is considered a treatment for IGD. It is suggested that effective treatment requires that the dynamics of the family should be assessed and that family members must also be helped to achieve health, or else relapse is much more likely.^[30]

Studies have shown that there are multiple factors that affect the severity of IGD, many of them considered IGD risk factors. Older age, lower self-esteem, and lower satisfaction with daily life are described as risk factors for more severe IGD.^[31] Although none of the genders is considered as a risk factor for IGD, however, this disorder is more prevalent in males in many studies, although statistically nonsignificant. On the other hand, female gender IGD patients play longer per session in one study.^[32] Unemployment or failure of studying in school and drinking can also be considered risk factors.^[33]

Our study has some limitations. First, it was a single-arm study; and we did not have a group to compare the treatment results with. Second, due to the coincidence of the final part of the study with the COVID-19 pandemic, the chance of scheduled regular follow-up after completion of treatment (which was determined to be the final part of the study for assessment of mid- and long-term effects) was not possible for most patients, because temporary closure of schools and lifestyle changes during home quarantine and consequently more usage of cyberspace (for online classes, etc.) and the increasing availability of computers and the Internet for adolescents, had a confounding effect on follow-up assessment.

It can be recommended that similar studies are performed either using a control group or comparatively, for example, comparing ACT with other treatments such as CBT or potential drug therapies. Also, to evaluate the short-term and long-term viability of the therapeutic results, follow-up of patients after completion of treatment based on a predetermined schedule (e.g., 1 or 3-month follow-up) can lead to the achievement of other valuable findings.

CONCLUSION

The results of this study showed a significant effect of ACT on reducing the severity of IGD in patients who have comorbid ADHD. ACT also mitigated symptoms of the underlying ADHD, although the clinical significance is unclear.

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Conflicts of interest

There are no conflicts of interest.

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