

Extended Abstract

Internet Gaming Disorder and Treatment Approaches: A Systematic Review*

Merve Denizci Nazlıgöl¹Samet Baş²Zeynep Akyüz³Orçun Yorulmaz⁴**Abstract**

The purpose of this systematic review is to investigate the phenomenology of the psychiatric diagnosis of Internet Gaming Disorder (IGD), which has a serious potential, through the physical and psychosocial impacts of recent candidates for its diagnosis, followed by current treatment approaches for this problem. Using specific terms, a comprehensive database search of PsychINFO, ScienceDirect, Wiley Online Library, Web of Science, and PubMed was conducted to access particular studies that examine treatment interventions for IGD. All searches have been limited to full text papers published between 2000 and 2017. Six eligible treatment studies fulfilling the criteria of preferred reporting items for systematic reviews and meta-analyses (PRISMA) as an international guideline were included in the literature review. The evaluation criteria of the IGD were observed to differ among studies and the current samples to consist predominantly of males in adolescence to young adulthood. The findings on interventions indicate that different treatment modalities show successful results in reducing IGD symptoms and the time spent playing games, as well as on addictive individuals' progress regarding verbal expression. The general impressions of this systematic review are that although technology seems to facilitate life, Internet use and gaming habits at the same time can easily turn into a serious psychiatric problem. On the other hand, relatively little is known about IGD with a rather limited number of studies describing, assessing, and treating this problem. However, increasing information about this disorder is crucial for developing specific interventions. Thus, conducting additional research in Turkey as well as the world is essential for understanding IGD's nature and how to treat it.

Keywords

Internet gaming disorder • Gaming addiction • PRISMA • Treatment approaches • Systematic review

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The fifth edition of the American Psychiatric Association's (APA) *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) has classified Gambling Disorder as a subsection of Non-Substance-Related Disorders in the category of Substance-Related and Addictive Disorders (APA, 2013). As the concept of behavioral addiction is recognized by DSM-5, some debates have arisen over whether a range of behaviors such as Internet usage, playing video games, having sex, and exercising should be included in this group (Black et al., 2014). Although Internet Gaming Disorder (IGD) has not yet been accepted as a mental disorder, IGD is positioned under the section "Condition for Further Study" in the DSM-5 Appendix (Irmak & Erdoğan, 2015). The diagnostic criteria for IGD is very similar to that for gambling: (a) a preoccupation with Internet games, (b) withdrawal symptoms when Internet gaming stops, (c) increased tolerance (the need to spend ever more time engaged in Internet gaming, (d) unsuccessful attempts to control participation in Internet gaming, (e) loss of interest in hobbies and other entertainment as a result of Internet gaming, (f) continued excessive use of Internet games despite being aware of psychosocial problems, (g) deceiving family members, therapists, or others regarding the amount of Internet gaming, (h) using Internet gaming to escape or relieve negative moods, and (i) loss of a significant relationship, job, or educational/career opportunity because of participating in Internet games (APA, 2013).

According to a recent epidemiological survey study (Müller et al., 2015) conducted in seven European countries, 1.6 % of adolescents meet the full criteria for IGD, while 5.1% of adolescents are at risk for IGD by fulfilling up to four of the criteria. In Turkey, only one study is found that is based on polythetic diagnostic criteria (i.e., checking at least three points and over four items through the seven items on the Digital Game Addiction Scale); it had a very limited number of subjects and the findings revealed a prevalence rate of 9.4% (Irmak & Erdoğan, 2015). Therefore, more extensive and detailed studies are needed in terms of diagnostic criteria.

The findings from risk factor studies show that some people with distinct psychological features (including aggressiveness, self-control, and narcissistic personality patterns) are more likely to develop IGD (Kim, Namkoong, Ku, & Kim, 2008). Furthermore, research results show that whether a player is employed or unemployed, how many years one has played, and the total time spent playing can also be viewed as risk factors. In addition, multiple risk factors can also raise the likelihood of developing addiction (Hussain, Griffiths, & Baguley, 2012). Moreover, good evidence exists that problematic relationships, lack of friends, deterioration in physical appearance, or maladaptive coping styles can lead to an increase in Internet gaming as a reaction to feeling incompetent (e.g., Griffiths, 2010). Socialization should also be kept in mind as it is one of the major motivations for Internet gaming (Calado, Alexandre, & Griffiths, 2014). Additionally, most players have characteristics of hypersensitivity and/or unstable self-esteem (Beard & Wickham,

2016). In fact, online games provide a feeling of success so that players maintain their gaming behaviors to achieve more and feel proud (Calado et al., 2014).

Inevitably, IGD has several negative physical, social, and psychological effects on players. They usually sacrifice sleep, food, and relationships to spend more time in the virtual world. Furthermore, back pain, eye fatigue, carpal tunnel syndrome, skin deterioration, and eating disorders are common health problems among these players (Lee, Lee, & Choo, 2016). In addition, IGD may lead to devastating emotional consequences such as quitting school or work, divorce, or disruption of family and social relationships (Bargeron & Hormes, 2017). Psychological well-being also deteriorates because people with IGD experience increased levels of depression, anxiety, and stress alongside decreased life satisfaction (Lee et al., 2016).

Despite its serious impact on life, IGD is still only a candidate for psychiatric diagnosis. The number of studies on IGD treatments is quite limited in the literature, and effective and specific treatment protocols for this disorder have yet to be developed. To our knowledge, no comprehensive or empirical research exists in Turkey on this topic. Consequently, this study aims to systematically review the studies currently published that investigate the effectiveness of treatments on patients with IGD.

Method

Screening and Selection Process

A systematic PRISMA review has been conducted using the following search terms: (Internet gaming disorder OR gaming addiction) AND (treatment OR intervention OR therapy). The search criteria identified below were entered in a number of databases, including PsychINFO, ScienceDirect, Wiley Online Library, Web of Science, and PubMed. All searches were limited to full text papers published from 2000 to 2017, as this term did not exist in the literature prior to this time. These database search parameters yielded a total of 74 results. The following results were included in each database: PsychINFO (19 results), ScienceDirect (11 results), Wiley Online Library (2 results), Web of Science (32 results), and PubMed (10 results). Excluding studies based on certain criteria (e.g., duplications in different databases, unavailability of a full-text version, publication language not in English, case studies, focus on neuropsychological assessments) led to a total of six studies being identified and selected for review. The process of inclusion for current research papers can be seen in the flowchart in Figure 1.

Results

Six studies were evaluated based on the PRISMA criteria in terms of sample characteristics, definition of gaming addiction, aim of the study, study design, treatment, and results (see Table 1).

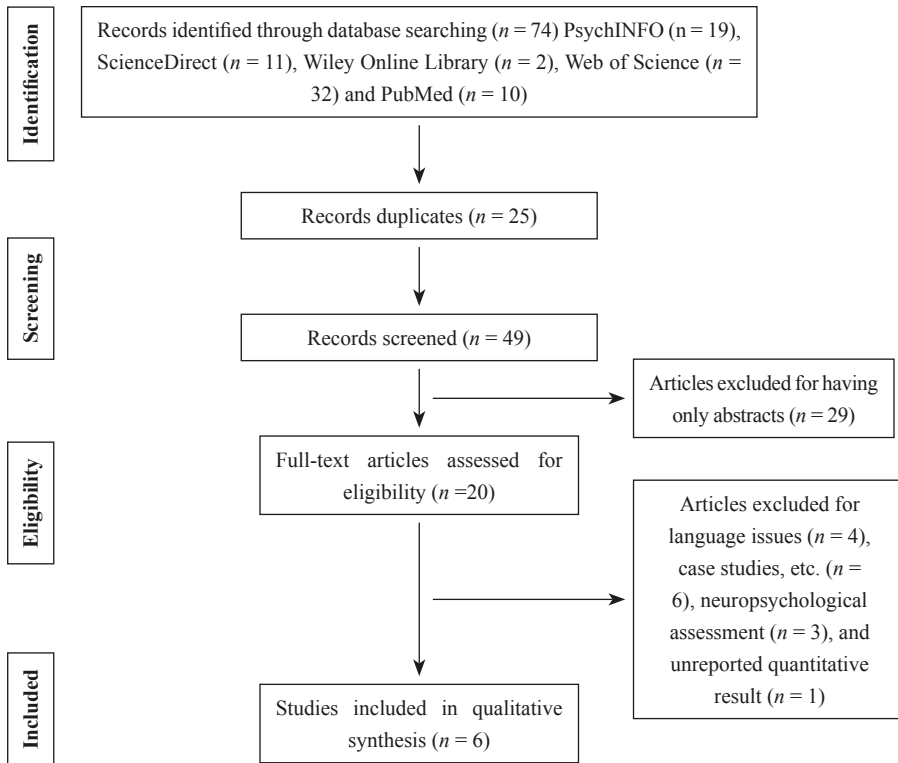


Figure 1. PRISMA Flow Diagram.

Discussion

This systematic review evaluates both the definitions of IGD and its characteristics. Moreover, various treatment approaches were systematically reviewed based on the PRISMA criteria. First, a clear relationship between IGD and age can be observed in the literature as the participants from six studies were teens or young adults. Episodes seem the most dangerous during adolescence (Müller et al., 2015). Second, regarding gender, our review supports the premise that males are more likely to develop IGD compared to females (Ko, Yen, Chen, Chen, & Yen, 2005). As an explanation, the literature highlights men's tendency to play games to maintain social relationships and feel successful (Ko et al., 2005). Third, the generalizability of the reviewed studies to a broader population is limited due to the small number of participants. Fourth, the findings should be replicated in other cultures because most studies were conducted in Asia (i.e., China, Korea, Japan). This way its characteristics can be tested cross-culturally. Fifth, more research is also needed on IGD owing to heterogeneity and comorbidity, as well as the absence of consensus on specific assessment measures. The studies showed the use of various measurement tools for identifying IGD. For instance, measurements were reported to include semi-structural interviews based on

Table 1
Selected Characteristics of Treatment Studies for Internet Gaming Disorder

Authors	Definition of Game Addiction	Participants	Aim of study	Study design	Treatment	Results
Han, Kim, Lee, and Renshaw (2012)	1) Spends more than four hours per day and 30 hours per week, 2) Young Internet Addiction Scale (YIAS) scores > 50, 3) impaired behaviors or distress.	Experiment: 15 adolescents with online game addiction and their families. Control: 15 healthy comparisons.	To investigate the effects of a brief 3-week family therapy intervention on patterns of brain activation	Experiment-Control. Time series. Quasi-experimental	Brief 3-week family therapy.	Improvement in perceived family cohesion following 3 weeks of treatment was associated with an increase in the activity of the caudate nucleus in response to affection stimuli and inversely correlated with changes in online game playing time.
Kim, Kim, Shim, Im, and Shon (2013)	1) Playing Dungeon & Fighter every day for at least 4 hours per day.	Experiment: 27 male students addicted to Dungeon & Fighter. Control: 32 male students addicted to Dungeon & Fighter.	To investigate how the effects of a course in writing and speaking using narrative characteristics and content borrowed from "Dungeon & Fighter" influence language expression and gaming addiction.	Randomized control. Experiment-Control. Time series. Experimental.	Writing and speaking course designed by the Korean Broadcasting System.	Participants in the experimental group improved their writing and speaking ability far more than those in the control group.
Park et al. (2016)	1) YIAS score > 50, 2) Time spent playing Internet games > 30 hrs. per week, 3) Disruption of regular life, 4) Maladaptive behaviors or distress in school or work.	Experiment: 24 adults with IGD. Control: 12 causal game users.	To investigate the effects of virtual reality therapy for online game addiction.	Randomized control. Experiment-Control. Pretest-Posttest. Experimental.	Cognitive Behavioral Therapy (CBT) & Virtual Reality Therapy	Both CBT and VRT groups showed reductions in YIAS scores. For the baseline, the IGD group showed a smaller ALFF within the right-middle frontal gyrus, and reduced FC in the cortico-striatal-limbic circuit. In the VRT group, connectivity from the PCC seed to the left middle frontal and bilateral temporal lobe increased after VRT.
Sakuma et al. (2017)	1) DSM-5 criteria for IGD using interviews, 2) Griffith's (2005) six components of addiction.	Experiment: 10 males diagnosed with IGD.	To investigate the effectiveness of the Self-Discovery Camp (SDIC) for IGD and confirm its effects over time.	Single group. Pretest-Posttest. Pre-Experimental.	CBT, personal counseling, medical lectures, and a workshop.	Total gaming time was significantly lower 3 months after the SDIC. Problem recognition and self-efficacy towards positive change also improved. Furthermore, a correlation was found for age of onset with problem recognition score.
Yao et al. (2017)	1) 5 or more DSM-5 criteria for IGD, 2) Spends at least 14 hrs per week Internet gaming, 3) Internet games are their primary Internet activities.	Experiment: 18 subjects with IGD. Control: 19 healthy controls (HC) who've never played Internet games.	To develop a group behavioral intervention combining reality therapy and mindfulness meditation to heightened decisional impulsivity, and to evaluate its efficacy.	Experiment-Control. Pretest-Posttest. Quasi-experimental.	Reality therapy (group) & mindfulness meditation (group).	At baseline, IGD subjects showed greater inter-temporal and risky-decision impulsivity than HC subjects. After intervention, IGD subjects decreased their delay discounting percentage and IGD severity compared to the baseline.
Zhang et al. (2016)	1) Chen Internet Addiction Scale scores > 67, 2) > 20 hrs. per week Internet game playing time, 3) Internet games as their primary Internet activities.	Experiment: 36 males with IGD. Control: 19 healthy males.	To investigate the effectiveness of a craving behavioral intervention (CBI) to identify abnormal intrinsic neural activity in IGD.	Experiment-Control. Pretest-Posttest. Quasi-experimental.	Craving behavioral intervention (group).	Compared with IGD subjects who did not receive the intervention, those receiving CBI demonstrated significantly reduced resting-state functional connectivity.

self-reporting or on DSM-5's diagnostic criteria. This situation indicates that a lack of consensus still exists in the literature on defining IGD. Furthermore, interventions for IGD across the reviewed studies varied considerably, including a virtual reality treatment, a therapeutic residential camp, an educational course, family therapy, reality therapy, mindfulness meditation, and craving behavioral intervention. A lack of consistency across these studies can clearly be seen in the types of therapy conducted. However, these studies highlight the importance of different aspects, such as awareness, family relationships, cognitive processes, and education. Therefore, future studies can further explore the underlying role of effective treatment approaches.

In conclusion, this review can help conceptualize IGD, which has been proposed as a potential disorder of behavioral addiction in the DSM-5. In terms of both practice and theory, increasing the information on effective and efficacious treatments is needed in Turkey. Particularly essential for early diagnosis is the development of prevention and psychoeducation programs for adolescents and their families.

Kaynakça/References

- Amerikan Psikiyatri Birliđi. (2013). *Ruhsal bozuklukların tanısai ve sayımsai el kitabı* (5. basım) (DSM-V) (E. Korođlu, Çev.) Ankara: Hekimler Yayın Birliđi.
- Barger, A. H., & Hormes, J. M. (2017). Psychosocial correlates of internet gaming disorder: Psychopathology, life satisfaction, and impulsivity. *Computers in Human Behavior*, *68*, 388–394.
- Baysak, E., Kaya, F. D., Dalgat, I., & Candansayar, S. (2016). Online game addiction in a sample from Turkey: Development and Validation of the Turkish Version of Game Addiction Scale. *Klinik Psikofarmakoloji Bulteni*, *26*(1), 21–31.
- Beard, C. L., & Wickham, R. E. (2016). Gaming-contingent self-worth, gaming motivation, and Internet Gaming Disorder. *Computers in Human Behavior*, *61*, 507–515.
- Beranuy, M., Carbonell, X., & Griffiths, M. D. (2013). A qualitative analysis of online gaming addicts in treatment. *International Journal of Mental Health and Addiction*, *11*(2), 149–161.
- Black, D. W., Coryell, W. C., Crowe, R. R., McCormick, B., Shaw, M., & Allen, J. (2014). A direct, controlled, blind family study of pathological gambling. *Journal of Clinical Psychiatry*, *75*(3), 215–221.
- Boysan, M., Kuss, D. J., Barut, Y., Aykose, N., Gulec, M., & Ozdemir, O. (2015). Psychometric properties of the Turkish version of the Internet Addiction Test (IAT). *Addictive Behaviors*, *64*, 247–252.
- Calado, F., Alexandre, J., & Griffiths, M. D. (2014). Mom, dad it's only a game! Perceived gambling and gaming behaviors among adolescents and young adults: An exploratory study. *International Journal of Mental Health and Addiction*, *12*(6), 772–794.
- Griffiths, M. D. (2005). A “components” model of addiction within a biopsychosocial framework. *Journal of Substance Use*, *10*, 191–197.
- Griffiths, M. D. (2010). The role of context in online gaming excess and addiction: Some case study evidence. *International Journal of Mental Health and Addiction*, *8*, 119–125.
- Günüç, S. & Kayri, M. (2010). Türkiye’de İnternet bağımlılık profili ve İnternet Bağımlılık Ölçeğinin geliştirilmesi: Geçerlik-güvenirlik çalışması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *39*(39), 220–232.

- Han, D. H., Kim, S. M., Lee, Y. S., & Renshaw, P. F. (2012). The effect of family therapy on the changes in the severity of on-line game play and brain activity in adolescents with on-line game addiction. *Psychiatry Research: Neuroimaging*, 202(2), 126–131.
- Hussain, Z., Griffiths, M. D., & Baguley, T. (2012). Online gaming addiction: Classification, prediction and associated risk factors. *Addiction Research & Theory*, 20(5), 359–371.
- Irmak, A. Y. & Erdoğan, S. (2015). Dijital Oyun Bağımlılığı Ölçeği Türkçe formunun geçerliliği ve güvenilirliği. *Anatolian Journal of Psychiatry*, 16(1), 10–18.
- Kayri, M., & Günüş, S. (2009). The adaptation of internet addiction scale into Turkish: The study of validity and reliability. *Ankara University, Journal of Faculty of Educational Sciences*, 42(1), 157–175.
- Kelleci, M., Güler, N., Sezer, H. & Gölbaş, Z. (2009). Lise öğrencilerinde internet kullanma süresinin cinsiyet ve psikiyatrik belirtiler ile ilişkisi. *TAF Preventive Medicine Bulletin*, 8(3), 223–230.
- Keser, H., Esgü, N., Kocadağ, T., & Bulu, S. (2013). Validity and reliability study of the internet addiction test. *Mevlana International Journal of Education*, 3(4), 207–222.
- Kim, E. J., Namkoong, K., Ku, T., & Kim, S. J. (2008). The relationship between online game addiction and aggression, self-control and narcissistic personality traits. *European psychiatry*, 23(3), 212–218.
- Kim, P. W., Kim, S. Y., Shim, M., Im, C. H., & Shon, Y. M. (2013). The influence of an educational course on language expression and treatment of gaming addiction for massive multiplayer online role-playing game (MMORPG) players. *Computers & Education*, 63, 208–217.
- Kiraly, O., Griffiths, M. D., Urbán, R., Farkas, J., Kökönyei, G., Elekes, Z., ... Demetrovics, Z. (2014). Problematic internet use and problematic online gaming are not the same: Findings from a large nationally representative adolescent sample. *Cyberpsychology, Behavior, and Social Networking*, 17(12), 749–754.
- Kiraly, O., Slezcka, P., Pontes, H. M., Urbán, R., Griffiths, M. D., & Demetrovics, Z. (2015). Validation of the ten-item Internet Gaming Disorder Test (IGDT-10) and evaluation of the nine DSM-5 Internet Gaming Disorder criteria. *Addictive behaviors*, 64, 253–260.
- Ko, C. H., Yen, J. Y., Chen, C. C., Chen, S. H., & Yen, C. F. (2005). Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. *The Journal of Nervous and Mental Disease*, 193(4), 273–277.
- Kuss, D. J., & Griffiths, M. D. (2012). Internet gaming addiction: A systematic review of empirical research. *International Journal of Mental Health and Addiction*, 10(2), 278–296.
- Lee, S. Y., Lee, H. K., & Choo, H. (2016). Typology of internet gaming disorder and its clinical implications. *Psychiatry and Clinical Neurosciences*, 71(7), 479–491. <http://dx.doi.org/10.1111/pcn.12457>
- Lemmens J. S., Valkenburg, P. M., & Peter, J. (2009). Development and validation of a game addiction scale for adolescents. *Media Psychology*, 12, 77–95.
- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P., ... Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration. *PLoS Medicine*, 6(7), 1–28. <https://doi.org/10.1371/journal.pmed.1000100>
- Müller, K. W., Janikian, M., Dreier, M., Wölfling, K., Beutel, M. E., Tzavara, C., ... Tsitsika, A. (2015). Regular gaming behavior and internet gaming disorder in European adolescents: Results from a cross-national representative survey of prevalence, predictors, and psychopathological correlates. *European Child & Adolescent Psychiatry*, 24(5), 565–574.

- Nichols, L. A., & Nicki, R. (2004). Development of a psychometrically sound internet addiction scale: A preliminary step. *Psychology of Addictive Behaviors, 18*(4), 381–384.
- Park, S. Y., Kim, S. M., Roh, S., Soh, M. A., Lee, S. H., Kim, H., ... Han, D. H. (2016). The effects of a virtual reality treatment program for online gaming addiction. *Computer Methods and Programs in Biomedicine, 129*, 99–108.
- Pontes, H. M., & Griffiths, M. D. (2015). Measuring DSM-5 Internet Gaming Disorder: Development and validation of a short psychometric scale. *Computers in Human Behavior, 45*, 137–143.
- Pontes, H. M., Kiraly, O., Demetrovics, Z., & Griffiths, M. D. (2014). The conceptualisation and measurement of DSM-5 Internet Gaming Disorder: The development of the IGD-20 Test. *PLoS One, 9*(10), 1–9. <https://doi.org/10.1371/journal.pone.0110137>
- Sakuma, H., Mihara, S., Nakayama, H., Miura, K., Kitayuguchi, T., Maezono, M., ... Higuchi, S. (2017). Treatment with the Self-discovery Camp (SDiC) improves internet gaming disorder. *Addictive Behaviors, 64*, 357–362.
- Starcevic, V. (2013). Is Internet addiction a useful concept? *Australian and New Zealand Journal of Psychiatry, 47*(1), 16–19.
- Weinstein, A., & Lejoyeux, M. (2010). Internet addiction or excessive internet use. *The American Journal of Drug and Alcohol Abuse, 36*(5), 277–283.
- Widyanto, L., & Griffiths, M. (2006). Internet addiction: A critical review. *International Journal of Mental Health and Addiction, 4*(1), 31–51.
- Yao, Y. W., Chen, P. R., Chiang-shan, R. L., Hare, T. A., Li, S., Zhang, J. T., ... Fang, X. Y. (2017). Combined reality therapy and mindfulness meditation decrease intertemporal decisional impulsivity in young adults with Internet gaming disorder. *Computers in Human Behavior, 68*, 210–216.
- Young, K. (2009). Understanding online gaming addiction and treatment issues for adolescents. *The American Journal of Family Therapy, 37*, 355–372.
- Young, K. S. (1998). *Caught in the net: How to recognize the signs of internet addiction--and a winning strategy for recovery*. New York, NY: John Wiley & Sons.
- Zhang, J. T., Yao, Y. W., Potenza, M. N., Xia, C. C., Lan, J., Liu, L., ... Fang, X. Y. (2016). Altered resting-state neural activity and changes following a craving behavioral intervention for internet gaming disorder. *Scientific Reports, 6*. <http://dx.doi.org/10.1038/srep28109>