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The Role of Mindfulness in Preventing and Treating Video Game Addiction in Teenagers: Systematic Review and Meta-Analysis

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Abstract

Context: Video game addiction among adolescents is an emerging public health concern, with growing evidence supporting behavioral interventions to mitigate its impact. Mindfulness-based interventions, which emphasize present-moment awareness and self-regulation, have shown promise in addressing various addictive behaviors.

Objectives: This systematic review and meta-analysis aimed to evaluate the effectiveness of mindfulness practices in preventing and treating video game addiction in adolescents aged 13 to 19 years.

Methods: A comprehensive literature search was conducted across PubMed, Web of Science, and Google Scholar databases for studies published between 2000 and 2025. Inclusion criteria focused on studies assessing mindfulness interventions targeting video game or internet gaming disorder (IGD) severity in adolescents. Five studies met the selection criteria and were included in the qualitative and quantitative synthesis. Data extraction and quality assessment were performed independently by two researchers, and meta-analytic pooling utilized random-effects models to estimate standardized mean differences (SMD) in addiction severity.

Results: The meta-analysis revealed that mindfulness-based interventions significantly reduced the severity of IGD in adolescents, with a large pooled effect size [SMD = 1.947; 95% confidence interval (CI): 0.599 to 3.295; P = 0.005]. Subgroup analysis indicated that traditional mindfulness training had a substantially greater impact (SMD = 2.77; 95% CI: 1.71 to 3.83; P < 0.001), compared to virtual reality-based mindfulness interventions, which showed no significant effect. However, substantial heterogeneity (I^2 = 96%) and potential publication bias call for cautious interpretation.

Conclusions: Mindfulness-based interventions, especially mindfulness training, are effective approaches to reduce video game addiction severity in adolescents. Further high-quality, large-scale randomized trials are warranted to confirm these findings and optimize intervention protocols.

Keywords: Mindfulness, Video Game Addiction, Teenager

1. Context

Video game addiction, now recognized as a behavioral disorder by the World Health Organization, is characterized by compulsive gaming behavior that significantly interferes with daily life (1). Prevalence rates range from 4% to 40% across the globe, with Asia being one of the hardest-hit regions (2). The intersection of mindfulness therapy and gaming addiction has started to receive scholarly attention, with emerging research indicating that mindfulness interventions can reduce cravings, impulsivity, and maladaptive gaming

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patterns (3). Given the developmental sensitivity of adolescents, understanding how mindfulness-based approaches can be integrated into treatment plans for this age group is essential for developing effective preventive strategies and therapeutic programs aimed at curbing digital game addiction in youth populations (4).

Mindfulness-based therapies have gained increasing recognition as effective interventions for a wide range of behavioral and psychological issues, including addiction-related behaviors. Recent studies suggest that mindfulness can help individuals develop greater self-awareness and emotional regulation, which are crucial in managing addiction symptoms (5). Specifically, mindfulness interventions tailored for adolescents have shown promise in reducing impulsivity and improving mental health outcomes (6), potentially serving as preventive and remedial measures against addictive behaviors such as gaming addiction (7). As digital engagement among youth continues to escalate, there is a growing interest in exploring how mindfulness-based strategies can mitigate problematic video game use, especially within vulnerable age groups like adolescents aged 13 to 18 (8).

Given the developmental vulnerabilities and the increasing prevalence of problematic gaming behaviors in youth, mindfulness interventions offer a feasible and effective strategy to enhance self-regulation, reduce impulsivity, and foster healthier digital habits. In conclusion, integrating mindfulness-based approaches into prevention and treatment programs holds significant promise for addressing adolescent video game addiction.

2. Objectives

This systematic review and meta-analysis aimed to evaluate the effectiveness of mindfulness practices in preventing and treating video game addiction in adolescents aged 13 to 19 years.

3. Methods

3.1. Research Question

The objective of this study was to investigate the role of mindfulness practices in treating video game addiction in adolescents. Specifically, the focus was on evaluating the effectiveness of mindfulness-based interventions in reducing the severity of internet and video game disorders among adolescents aged 13 to 19 years.

3.2. Search Strategy

The databases PubMed, Web of Science, and Google Scholar were systematically searched to identify relevant studies. The search strategy was implemented using the following combination of keywords and Boolean operators: ((((((Mindfulness Therapy[Title]) OR (Mindfulness-based therapy[Title])) OR (Mindfulness intervention[Title])) AND (gaming Addiction[Title])) OR (Video Games[Title])) OR (Video game addiction[Title])) OR (Digital game addiction[Title])) AND (Adolescent[Title]) AND (("2000"[Date - Create] : "2025"[Date - Create])). The search was restricted to studies published between 2000 and 2025 (Figure 1).

3.3. Target Population

The population of interest included adolescents (aged 13 - 19 years) who participated in studies examining video game addiction and the effects of mindfulness interventions.

3.4. Inclusion and Exclusion Criteria

1. Inclusion criteria:

- Studies with titles relevant to mindfulness practices, mindfulness-based interventions, and video or digital game addiction in adolescents

- Studies published in the fields of mental health, psychology, or child development

- Publications in English

- Studies that assessed the intensity of internet gaming disorders (IGDs) or similar outcome measures

2. Exclusion criteria:

- Studies focusing exclusively on adults

- Studies not related to mindfulness interventions

- Articles lacking quantitative or statistical data on addiction severity

- Incomplete translations or studies of low methodological quality

3.5. Type of Intervention or Exposure

Included studies encompassed various forms of mindfulness-based interventions, such as meditation

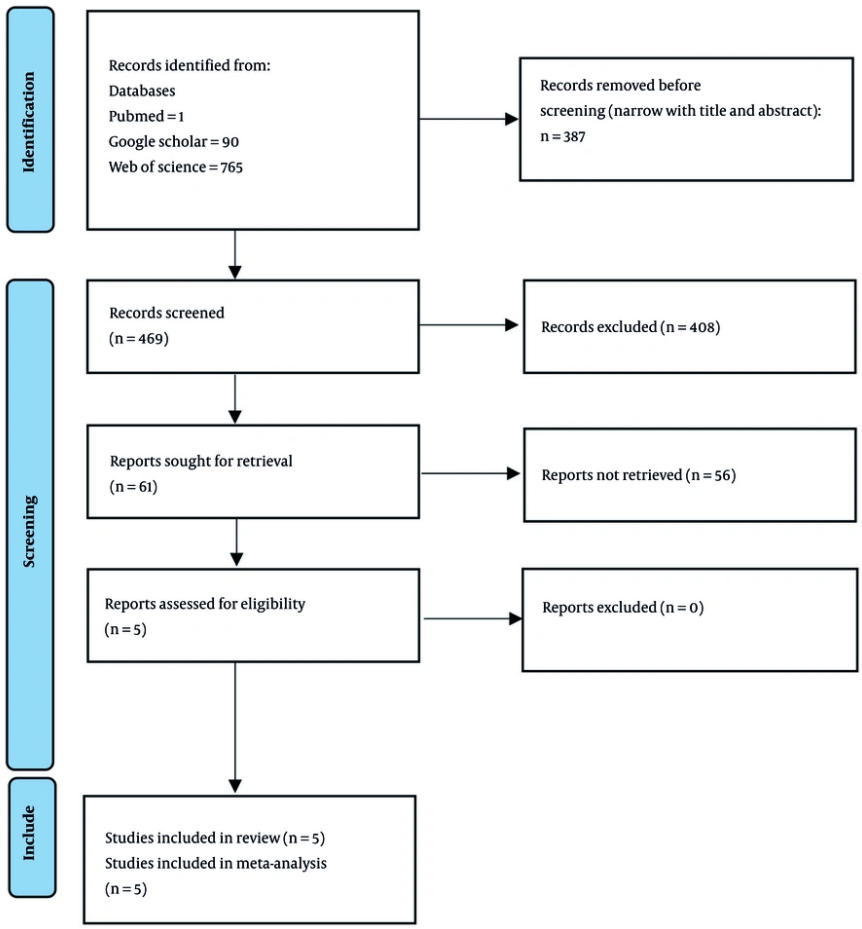

Figure 1. PRISMA 2020 flow diagram for new systematic reviews which included searches of databases (9)

practices, mindfulness training exercises, and educational mindfulness programs delivered either in group or individual formats. These interventions were primarily designed to mitigate the adverse effects of video game addiction.

3.6. Primary Outcomes

The main outcome assessed was changes in the severity of internet and video game addiction, operationalized through validated measures of IGD severity. Primary results included changes in Addiction Scale scores and reductions in time spent playing games.

3.7. Subgroup Analysis

Based on type of mindfulness technique, a subgroup analysis was conducted to explore differences in effectiveness among types of mindfulness-based interventions according to the specific intervention technique. Studies were grouped by the type of mindfulness protocol implemented. The effect of each subgroup on the severity of IGD was estimated separately, and differences between subgroups were assessed using a random-effects model.

3.8. Data Extraction

Two independent researchers extracted data from

Table 1. Characteristics of Included Studies

Authors	Place	Design	Sample Size	Mean Age (y)	Target Groups	Number of Session	Type of Intervention	Questionnaire	Quality Assessment	Key Findings
Tvrtkovic-Hasandic et al., 2024 (10)	Bosnia and Herzegovina	Experimental study	27	20.33 ± 1.12	Participants with the IGD symptom criteria	Four weekly 20-min-long attentional focus mindfulness sessions	Virtual-reality-based mindfulness	IGDT-10	Low quality of assessment	The findings showed a significant reduction in IGD symptoms and weekend gaming time in the treatment people especially in younger people gamers.
Shameli et al., 2018 (11)	Iran	Experimental study	64	Range of age 14 - 16	Students IGD	8 sessions	MBCT	IAT	Low quality of assessment	Cognitive therapy based on mind-fullness reduce the IGD s ($P < 0.01$).
Ni et al., 2024 (12)	China	Randomized clinical trial	80	≥ 18	Adults with identified IGD	8 training sessions	MORE	DSM-5-TR proposed criteria for IGD and with IAT scores	Moderate quality of assessment	These results showed that MM can be an effective treatment for IGD and can exert its effects on altering front-pallidal pathway
Chau et al., 2019 (2)	Hong Kong	Experimental study	248	10.6 ± 0.97	Students at risk IGD	3 months	Psychoeducation program (cognitive behavioral therapy, MM and reality therapy)	self-report version of the Korean Internet Addiction Proneness Scale	Low quality of assessment	Psychoeducation program can have a social impact in successfully mitigating. The symptoms of IGD and enhancing emotional well-being over time.
Jameinezhad et al., 2024 (13)	Iran	Experimental study	30	range of age 15 - 16	9th and 10th-grade male students addicted to the online game	8 sessions of 90 minutes of mindfulness training	Mindfulness training	OGQ, Whang and Chang, 2002	Moderate quality of assessment	Cognitive therapy based on mind-fullness reduce the IGDs.

Abbreviations: IGD, internet gaming disorder; IGDT-10, ten-item internet gaming disorder test; MBCT, mindfulness-based cognitive therapy; IAT, internet addiction test; MORE, mindfulness-oriented recovery enhancement; MM, mindfulness meditation; OGQ, Online Game Questionnaire.

Table 2. Quality Assessment of Included Studies

Variables	Tvrtkovic-Hasandic et al., 2024 (10)	Shameli et al., 2018 (11)	Ni et al.,2024 (12)	Chau et al., 2019 (2)	Jameinezhad et al., 2024 (13)
Was a method of randomization performed?	0	0	1	0	1
Were the groups similar at baseline?	1	1	1	1	1
Were the eligibility criteria specified?	1	1	1	0	1
Is a sample size justification described?	0	0	1	1	1
Was the patient blinded?	0	0	0	0	0
Was the care provider blinded?	0	0	0	0	0
Result	Low quality of assessment	Low quality of assessment	Moderate quality of assessment	Low quality of assessment	Moderate quality of assessment

each study using a standardized form that included:

- Study characteristics (authors, year of publication)
- Study type (randomized controlled trial, quasi-experimental)
- Sample size and number of participants
- Age range or mean age
- Type and duration of intervention
- Assessment instruments used

- Main outcomes and effect sizes

All data were entered into Microsoft Excel, and after independent verification, were analyzed using Stata version 17.

3.9. Risk of Bias Assessment

Each study was appraised, and its methodological quality was determined according to accepted standards.

3.10. Assessment of Publication Bias

To assess the potential for publication bias, Egger's test was conducted. This test detects the tendency of smaller studies to report positive results. Funnel plots were generated to visualize publication bias. A P-value of less than 0.05 in Egger's test was considered indicative of significant publication bias. All analyses regarding publication bias were performed using Stata version 17.

3.11. Statistical Analysis

Data were analyzed using Stata version 17. Intervention effects were pooled using random-effects models and reported as standardized mean differences (SMD) with 95% confidence intervals (CIs).

4. Results

4.1. Included Studies

After conducting advanced searches in PubMed, Web of Science, and Google Scholar without any language restrictions, a total of five studies (2, 10-13) were finally included in the quantitative and qualitative synthesis process (Table 1).

4.2. Quality Assessment of Included Studies

The quality assessment of the included studies indicates that most of the studies were of low to moderate quality. Specifically, only two studies (Ni et al. 2024; Jameinezhad et al. 2024) demonstrated moderate quality, primarily due to better methodological rigor such as specified eligibility criteria and sample size justification. The majority, however, showed low quality mainly because they lacked proper randomization methods and blinding procedures, which are crucial for reducing bias. Overall, these findings suggest that the evidence base contains studies with significant methodological limitations, highlighting the need for more rigorously designed research in this area (Table 2).

4.3. Meta-Analysis Results

Overall, the meta-analysis using the random-effects model indicated that mindfulness-based interventions have a significant effect on reducing the severity of IGD in adolescents. The pooled SMD was 1.947 (95% CI: 0.599 to 3.295), representing a large and statistically significant effect (P = 0.005). However, the analysis demonstrated substantial heterogeneity among the included studies (I-squared = 96.0%, tau-squared = 2.2063, chi-squared = 99.37, df = 4, P = 0.000), indicating considerable variability in study outcomes and underscoring the necessity for subgroup and sensitivity analyses (Figure 2A).

Subgroup analysis (virtual-reality-based mindfulness vs. mindfulness training) revealed that mindfulness training interventions had a large and statistically significant effect on reducing the severity of IGD in adolescents (SMD = 2.77, 95% CI: 1.71 to 3.83, P = 0.000), whereas virtual-reality-based interventions showed no significant effect (SMD = 0.57, 95% CI: -0.13 to 1.27, P = 0.11). Considerable heterogeneity was observed within the mindfulness training group (I^2 = 81.1%), while heterogeneity in the virtual reality group was moderate (I^2 = 56.2%). These findings suggest that mindfulness training is substantially more effective than other intervention techniques evaluated (Figure 2B).

4.4. Publication Bias

The results of Egger's test suggest that there may be small-study effects, which could be related to publication bias or other factors affecting smaller studies. Although the P-value is marginal at 0.051, it indicates a potential tendency for asymmetry in the effect sizes of smaller studies. This does not conclusively confirm bias but warrants cautious interpretation. It suggests that there might be some influence of publication bias, and further investigation or larger sample sizes are recommended to clarify the validity of the pooled results (Figure 3).

5. Discussion

This study's findings demonstrate that mindfulness-based interventions have a significant and substantial

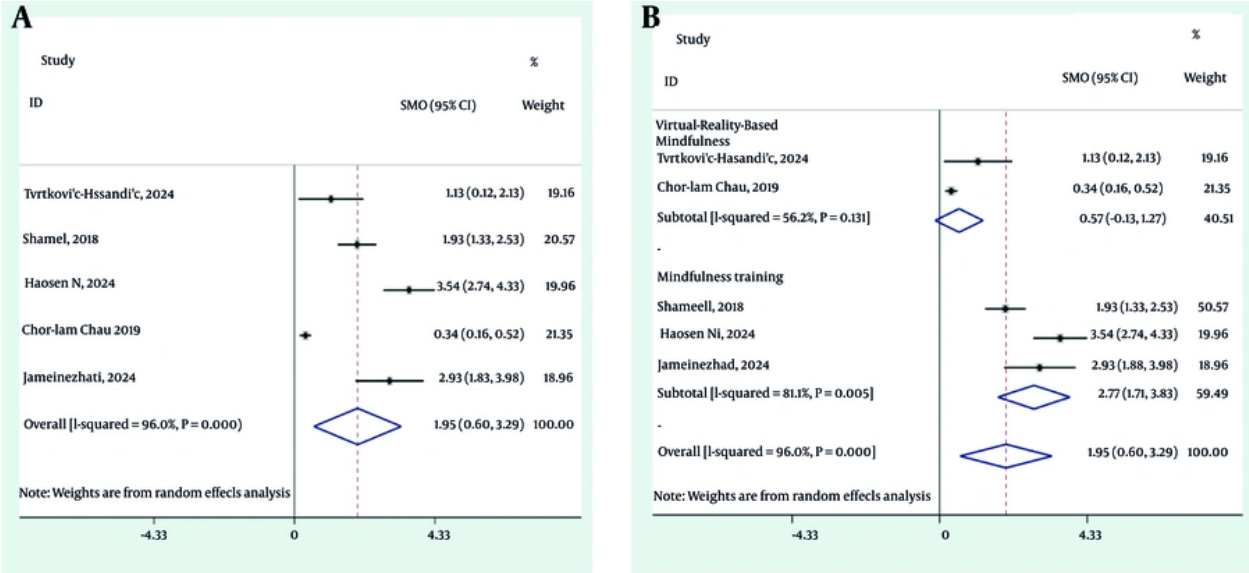

Figure 2. A, total analysis for included studies; B, subgroup analysis by type of intervention (virtual-reality-based mindfulness vs. mindfulness training) (2, 10 - 13)

effect on reducing the severity of video game addiction among adolescents. The meta-analysis revealed a large pooled SMD (SMD = 1.947, 95% CI: 0.599 to 3.295, P = 0.005), indicating the efficacy of mindfulness practices in addressing IGD symptoms. These results are consistent with previous systematic reviews and meta-analyses reporting the usefulness of mindfulness interventions in mitigating problematic gaming behaviors and internet use (14, 15).

The subgroup analysis highlights that mindfulness training techniques, involving group or individual mindfulness exercises, are far more effective than virtual reality-based mindfulness interventions. Specifically, mindfulness training yielded a large and statistically significant effect (SMD = 2.77, 95% CI: 1.71 to 3.83, P < 0.001), while virtual reality-based approaches did not produce significant outcomes (SMD = 0.57, 95% CI: -0.13 to 1.27, P = 0.11). This suggests that traditional mindfulness training protocols may better target cognitive and emotional processes associated with gaming addiction, such as reducing maladaptive gaming cognitions and enhancing awareness and self-regulation (16, 17).

The observed heterogeneity within the mindfulness training subgroup (I^2 = 81.1%) indicates variability across studies, which may stem from differences in intervention duration, protocol specifics, or sample characteristics.

While the overall evidence supports mindfulness as a promising approach to reducing IGD severity in adolescents, the quality assessment revealed that most included studies ranged from low to moderate methodological rigor. Only two studies met moderate quality standards by employing clearer randomization and sample size justification. The predominance of lower-quality studies and the indication of potential publication bias, as suggested by Egger's test (P = 0.051), underscore the need for caution when interpreting these findings. Future research should prioritize well-designed, large-scale randomized controlled trials with rigorous methodologies to confirm and extend these results.

In summary, mindfulness-based interventions, particularly traditional mindfulness training, appear to be an effective strategy for preventing and treating video game addiction in adolescent populations. They offer a non-invasive, accessible treatment option that may complement existing behavioral and psychological therapies. However, given limitations in current evidence, further high-quality studies are essential to

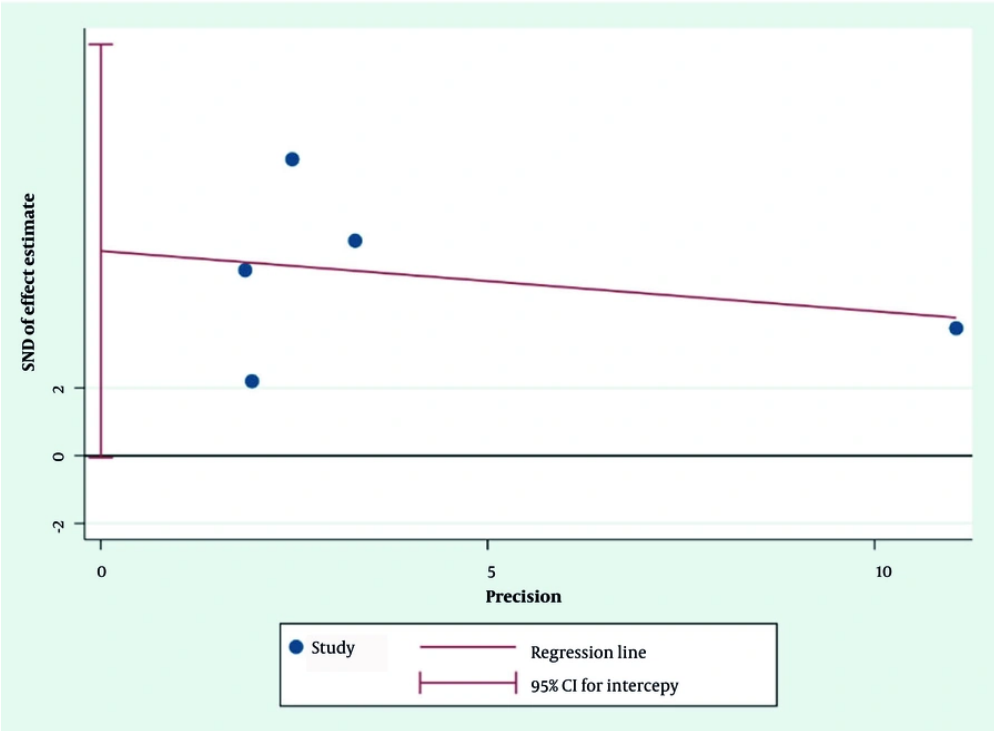

Figure 3. Egger's test for assessing the small-study effects (publication bias)

establish standardized protocols and elucidate underlying mechanisms more clearly.

5.1. Conclusions

This systematic review and meta-analysis provide evidence that mindfulness-based interventions, particularly traditional mindfulness training, are effective in significantly reducing the severity of video game addiction among adolescents. Despite notable heterogeneity and some limitations related to study quality and potential publication bias, the findings highlight mindfulness as a promising non-pharmacological approach for preventing and treating IGD in youth. Virtual reality-based mindfulness interventions showed less clear benefits, indicating the need for further research in this area. Future well-designed, large-scale randomized controlled trials are essential to confirm these results and to establish standardized intervention protocols for broader clinical application.

5.2. Strengths

This study has several notable strengths, including being one of the first systematic reviews and meta-analyses specifically examining mindfulness-based interventions for video game addiction in adolescents. It employed a comprehensive search strategy across multiple databases from 2000 to 2025 and utilized rigorous subgroup analyses to differentiate the effects of various mindfulness approaches. Additionally, the use of standardized and validated measures for assessing IGD severity and the application of robust meta-analytic techniques, including assessment of publication bias, enhance the reliability of the findings.

5.3. Limitations

The study also has limitations, such as the predominance of included studies with low to moderate methodological quality, which may affect the overall confidence in the results. Significant heterogeneity

among studies (I^2 = 96%) reflects variability in intervention protocols, populations, and outcomes, complicating the ability to draw clear conclusions. The potential presence of publication bias, indicated by Egger's test, and the relatively small number of studies (only five) further restrict the generalizability of the findings. Furthermore, virtual reality-based mindfulness interventions did not demonstrate significant effectiveness, underscoring the need for additional research in this modality.

Footnotes

Authors' Contribution: Study concept and design: M. S. and S. E. A.; Acquisition of data: V. R. H. and S. S.; Analysis and interpretation of data: M. S., M. S., and S. E. A.; Drafting of the manuscript: Z. E., M. S., and S. E. A.; Critical revision of the manuscript for important intellectual content: M. S. and S. E. A.; Statistical analysis: V. R. H. and S. S.; Administrative, technical, and material support: M. S. and S. E. A.; Study supervision: S. E. A.

Conflict of Interests Statement: The authors declare no conflict of interest.

Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication. The data are not publicly available due to privacy.

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References

1. King DL, Delfabbro PH. Video game addiction. *Adolescent Addiction*. 2020. p. 185-213. https://doi.org/10.1016/b978-0-12-818626-8.00007-4.
2. Chau CL, Tsui YY, Cheng C. Gamification for Internet Gaming Disorder Prevention: Evaluation of a Wise IT-Use (WIT) Program for Hong Kong Primary Students. *Front Psychol*. 2019;**10**:2468. [PubMed ID: 31736842]. [PubMed Central ID: PMC6839419]. https://doi.org/10.3389/fpsyg.2019.02468.
3. Kim J, Oh H, Yoon AS. Mindfulness-Based Cognitive Therapy-Game: An Ironic Way to Treat Internet Gaming Disorder. *J Med Internet Res*. 2025;**27**. e65786. [PubMed ID: 40146992]. [PubMed Central ID: PMC11986384]. https://doi.org/10.2196/65786.
4. Jameinezhad F, Omidian M. [Effectiveness of Mindfulness Training on Mood and Anxiety Symptoms in Adolescents with Addiction to Online Games]. *Iran J Rehab Res Nurs*. 2024;**11**(1):83-92. FA. https://doi.org/10.22034/ijrn.11.1.8.
5. Hofmann SG, Gomez AF. Mindfulness-Based Interventions for Anxiety and Depression. *Psychiatr Clin North Am*. 2017;**40**(4):739-49. [PubMed ID: 29080597]. [PubMed Central ID: PMC5679245]. https://doi.org/10.1016/j.psc.2017.08.008.
6. Lin J, Chadi N, Shrier L. Mindfulness-based interventions for adolescent health. *Curr Opin Pediatr*. 2019;**31**(4):469-75. [PubMed ID: 30939515]. https://doi.org/10.1097/MOP.0000000000000760.
7. Wilson AD, Roos CR, Robinson CS, Stein ER, Manuel JA, Enkema MC, et al. Mindfulness-based interventions for addictive behaviors: Implementation issues on the road ahead. *Psychol Addict Behav*. 2017;**31**(8):888-96. [PubMed ID: 29072477]. [PubMed Central ID: PMC5714676]. https://doi.org/10.1037/adb0000319.
8. Nikdel K, Ghahraman zadeh L, Najari M. [The Effectiveness of Mindfulness Therapy on Sleep Quality and Quality of Life in Internet-Addicted Adolescents]. *J Psychol new Idea*. 2024;**22**(26):1-9. FA.
9. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. *The PRISMA 2020 statement: an updated guideline for reporting systematic reviews*. Melbourne, Australia: PRISMA 2020; 2021. Available from: https://costr.ilcor.org/assets/images/photos/Figure-1-PRISMA-diagram.pdf.
10. Tvrtkovic-Hasandic S, Unal-Aydin P. Investigating the Effectiveness of a Virtual-Reality-Based Mindfulness Intervention on Internet Gaming Disorder. *Behav Sci*. 2024;**14**(12). [PubMed ID: 39767278]. [PubMed Central ID: PMC11674028]. https://doi.org/10.3390/bs14121137.
11. Shameli M, Moatamedi A, Borjali A. [The effectiveness of cognitive therapy based on mindfulness of internet game addiction intermediary variables with self-control and sensation seeking, in boy adolescents in the city of Tehran]. *Counsel Cult Psycotherapy*. 2018;**9**(33):137-61. FA. https://doi.org/10.22054/qccpc.2018.25865.1635.
12. Ni H, Wang H, Ma X, Li S, Liu C, Song X, et al. Efficacy and Neural Mechanisms of Mindfulness Meditation Among Adults With Internet Gaming Disorder: A Randomized Clinical Trial. *JAMA Netw Open*. 2024;**7**(6). e2416684. [PubMed ID: 38888924]. [PubMed Central ID: PMC11185988]. https://doi.org/10.1001/jamanetworkopen.2024.16684.
13. Jameinezhad F, Omidian M, BassakNejad S, Maktabi G. [The effectiveness of mindfulness training on sleep quality, mood and anxiety symptoms and addiction symptoms to online game in addicted adolescent to online game]. *Rooyesh-e-Ravanshenasi J*. 2024;**13**(4):11-20. FA.
14. Kim J, Lee S, Lee D, Shim S, Balva D, Choi KH, et al. Psychological treatments for excessive gaming: a systematic review and meta-analysis. *Sci Rep*. 2022;**12**(1):20485. [PubMed ID: 36443408]. [PubMed Central ID: PMC9705304]. https://doi.org/10.1038/s41598-022-24523-9.
15. Fendel JC, Vogt A, Brandtner A, Schmidt S. Mindfulness programs for problematic usage of the internet: A systematic review and meta-analysis. *J Behav Addict*. 2024;**13**(2):327-53. [PubMed ID: 38703362]. [PubMed Central ID: PMC11220809]. https://doi.org/10.1556/2006.2024.00024.
16. Nunez-Rodriguez S, Burgos-Gonzalez D, Minguez-Minguez LA, Menendez-Vega F, Antonanzas-Laborda JL, Gonzalez-Bernal JJ, et al. Effectiveness of Therapeutic Interventions in the Treatment of Internet Gaming Disorder: A Systematic Review. *Eur J Investig Health Psychol Educ*. 2025;**15**(4). [PubMed ID: 40277866]. [PubMed Central ID: PMC12025817]. https://doi.org/10.3390/ejihpe15040049.
17. Thomas J, Al-Beyahi F, Colder Carras M, Aljuboori D, Alomairah S, Thrul J. Mindfulness-based approaches to problematic technology use: A scoping review. *Computers in Human Behavior Reports*. 2025;**18**. https://doi.org/10.1016/j.chbr.2025.100653.