



## TRENDS IN THE TREATMENT OF INTERNET GAMING DISORDER OVER THE LAST 10 YEARS: SYSTEMATIC REVIEW

Dwi Suratmini<sup>1</sup>, Boby Nurmagandi<sup>2\*</sup>

<sup>1</sup>Department of Nursing, Faculty of Health Science, Universitas Pembangunan Nasional Veteran Jakarta, Jl. Pd. Labu Raya, Pd. Labu, Cilandak, Jakarta Selatan, Jakarta 12450, Indonesia

<sup>2</sup>Department of Nursing, Faculty of Health Science, Universitas Sulawesi Barat, Jl. Prof. Dr. Baharuddin Lopa, S.H, Talumung, Baurung, Banggae Timur, Majene, Sulawesi Barat 91412, Indonesia

\*[nurmagandi.bob@gmail.com](mailto:nurmagandi.bob@gmail.com)

### ABSTRACT

Internet gaming disorder (IGD) is a problem caused by excessive online gaming, characterized by a significant decline in physical and mental health as well as social interaction among adolescents. Several therapies have been used to treat IGD over the past 10 years, but the problem persists, with relapses and an increase in cases in some areas. This study aims to assess the trends in IGD treatment over the past 10 years, as well as the effectiveness and novelty of approaches to address IGD in adolescents. This study employs a systematic review to identify articles on IGD treatment published over the past 10 years (2015-2025). The article databases used were SCOPUS and EBSCO, with search keywords including “Internet gaming disorder” OR “Internet Gaming Online” OR “Game Online” OR “Online Gaming” OR “Gaming disorder” AND “therapy” OR “Treatment” OR “Therapeutic” AND “adolescent” OR ‘Teenager’ OR “Youth.” The number of articles obtained from the SCOPUS database was 280, and from EBSCO was 273. Article screening using the PRISMA method, which consists of identification, screening, eligibility and include. The number of articles analyzed through a systematic review was 11 article. Eleven articles were found to be relevant to this study. The therapies identified for treating internet gaming disorder are cognitive behavior therapy, family therapy, psychoeducation, psychopharmacological therapy, and physical exercise therapy. All of these therapies are effective in addressing IGD issues in adolescents; however, the majority of these therapies are still conducted conventionally, i.e., offline. Over the past 10 years, research on the management of IGD in adolescents remains insufficient, with only 84 articles available. Additionally, the management of IGD in adolescents is still conducted conventionally or offline despite the rapid advancement of information technology.

Keywords: adolescents; internet gaming disorder; treatment

### INTRODUCTIN

Internet Gaming Disorder (IGD) or online gaming disorder has become a serious concern in the field of mental health, especially among adolescents, over the past decade. Rapid advances in digital technology have led to a significant increase in the number of adolescents spending excessive amounts of time playing online games. This has contributed to various negative impacts, including social, emotional, academic, and even physical issues (Bonnaire & Baptista, 2019; Şalvarlı & Griffiths, 2022). Based on research conducted by various health and psychology institutions, IGD has been categorized as a condition requiring special attention. The World Health Organization (WHO) even included gaming disorder as a mental disorder in the International Classification of Diseases (ICD-11) in 2019. This step affirms that this disorder is not merely a bad habit but a condition that requires professional intervention.

Over the past decade, various efforts have been made to address IGD in adolescents. The approaches applied include cognitive-behavioral therapy (CBT), school-based intervention programs, and increasing parental and community awareness of the risks of online gaming addiction (Dreier et al., 2019; Nielsen et al., 2022a; Szász-Janocha et al., 2021). Some countries have also implemented policies restricting gaming time for children and adolescents to reduce the negative impacts of addiction, yet IGD among adolescents persists and has even increased in some regions.

Challenges in addressing IGD continue to evolve alongside technological innovations and increased access to online gaming. Therefore, more effective and sustainable strategies are needed to address this issue. This study aims to identify approaches to addressing IGD among adolescents over the past ten years, as well as the effectiveness and novelty of strategies that can be implemented to address IGD among adolescents.

## **METHOD**

### **Design**

This study used a systematic review design with Prisma guidelines to identify and analyze various forms of therapy used in the treatment of Internet Gaming Disorder (IGD) in adolescents. The research protocol has been officially registered with PROSPERO under registration number ID: 1063733, ensuring transparency and traceability of the research methodology. The process of searching, selecting, and analyzing the literature was conducted systematically and structurally.

### **Search strategy**

The literature search strategy was conducted using the Scopus and EBSCO databases to identify relevant articles. The search was conducted in June 2025 by two researchers (BN and DS). The articles included were publications published between 2015 and June 2025. The keywords and Medical Subject Headings (MeSH) used included a combination of the following terms: “Internet gaming disorder”, “Internet Gaming Online”, “Online Games”, “Online Gaming”, or “Gaming disorder” combined with “therapy”, “treatment”, or “therapeutic”, as well as the population terms “adolescent”, “teenager”, or “youth”. Studies included met the following criteria: (a) publication between 2015 and 2025; (b) publication in English; (c) full-text availability; (d) research articles, i.e., experiments and case reports. Other documents such as book chapters, book reviews, and conference proceedings were not included in this study. The search strategy was designed to ensure comprehensive coverage of the literature related to therapeutic interventions on internet gaming disorder in adolescent.

### **Data extraction**

The data extraction process was conducted based on PICO using the Mendeley reference manager to identify and select appropriate articles, namely experimental or quasi-experimental research designs on the treatment of online internet gaming, with adolescents as the research sample. Two researchers conducted the extraction process independently. In the event of a difference of opinion, the articles were reviewed together to ensure the accuracy of the categories and the completeness of the data collected. A total of 553 articles were identified, and 11 of them met the criteria for inclusion.

### **Risk of bias**

The risk of bias was minimized through a process of article selection and assessment conducted independently by two researchers. Any differences in assessment were discussed until agreement was reached. In addition, the use of standardized quality assessment instruments helped reduce the potential for methodological bias in the interpretation of the included study results.

### **Quality appraisal**

The quality appraisal process was carried out systematically with reference to the critical appraisal instrument developed by the Joanna Briggs Institute (JBI) to assess experimental research. The quality assessment process was conducted independently by two researchers (BN and DS). Each article was assessed based on all items in the relevant JBI checklist. If there were differences in assessment between researchers, discussions were held to reach a mutual agreement. This approach was applied to minimize assessor bias and increase the reliability of the quality appraisal results.

### **Data analysis**

Data analysis was conducted narratively and descriptively by grouping studies based on research design, sample characteristics and type of therapy used, as well as reported research results. The

results of the analysis were used to identify the types of intervention, the effectiveness of therapy, and the existing research gaps in the treatment of internet gaming disorder in adolescents.

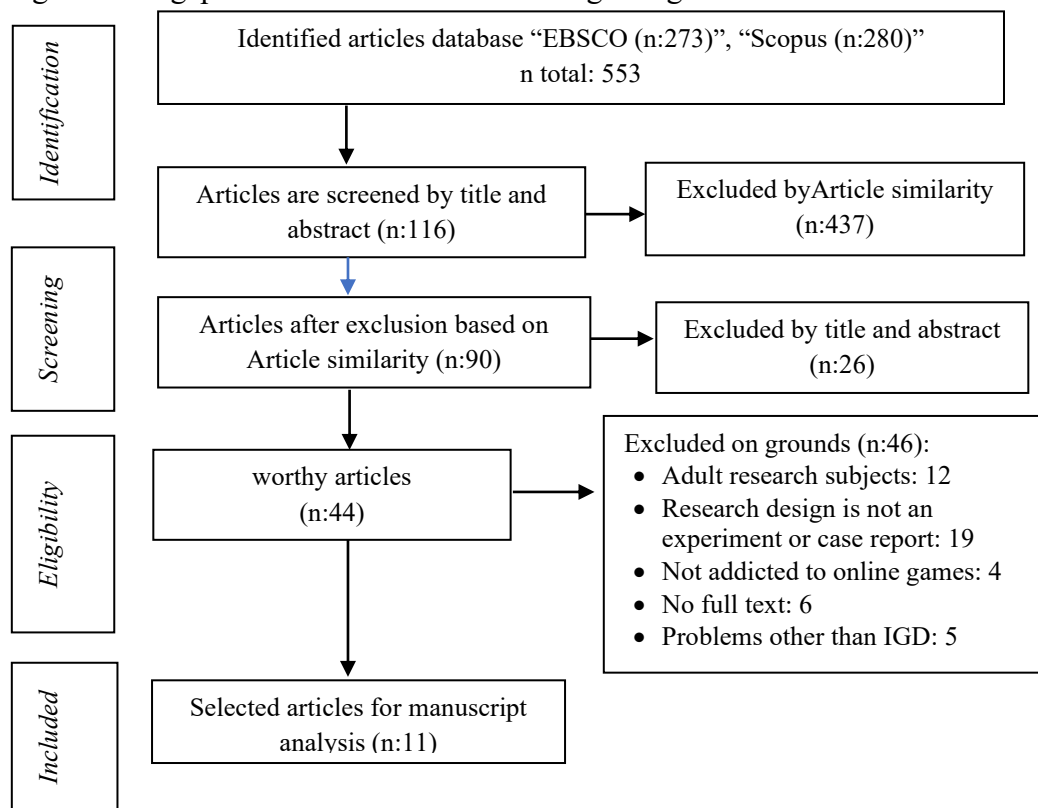


Figure 1, Prisma Flow Diagram

Figure 1 shows the Prisma flow from the literature study conducted. The first stage is identification, with articles identified as published between 2015 and June 2025. There were 553 articles identified at this stage, namely 280 from Scopus and 273 from EBSCO. The next stage was screening. Articles were screened based on similarity, resulting in 116 articles. The articles were then screened based on title and abstract, resulting in 90 articles. The third stage was assessing the eligibility of articles, namely experimental research design, research sample of adolescents, treatment of internet gaming disorder, and availability of full text. Based on the article search and identification process, 11 articles were found to be eligible for use in this systematic review.

Table 1.

Characteristics and methods of publications in research on emergency department treatment of adolescents from 2015 to 2025

Author, year of publication, country	Objective	Design and sample	Method	Measurement tools	Conclusion
(Song et al., 2016) South Korea	To Compare the efficacy of bupropion and escitalopram treatments in Internet gaming disorder (IGD) patients.	- open trial and controlled study - Age: 13-45 tahun - N: 119	- Partisipants were classified into three study groups: 44 participants were treated with bupropion for 6 weeks, 42 participants were treated with escitalopram for 6 weeks, and 33 patients were observed in the community and did not take any medications for 6 weeks. - Analysis statistical: The demographic data and clinical symptoms were analyzed using one-way analysis of variance	- Clinical Global Impression Severity Scale (CGI-S) - the Young Internet Addiction Scale (YIAS) - the Beck Depression Inventory (BDI) - the ADHD Rating Scale (ARS)	Both bupropion and escitalopram were effective in treating and managing IGD symptoms. Moreover, bupropion appeared to be more effective than escitalopram in improving attention and impulsivity in IGD patients.

Author, year of publicatio, country	Objective	Design and sample	Method	Measurement tools	Conclusion
			(ANOVA). To confirm the changes that used repetitive-measures ANOVA.	- the Behavioral Inhibition and Activation Scales (BIS/BAS).	
(Hong et al., 2020), South Korea	To evaluate the effect and neurophysiological mechanism of physical exercise intervention combined with cognitive behavioral therapy on mood and frontal alpha asymmetry in the treatment of Internet gaming disorder.	- Randomized assigned group - Age: 13-18 Years old - N: 54	- This study was designed as a 14-week prospective trial. Participants in the CBT+PE group alternatively underwent eight sessions of CBT and six sessions of a PE intervention. Participants in the CBT-only group alternatively underwent eight sessions of CBT and six sessions of supportive counseling. - Analysis statistical: 1. Wilcoxon's rank-sum test used to compare demographic, clinical characteristics, psychometric and FAA values at baseline. 2. Wilcoxon's signed-rank test used to evaluate the changes in psychometric scale scores and FAA values 3. ANOVA Test Pearson's correlation analyses were conducted to evaluate the correlation between the changes in the FAA scores and clinical scale scores	- Young Internet Addiction Scale (YIAS) - Beck Depression Inventory (BDI) - Beck Anxiety Inventory (BAI) - EEG recordings were performed for all participants using a 21-channel EEG system.	Physical exercise intervention in combination with cognitive behavioral therapy for individuals with Internet gaming disorder seems to improve the severity of internet use and depressive mood and enhance left prefrontal activation.
(Zhao et al., 2022), China	The aims of this study were to explore the effect of a memory retrieval-extinction manipulation on gaming cue-induced craving and reward processing in individuals with IGD.	- a randomized single-blind study - Age: 18-23 years old - N: 60	- This was a randomized single-blind study comparing two different intervals within the RET for IGD. - participants were randomized using a computer-generated random number sequence in a 1:1 ratio into one of the two treatment groups R-10min-E training and R-6h-E training - The experimental procedure consisted of four stages: (i) baseline session; (ii) retrieval-extinction training (RET) sessions; (iii) posttraining session; and (iv) follow-up session. - Analysis Statistical: 1. The variance analysis measures analysis of variance (ANOVA),	- Beck Anxiety Inventory (BAI) - Beck Depression Inventory - Raven's Intelligence Test - Tridimensional Personality Questionnaire (TPQ) - Hopkins Verbal Learning Test-Revised (HVLTR)	The two-day R-10min-E training reduced addicts' craving for Internet games, restored monetary reward processing in IGD individuals, and maintained long-term efficacy.

Author, year of publicatio, country	Objective	Design and sample	Method	Measurement tools	Conclusion
			<ol style="list-style-type: none"> <li>2. Significant effects from the ANOVA were followed by Bonferroni correction.</li> <li>3. T-Tests were performed to compare conditions.</li> <li>4. Pearson’s correlation analysis was conducted to analyze correlations between two variables</li> </ol>		
(Lee & Huh, 2024), South Korea	To verify a preliminary experiment for treating game-addicted adolescents with exercise games using augmented-reality (AR) technology.	<ul style="list-style-type: none"> <li>- experime ntal group (AR-based exercise) and a control group (offline exercise)</li> <li>- Age: Average 19,5 years old</li> <li>- N: 20</li> </ul>	<ul style="list-style-type: none"> <li>- Participants were divided into two groups: AR-based exercise and offline exercise. Both groups conducted the exercises simultaneously.</li> <li>- Analysis statistical :                             <ol style="list-style-type: none"> <li>1. ANOVA test to compare changes in mood state and immersion experience, heart rate, and perceived exercise level between the groups according to participation in the physical activity program</li> <li>2. Mann–Whitney U-test was use to asses Differences between experimental and control groups</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>- The Internet Game Addiction and Over-engagement Scale (IGAOS)</li> <li>- The Korean version of the Profile of Mood States–Brief (K–POMS–B)</li> <li>- Exercise intensity measurement (Heart Rate)</li> <li>- The Rating of Perceived Exertion (RPE)</li> <li>- Hemodynamic Changes in the Prefrontal Cortex Measurement Device: NIRSIT</li> <li>- Heart Rate Measurement Device</li> </ul>	<p>AR exercise games increase a subject’s mental pleasure, and they become satisfied with the exercise’s positive effect Rather than offline exercise.</p> <p>Fun AR exercise games with gamification effects can be suggested as a more helpful method for teenagers. applying the AR exercise protocol to students who are overly immersed in games could realize psychological and mental healing effects due to excessive immersion in games.</p>
(Nielsen et al., 2021), Switzerland	To assessed two family therapies multidimens ional family therapy (MDFT) and family therapy as usual (FTAU) on their impact on the prevalence of IGD and IGD symptoms	<ul style="list-style-type: none"> <li>- randomis ed controlled trial</li> <li>- Age: 12-19 years old</li> <li>- N: 42</li> </ul>	<ul style="list-style-type: none"> <li>- Treatment started within one month of the baseline assessment and lasted for approximately 6 months. MDFT (3 therapists) and FTAU (4) were delivered by psychologists and psychiatrists with similar long-term experience.</li> <li>- Analysis Statistical:                             <ol style="list-style-type: none"> <li>1. ANOVA test was use to compare differences between treatment groups across time.</li> <li>2. Wilk’s Lambda was use to assesses significant multivariate</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>- DSM-5-based IGD</li> <li>- Time - Line Follow-Back (TLFB) method</li> <li>- Abbreviated Self Completion Teen-Addiction Severity Index</li> </ul>	<p>Family therapy, especially MDFT, was effective in treating adolescent IGD. Improvements in family relationships may contribute to the treatment success. Our findings are promising but need to be replicated in larger study</p>
(Kapetanovic et al., 2023),	To evaluate the effectiveness	<ul style="list-style-type: none"> <li>- Randomiz ed</li> </ul>	<ul style="list-style-type: none"> <li>- Collected pre-intervention (baseline) data from the participants before starting</li> </ul>	<ul style="list-style-type: none"> <li>- Game Addiction Scale for</li> </ul>	<p>Relapse prevention was found to be</p>

Author, year of publicatio, country	Objective	Design and sample	Method	Measurement tools	Conclusion
Sweden	of relapse prevention (RP) as a treatment for internet gaming disorder (IGD).	controlled trial. - Age: 13 - 18 years old - N: 102	treatment. The treatment ran for 5 to 7 weeks for each participant. Post-intervention data were collected at weeks five to seven after completion of treatment. Follow-up data were collected 3 months after baseline date. - Partisipan divided to 2 group, intervention group get CBT, and control group get treatment as usual consist of different interventions according to existing practice were counseling, medication for ADHD, antidepressants, referral to other unit, further psychiatric evaluation . - Analytic statistical: 1. ANOVA test use to compare the change in mean GASA score between control group and treatment group 2. Independent sample <i>t</i> -test use to assest the difference of GASA score between treatment group and control group.	Adolescents (GASA)	superior to TAU in terms of reduction of IGD symptoms among children and adolescents in CAP clinics. The present study adds to a research field still in its infancy with further evidence that CBT, and specifically RP can be an effective treatment for IGD among children and adolescents.
(Sakuma et al., 2017), Japan	To investigated the efficacy of the Self-Discovery Camp (SDiC) on IGD	- True experiment - Age: average year of 16,2 - N: 10	- The responden get Self-Discovery Camp (SDiC) was held over 8 nights and 9 days. The SDiC comprised 14 sessions of CBT and not use pharmacotherapeutic. The SDiC also involved outdoor cooking, a walk rally, trekking, and woodworking. - Analysis statistical: 1. A Wilcoxon rank sum test was used for a statistical analysis of continuous variables. 2. Spearman's rank correlation coefficients were used to assess the association between variables	- the Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) - Questionnaire used to collect data Internet use and/or gaming time per day (in hours) and perweek (in hours and days) - DSM-5 IGD	The results was demonstrated the effectiveness of the SDiC for IGD, especially regarding gaming time and self-efficacy. Additionally, age of onset may be a useful predictor of IGD prognosis. Further studies with larger sample sizes and control groups, and that target long-term outcomes, are needed to extend our understanding of SDiC efficacy.
(Chauhan et al., 2023), India	This study examines the effectiveness of the psycho-therapeutic intervention module on adolescents	- True Experiment - Age: 12-18 years old - N: 8	- Study's treatment was designed using an eclectic approach and is a therapeutic strategy that places emphasis on each participant. Psychotherapy intervensi was used intervention modul of 12 session.	- Internet Gaming Disorder Scale (IGDS9-SF) - Barratt Impulsiveness Scale Revised (BIS-R-21)	The eclectic approach to treatment is proven to be effective for adolescents yielding significant improvement in

Author, year of publicatio, country	Objective	Design and sample	Method	Measurement tools	Conclusion
	suffering from Internet gaming disorder		- The intervention module of 12 sessions, with various therapies and techniques was conducted in group. The family was actively involved during the process. Lastly in post intervention phase, the questionnaire was again applied to observe the effect of the psychotherapy. - Analytic statistical: using Wilcoxon Signed Rank Test results to assest Internet Gaming addiction, impulsivity, loneliness, life satisfaction, social support, and self-esteem before and after therapy.	- Satisfaction with Life Scale (SWLS) - Rosenberg Self-Esteem Scale (RSES) - UCLA Loneliness Scale Version 3 - Multi-dimensional Scale of Perceived Social Support	the clinical condition and promotes wise engagement in gaming.
(Sravanthi et al., 2024), India	Knowing the effectiveness of bupropion medication with cognitive behavior therapy to overcome internet gaming addiction in adolescents	- Case report - Age: 13 years old - N: 1	- The boy was treated with bupropion 150 mg/day and underwent CBT sessions. The management plan included a gradual reduction of gaming time, encouragement to explore other areas of interest and indoor activities, and providing a safe environment for the boy to express his feelings. Additionally, psychoeducation for the parents about IGD and strategies to improve their interaction with their child was provided. - Analytical statistic: no statistical analysis was used	- Internet gaming disorder (IGD)- scale 9	Treatment included medication with bupropion and CBT resulting in significant improvement in gaming habits and social functioning. This case highlights the effectiveness of a combined approach for managing IGD and emphasizes the need for further research to optimize treatment strategies.
(Pornnoppadol et al., 2020), Thailand	To compare the effectiveness of psychosocial interventions for adolescents with IGD	- Quasi eksperimental study - Age: 13-17 years old - N: 104	- Adolescent were allocated by self-selection to S-TRC alone, PMT-G alone, S-TRC with PMT-G (combined group), or a wait list control group. - Participants were divided into four groups: Group 1 consisted of adolescents who received S-TRC and parents who received basic psychoeducation. Group 2 consisted of adolescents who did not receive intervention, but parents received PMT-G. Group 3 consisted of adolescents who received S-TRC and parents who received PMT-G. Group 4 was the control group,	- Game Addiction Screening Test (GAST) - Game Addiction Quality of Life Scale (GAME-Q) - Game Addiction Protection Scale (GAME-P) - Pediatric Symptom Checklist-17 (PSC-17) Thai version	S-TRC and PMT-G were effective psychosocial interventions for IGD and were superior to basic psychoeducation alone. The combination of S-TRC and PMT-G was not superior to S-TRC or PMT-G alone. A randomized, controlled trial is warranted to further validate the results of this study.

Author, year of publicatio, country	Objective	Design and sample	Method	Measurement tools	Conclusion
			<p>consisting of adolescents and parents who did not receive therapy.</p> <p>- Analysis statistical:</p> <ol style="list-style-type: none"> <li>1. analyzed descriptively was use to analyze Demographic characteristics</li> <li>2. chi-square and oneway analysis of variance (ANOVA) was to tested Comparisons among the four intervention groups</li> </ol>		
(Torres-Rodríguez, Griffiths, Carbonell, et al., 2018), Spain	this study was to assess the efficacy of a specialized psychotherapy program for adolescents with IGD [“Programa Individualizado Psicoterapéutico para la Adicción a las Tecnologías de la Información y la Comunicación” (PIPATIC) program].	- Experimental study - Age: 12-18 years old - N: 31	- Participants were divided into two groups: the intervention group and the control group. The intervention group received the PIPATIC Program and CBT, which consisted of 22 therapy sessions, each lasting 45 minutes per week. The therapy was conducted over a period of six weeks. The control group did not receive any intervention but was monitored psychologically. If the condition of participants in the group deteriorated during the therapy period, CBT would be administered. Analysis statistical: <ol style="list-style-type: none"> <li>1. non-parametric Mann-Whitney U test was use to compare the results of the treatment between the experimental group and the control group</li> <li>2. The Wilcoxon test was used in a post-hoc Friedman analysis to calculate the effect sizes regarding the changes via the temporal stages (pre- and post-measures)</li> </ol>	- Internet Gaming Disorder Test (IGD-20) - Achenbach System of Empirically Based Assessment - Youth Self-Report (YSR) - the Child Behavior Checklist (CBCL) - The Expressed Concern Scales of the Millon Adolescent Clinical Inventory (MACI) in its - The Trait Meta-Mood Scale (TMMS-24) - Social Skills Scale - Family relationships scale - The Working Alliance Theory of Change Inventory (WATOCI) scale	Based on the findings of this study, the PIPATIC program presented significant positive effects regarding the treatment of the IGD and its comorbid disorders/symptoms, alongside statistically significant improvements of intra- and interpersonal abilities and family relationships. However, it should also be noted that standard CBT also demonstrated positive significant effects in the treatment of IGD, but reductions regarding the most of the comorbid disorders and improvements in other areas of life functioning were not statistically significant.

The 11 articles in this systematic review had a total sample of 551 adolescent respondents. The articles discussed the implementation of therapy for the treatment of internet gaming disorder in adolescents. The results of the systematic review can be seen in Table 4 find that cognitive behavior therapy,

psychopharmacology therapy, family therapy, psychoeducation, and physical exercise can overcome the problem of internet gaming disorder in adolescents.

## **DISCUSSION**

Over the past 10 years, internet gaming disorder has been treated using several different therapies, namely cognitive behavior therapy, family therapy, psychopharmaceutical therapy, physical exercise, and psychoeducation. All of these therapies are effective in treating internet gaming disorder in adolescents.

### **Cognitive Behavior Therapy**

Cognitive Behavior Therapy (CBT) is a psychotherapy approach that focuses on how a person's thoughts (cognitions) and behaviors influence each other. CBT aims to help individuals identify, understand, and change unhealthy or unproductive thought patterns and behaviors so they can deal with problems more effectively. CBT is one of the most effective therapeutic approaches for treating IGD in adolescents. CBT helps individuals identify and change thought patterns and behaviors that contribute to IGD (Ji & Wong, 2023). Several studies indicate that CBT can help adolescents develop skills to control excessive gaming urges and replace them with healthier activities (Lampropoulou et al., 2022; Sravanthi et al., 2024).

CBT aims to change adolescents' thought patterns and behaviors that cause problems by using several strategies, including: cognitive restructuring, where adolescents learn to replace thoughts about gaming with healthier thoughts; and behavioral modification, which helps adolescents gradually reduce their gaming time using techniques such as creating alternative activity schedules (e.g., sports, reading, or other hobbies). This is supported by previous research on the implementation of the Self-Discovery Camp (SDiC), a camping activity without gadgets, featuring activities like outdoor cooking, a walk rally, trekking, and woodworking, which effectively addressed IGD behavior in adolescents (Sakuma et al., 2017).

Another technique in CBT is implementing a reward and consequence system to control gaming time using self-monitoring techniques, as well as problem-solving training techniques, which train adolescents to solve problems, as they previously used games as an escape from issues. CBT trains them to face life's challenges in a healthier way, such as learning to cope with stress through relaxation techniques, developing communication skills to make socializing easier, and boosting self-confidence without relying on the gaming world (Boonen et al., 2024).

CBT implementation is also combined with other therapies such as the PIPATIC program for treating IGD in adolescents. The purpose of implementing CBT in this therapy is to reconstruct adolescents' negative cognitive and behavioral patterns as causes and effects of IGD issues. The implementation of the PIPATIC Program and CBT is effective in addressing IGD, as evidenced by a reduction in symptoms and signs (Torres-Rodríguez, Griffiths, Carbonell, et al., 2018).

### **Family Therapy**

Family Therapy (FT) is a psychotherapeutic approach that involves all family members in the therapeutic process to overcome the problems faced by one of its members (Wang et al., 2024). The use of FT to address IGD in adolescents aims to improve family dynamics that may be contributing to the problem and help create an environment that supports positive change in adolescents or the adolescent IGD treatment process. Some research results state that FT can help overcome IGD problems in adolescents (Throuvala et al., 2019b). Family involvement as a form of social support, helping the ongoing treatment process as well as the role of supervision against excessive online gaming (Hermawan & Abdul Kudus, 2021). The importance of family involvement because the family is one of the factors adolescents experience IGD such as lack of communication and parental involvement in the child's life, permissive parenting that does not set clear limits to the use of Technology, family conflicts that make adolescents use games as an escape and lack of alternative

activities outside the game supported by the family (Nielsen et al., 2021). FT focuses on improving interaction patterns within the family to help adolescents reduce their dependence on games. Strategies that can be used in FT are improving family communication, setting healthy limits on the use of online games and time management for using online games, overcoming conflicts and improving harmonious relationships between families because online games can be a teenage escape from family conflicts, and FT can help encourage alternative activities in adolescents other than using online games, and can help develop positive coping in adolescents (Lo et al., 2020; Nielsen et al., 2022b).

The implementation of FT is also combined with several therapies, one of which is PIPATIC program to overcome IGD in adolescents. FT implementation aims to improve family communication relationships with adolescents as well as to improve the knowledge and skills of families in caring for adolescents who experience IGD. The results of research on the application of FT PIPATIC program proved effective in improving communication patterns of adolescents with families and increasing family knowledge in caring for adolescents with IGD problems, adolescents also decreased signs and symptoms of IGD (Torres-Rodríguez, Griffiths, Carbonell, et al., 2018).

### **Psychopharmaceutical Therapy**

Psychopharmaceutical therapy is the use of drugs to treat mental or behavioral disorders, including online gaming addiction. Psychopharmaceutical use can be used to help control symptoms associated with addiction, such as impulsivity, anxiety and depression (Song et al., 2016; Sravanthi et al., 2024). Psychopharmaceuticals help balance neurotransmitters in the brain, so that individuals are better able to control the urge to play games. Psychopharmaceutical therapy is usually given if IGD is accompanied by other psychological conditions such as: attention deficit and hyperactivity disorder (ADHD), depressive or anxiety disorders, obsessive-compulsive disorder (OCD) and inability to control impulses (impulse control disorder) (Park et al., 2016; Sakuma et al., 2017; Salvati et al., 2024).

Some classes of drugs used in psychopharmaceutical therapy to overcome IGD in adolescents are selective serotonin reuptake inhibitors (SSRIs) to overcome depression & anxiety. SSRIs drugs function to increase serotonin levels in the brain to reduce symptoms of depression and anxiety that often trigger game addiction, these types of drugs are Fluoxetine, Sertraline, Escitalopram (Song et al., 2016). The next drug is a type of stimulants that function to overcome ADHD and impulsivity, this drug works to increase dopamine and norepinephrine in the brain to increase attention and reduce impulsive behavior, this type of drug is methylphenidate (ritalin), amphetamine (adderall) (Park et al., 2016). The next drug is a type of Norepinephrine Reuptake Inhibitors (NRIs) that serves to overcome impulsivity & ADHD, the way this type of drug works is to increase norepinephrine levels to help control impulsive behavior without stimulant effects, this type of drug is Atomoxetine (Strattera) (Azzahra et al., 2024). The next type of drug is opioid antagonists that function to reduce the urge to play games, the way this drug works is to reduce the "reward" effect of playing games by suppressing the dopaminergic reward system in the brain, this type of drug is Naltrexone (Gour et al., 2022).

Although psychopharmaceutical therapy is effective to overcome IGD in adolescents, but there are some challenges and risks in its implementation, namely the side effects of drugs such as sleep disorders, loss of appetite, headaches, or mood swings, the risk of dependence, especially on stimulant drugs such as methylphenidate or amphetamine, problems in the long-term rfe are not fully understood, because research on drug therapy for gaming addiction is still limited, and does not address the root, because it only helps control symptoms without changing behavior (Azzahra et al., 2024).

### **Physical exercise**

Physical exercise or exercise has been shown to be effective in helping overcome IGD in adolescents (Aryani et al., 2024). Physical activity not only provides benefits for the health of the body but also plays a role in balancing brain function, reducing stress, improving self-control, and replacing gaming habits with healthier activities. Physical exercise works through psychological and physiological mechanisms, among others, improving the balance of brain neurotransmitters, namely stabilizing dopamine levels that increase due to excessive online gaming. Physical exercise also increases serotonin and endorphins to reduce feelings of anxiety, stress and depression that are triggers or causes of playing online games. In addition physical exercise helps improve the function of the prefrontal cortex, the part of the brain responsible for decision-making, impulse control, and planning (Henchoz et al., 2016; Hong et al., 2020; Lee & Huh, 2024).

Physical exercise can be a positive substitute, by providing pleasure and a sense of achievement similar to playing games and sports it also helps adolescents build social interactions in the real world that reduce dependence on virtual relationships in games (Warid et al., 2024). Some types of physical exercise that effectively overcome online game addiction in adolescents are: aerobic exercise (Cardio) such as Jogging, cycling, swimming, jumping rope. This exercise increases the production of endorphins that provide relaxation and happiness effects (Lee & Huh, 2024). The next physical exercise is Strength Training (Strength Training) which can aim to increase self-confidence for example lifting weights, push-ups, sit-ups, resistance training (Hong et al., 2020). The next exercise is team sports for example football, basketball, volleyball, badminton, these exercises have the benefit of teaching teamwork and social skills, which can replace virtual social interaction in the game and increase the sense of community and social support (Moge & Romano, 2020; Warburton et al., 2022). The next exercise is mindfulness such as yoga and tai chi, the benefits of this exercise is to increase self-awareness and reduce impulses to play games and help manage negative emotions that are often associated with gaming addiction (Xu et al., 2024).

Along with the development of technology, physical exercise therapy is increasingly developing in the form of virtual reality (VR). Physical exercise in the form of VR has an interest in teenagers in the form of a desire to break records, competition with opponents and other interesting visual elements such as playing games. Even in the form of VR, physical exercise does not have a significant difference with offline physical exercise which both have an impact on reducing symptoms of online game addiction in adolescents (Lee & Huh, 2024).

### **Psychoeducation**

Psychoeducation is an educative approach that aims to improve adolescents' understanding of the problems they face, including IGD. Through psychoeducation, teens and parents are provided with comprehensive information about the negative impacts of playing online games, time management strategies, as well as stress coping skills and building healthy habits. Psychoeducation not only provides understanding, but also equips individuals with practical tools and strategies to positively change their behavior (González-Bueso et al., 2018; Sakuma et al., 2017).

Psychoeducation raises awareness about IGD problems in adolescents. Teenagers who are addicted to gaming often don't realize they have a problem. With psychoeducation, they are given knowledge of the signs of IGD, ignore academic or social responsibilities and experience anxiety or anger when unable to play. With increased awareness, adolescents are more receptive to the need for behavioral change (Sakuma et al., 2017).

Psychoeducation teaches time management and self-control such as through methods of limiting gaming sessions, journaling or self-monitoring methods to record gaming time and methods of creating daily schedules to balance offline and online activities. Psychoeducation also helps adolescents develop healthy coping skills such as through breathing and relaxation exercises, developing alternative hobbies (e.g. sports, art, or reading) and problem-solving techniques to deal

with academic or social pressures (Renidayati, 2018; Safarina et al., 2024). Psychoeducation is also used as a therapy to overcome IGD problems in adolescents through PIPATIC Program. The use of psychoeducation has been shown to be effective in increasing adolescents' awareness of IGD problems, thereby increasing adolescents' enthusiasm to participate in other therapeutic programs in the PIPATIC program to overcome IGD (Torres-Rodríguez, Griffiths, Carbonell, et al., 2018).

Treatment of IGD in adolescents over the past 10 years has been carried out in various forms of action, all of which have proven effective. Some measures of IGD treatment in adolescents identified in this study are cognitive behavior therapy, family therapy, psychopharma therapy, physical exercise therapy and psychoeducation. Some of the above therapies are even carried out simultaneously to further increase the effectiveness of the desired therapy, such as the implementation of CBT with FT and CBT with psychopharmaceutical therapy. This study found that almost all of the implementation of therapy is done conventionally, namely patients who must meet directly with a therapist to obtain treatment. The implementation of therapy that is carried out or packaged online or VR-based is still very lacking to be developed and researched.

This study can serve as an appropriate reference for addressing internet gaming disorder through several therapies that have been described. There are many therapy options that can be used to address internet gaming disorder issues according to the patient's condition, so that internet gaming disorder issues can be resolved before they worsen. The limitation of this study is that only two databases were used, namely Scopus and EBSCO, so there is still a possibility that some articles discussing the treatment of internet gaming disorder were not identified. Nevertheless, these two databases are sufficient to illustrate the trends in addressing internet gaming disorder over the past decade.

## CONCLUSION

The results found that in the last 10 years cognitive behavior therapy, family therapy, psychopharmaceutical therapy, physical exercise therapy and psychoeducation have been used as therapy to overcome IGD in adolescents and proved effective. Even so, most of the implementation of such therapy is still carried out conventionally or offline in the last 10 years, so it is expected that further development and research related to the treatment of online or VR-based online gaming addiction.

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