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Comorbid Psychopathology In Internet Gaming Disorder

Francisco de Almeida Morais

Orientado por:

Prof. Doutor Marco Torrado

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RESUMO

A perturbação de jogo pela internet (PJI) foi reconhecida, em 2013, como uma potencial patologia psiquiátrica, de natureza aditiva, que requer investigação científica adicional pela Associação Americana de Psiquiatria. A literatura atual associa a PJI com diversas psicopatologias. No entanto, com base na evidência ainda não é possível clarificar totalmente a dinâmica dessas associações. O principal objetivo desta revisão foi explorar o estado atual da literatura para caracterizar comorbilidades associadas a PJI e descrever as relações entre elas. Foi feita uma pesquisa eletrônica da literatura com recurso à base de dados MEDLINE. Quarenta e oito artigos científicos (revisões e artigos de investigação original), datados de 2001 a 2021, foram revistos. PJI apresentou maior correlação com depressão, ansiedade, perturbação de hiperatividade e défice de atenção e perturbação obsessivo-compulsiva. O baixo número de estudos longitudinais identificados e os resultados nem sempre consensuais encontrados na literatura tornam complicado entender algumas destas associações bem como a sua relação causal, demonstrando a complexidade destas patologias.

ABSTRACT

Internet gaming disorder (IGD), in 2013, has been recognized by the American Psychiatric Association as a potential psychiatric condition, of addictive nature, that requires further scientific research. Current literature associates IGD with several other mental disorders. However, most studies fail to demonstrate how these associations function. The main purpose of this review was to explore the state of current literature characterizing comorbidities associated with IGD and describing the relationship between them. An electronic literature search was conducted through the MEDLINE database. Forty-eight research papers (reviews and original research articles), dating from 2001 and 2021, were reviewed. IGD is mostly correlated to depression, anxiety, attention deficit hyperactivity disorder (ADHD), and obsessive-compulsive disorder. Evidence showed IGD is much more prevalent in the male gender. The very low number of longitudinal studies identified, and the not always consensual results found in literature make understanding some of these associations and its causal relationship a complicated subject, evidencing the complexity of these disorders.

Key words: internet gaming disorder, psychopathology, comorbidity, addiction, video-gaming

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INTRODUCTION

Videogames have become an integral part of our society. Most players are known to indulge in gaming through a harmless manner (e.g., relieve stress, socialize, spend time), nonetheless maladaptive behaviors have been recognized among others. The formal features of a videogame are also predisposing to the development of an addiction. The combination of said factors culminate with decreased social functioning and well-being and, in some cases, may become an addiction¹.

Several defining components have been used to describe addiction²:

1. "Continued engagement in a behavior despite adverse consequences";
2. "Diminished self-control over engagement in the behavior";
3. "Compulsive engagement in the behavior";
4. "Appetitive/craving state prior to engaging in the behavior".

Currently is well-accepted addiction as a condition not limited to the abuse of psychoactive substances, also relating to behaviors such as gambling or gaming³. The only non-substance-related disorder included in the substance-related and addictive disorder section of the DSM-5 is gambling disorder⁴. However, behavioral disorders have been shown to be congruent with substance-related addictive behaviors in respect to clinical expression, comorbidities, neurobiological profile and inheritability, natural history and consequences, higher prevalence in adolescents and young adults, the presence of chronic and relapsing patterns, as well as recovery without formal treatment². Of the aforementioned conditions, the internet gaming disorder (IGD) is one with considerable literature⁴.

The DSM-5, in 2013, proposed IGD as a potential psychiatric condition that requires further scientific research⁵ and provides a thorough definition for it, shown on table 1⁴. In 2018, the World Health Organization included "Gaming Disorder" in the International Classification of Diseases where it is defined as a "pattern of persistent or recurrent gaming behavior ('digital gaming' or 'video-gaming'), which may be online (i.e., over the internet) or offline, manifested by (1) impaired control over gaming (e.g.,

onset, frequency, intensity, duration, termination, context); (2) increasing priority given to gaming to the extent that gaming takes precedence over other life interests and daily activities; and (3) continuation or escalation of gaming despite the occurrence of negative consequences. The pattern of gaming behavior may be continuous or episodic and recurrent. The pattern of gaming behavior results in marked distress or significant impairment in personal, family, social, educational, occupational, or other important areas of functioning. The gaming behavior and other features are normally evident over a period of at least 12 months in order for a diagnosis to be assigned, although the required duration may be shortened if all diagnostic requirements are met, and symptoms are severe⁶.

Internet Gaming Disorder | Proposed Criteria

Persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress as indicated by five (or more) of the following in a 12-month period:

1. Preoccupation with Internet games. (The individual thinks about previous gaming activity or anticipates playing the next game; Internet gaming becomes the dominant activity in daily life).

Note: This disorder is distinct from Internet gambling, which is included under gambling disorder.

2. Withdrawal symptoms when Internet gaming is taken away. (These symptoms are typically described as irritability, anxiety, or sadness, but there are no physical signs of pharmacological withdrawal.)

3. Tolerance—the need to spend increasing amounts of time engaged in Internet games.

4. Unsuccessful attempts to control the participation in Internet games.

5. Loss of interests in previous hobbies and entertainment as a result of, and with the exception of, Internet games.

6. Continued excessive use of Internet games despite knowledge of psychosocial problems.
7. Has deceived family members, therapists, or others regarding the amount of Internet gaming.
8. Use of Internet games to escape or relieve a negative mood (e.g., feelings of helplessness, guilt, anxiety).
9. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of participation in Internet games.

Note: Only nongambling Internet games are included in this disorder. Use of the Internet for required activities in a business or profession is not included; nor is the disorder intended to include other recreational or social Internet use. Similarly, sexual Internet sites are excluded.

Table 1. DSM-5 proposed criteria for Internet Gaming Disorder⁴

IGD is most often associated with internet-based games, however it can also be related to offline games⁴. Gamers who indulge in online gaming have four times the potential to score higher on IGD as compared to offline gamers⁷.

Both IGD and substance use are suspected to share similar neurocognitive deficits⁷. More, a similar array of personality traits has been described in adolescents who gamble, play videogames and engage in the pathological use of substances⁸.

Global epidemiological surveys have calculated IGD to have a prevalence of about 0,3-4,9% in the general population^{9,10,11}. Higher prevalence rates were observed among adolescents and young adults^{12,13}. In these age groups, prevalence is estimated to be between 2,7 and 10,3% in different locations⁹. Also, estimates predicted that 8% of young adults who played videogames met the IGD criteria¹⁴. Higher rates of IGD have been documented in Asian countries, especially China and Taiwan⁹. Males are also more prone to develop IGD compared to females, in a rate of about 2.5:1^{1,10,15}. In Portugal

few epidemiological data is available, but estimates predict that 5,5% of the general population in a typical school day engage in 6 or more hours of gaming, compared to 16% in a non-school day. Also, males were ten times more likely to spend more than 6 hours a day gaming, both in school and non-school days¹⁶. The prevalence of IGD in Portugal is about 5,2% for the general population with the most affected age group being 15-24 years, where it can reach 10,6%¹⁷.

These life-time stages are associated with higher susceptibility to engaging in addictive behaviors, given that they are correlated with an increased number of stressors and environmental demands⁵. At this stage, many biological, mental, and social changes occur and could trigger detrimental behavior patterns faster and with higher intensity as opposed to other stages of life¹⁸.

Several risk factors for IGD have been identified: time spent playing, poor social and cognitive competence and low self-esteem, poor impulse control, increased sensation-seeking, increased narcissist or impulsive personality traits, high state and trait anxiety, previous truancy and few leisure activities^{1,19}.

Specific characteristics such as anguish, personality traits and severe psychological distress are shared by many technology-related behaviors with the potential to become addictive. A secure attachment is considered a protective factor against behavioral addictions, however anxious and avoidant types of attachment were positively correlated with these morbidities. Attachment and parental bonding are fundamental in determining the abilities, resources and skills a person will develop in order to cope with everyday adversities. Insecure attachment styles also predicted internet abuse⁸.

IGD is associated with several comorbidities²⁰. These psychopathologies co-occurring with addictive behaviors might be the consequence of an established condition or, alternatively, potentially generate further issues²¹. Three possible combinations arise from these associations: a specific mental disorder may influence the development of IGD; IGD diagnosis and its negative consequences facilitate the development of comorbid psychiatric disorders; or both problems share biological, sociodemographic, or psychological mechanisms making people more susceptible to both pathologies²¹.

Public perception constrains the amount of knowledge in these behavioral disorders, as its consequences (incarceration, family disfunction, early school dropouts and financial troubles) often go overlooked, in contrast to the well-known and severe consequences we commonly observe in substance-use addictions².

The main purpose of this review was to explore the state of current literature summarizing and characterizing the most prevalent comorbidities associated with IGD and describing found relationships between both.

METHODS

A research of the Anglo-Saxon literature was carried out through the MEDLINE platform using the following keywords, isolated or combined: “internet gaming disorder”, “comorbidity”, “addiction”, “video-gaming”. From the pool of articles searched, some were excluded based on the following criteria: articles related to other pathologies (e.g., gambling), studies focused only on prevention and/or treatment; authors reporting results on phenomenon such as motivation to play video games, decision-making, stress, lifestyle, impulsivity and sexual attitude, without reporting other psychiatric comorbidities. There was no time limit for inclusion and studies referenced in the selected articles were also considered.

Forty-eight research papers were selected and reviewed, dating from 2001 to 2021, comprising eight reviews, thirty-four cross-sectional studies, and six longitudinal studies. Additionally, two textbooks were consulted, the DSM-5 and the ICD-11, for their important contribution in understanding key topics concerning psychopathology.

RESULTS

Many comorbidities have been identified to be related with IGD²⁰. Increased risks for psychopathologies and self-harming behaviors were demonstrated in a population of pathological internet users, gamers and non-gamers, when compared to normal internet users²².

Video game addicts tend to report poorer indicators of mental and physical health¹. Though physical health is not the topic of this work, it is relevant to highlight some aspects, such as when compared to non-addict individuals, IGD patients revealed similar body mass indices¹ and no correlation between problematic gaming behavior and being overweight was established^{1,29}.

Sleep disturbances were prevalent among IGD patients^{1,30}, as gaming may interfere directly with sleep and sleep patterns among excessive consumers of videogames¹.

In adolescents, eye strain and potential permanent vision impairment can be a result of continuous staring at computer screens³¹. Some reported chronic pain⁷, especially of the back and joint³¹, given the predisposing factor of extended sitting with fewer breaks than recommended³¹.

In the same context, some relevant data concerning gender differences is worth noting. IGD was highly associated with adolescent male gender^{13,18,35,37}, usually gaming more frequently and for longer periods⁷. Male gender was also a solid predictor of symptoms increase²².

Female patients presented with aggressive, hyper-masculine and gender atypical behavior as well as more somatic disturbances than males¹. Although, tending to reach fewer problematic states of addiction when compared to males, females were more prone to showcase higher levels of impulsivity²⁰ and more comorbid mood disorders²⁶.

In the male gender, an association between problematic gaming and nonwhite and Asian race was found, but the same did not apply to females³⁷.

| NEURODEVELOPMENTAL AND EMOTIONAL REGULATION FEATURES |

Patients with IGD displayed poorer overall cognitive functioning and higher levels of depression, anxiety, aggressive behaviors¹. Also, adolescents show more antisocial behavior, anger control problems, emotional distress, and self-esteem problems²³.

Pathological gamers also displayed executive impairment such as: (1) reduced impulse control^{1,24}; (2) diminished inhibitory control when presented with game-related stimuli²⁵, and (3) deficits in decision-making under risk where observed, nevertheless when tested for decision-making under ambiguity these individuals performed well²⁵.

It was suggested that IGD patients showed reduced comprehension skills compared with a healthy control²⁶.

Several personality traits were found to be highly associated with IGD including neuroticism, impulsivity and introversion, and lower levels in agreeableness, cooperativeness and self-regulation²⁷. Associations between IGD and boredom inclination, sensation-seeking, and schizoid traits have also been reported²⁸. Lower self-responsibility is presented as a risk factor for IGD, and low levels of self-directedness were predictors of an increased use of videogames in an adult population with gambling disorder²⁷.

| OTHER ADDICTIVE BEHAVIORS |

Problematic use of video games has been associated with an earlier onset of substance use and an earlier onset of consumption (alcohol, tobacco, and cannabis) was found to be a risk factor of problematic gaming behavior³².

Individuals who drink alcohol, smoke cigarettes or use cannabis were twice as likely to presenting with high scores on IGD⁷. Those who smoke cigarettes also presented more time playing video games than non-smokers³². Adolescents who play video games consume significantly more alcohol than non-video gamers, the same did not apply to tobacco or cannabis consumption³². Longer hours of internet gaming were

associated with less consumption of alcohol among men, but more consumption of alcohol among women³³.

Others found no association for tobacco and alcohol use with pathological gaming. However, they found all types of addictive behavior to be positively correlated, indicating that students presenting with one kind of addictive behavior have increased chances of showing another³⁴.

| PSYCHOSOCIAL ASPECTS AND WELL-BEING |

IGD was associated with increased social isolation and feelings of loneliness^{1,23}. Moreover, both social vulnerability^{22,29,30} and loneliness²³ were predictors of pathological gaming. Also, it was found that excessive gaming can jeopardize significant relationships²³, with some indicating familial difficulties and disharmony³⁹, and marital difficulties³⁵.

Lower satisfaction with life²² and social anxiety were positively associated with a preference for online socialization²⁹, which presented ineffective in controlling feelings of loneliness³⁶.

Problematic internet pornography use also correlated positively with IGD¹.

Emotional problems (depression and anxiety), hyperactivity (attention and goal prosecution problems), and behavioral problems (difficulties in impulse control and interpersonal conflicts) showed the most prominent correlation with IGD³⁶.

-DISTRESS, ANXIETY AND AFFECTIVE DISORDERS-

Emotional dysregulation has been highlighted as a relevant contributor for IGD and Depression is one of the most prevalent comorbidities³⁹.

Depressive symptoms and lower self-esteem were more common in IGD patients than in healthy controls⁴⁰, with the first also being a significant predictor of the

disorder^{29,40}. Individuals who presented with more severe forms of addiction correlated with higher indices of depression and anxiety³⁰.

Others found that anxiety was a negative contributor to IGD, but for depression the associations were reversed. However, it showed that depression had a much sounder correlation with IGD when compared with addictive social networking⁴¹.

Among adolescents, IGD is a mediator of depression and anxiety levels⁴². Patients with lesser scores on IGD demonstrated higher levels of approach coping and diminished levels of depression and anxiety. Contrarily, those presenting higher scores on IGD expressed an augmented use of avoidance coping and higher level of depression, anxiety and stress⁴³.

Depression and anxiety were also found to mediate the association between IGD and quality of life, which begins with IGD, then development of depressive symptoms and lastly a decrease in the quality of life. During the COVID-19 pandemic, it was suggested that depression and anxiety levels, among adolescents, were powerful mediators in the association between IGD, insomnia².

A longitudinal study reported both depression and anxiety symptoms had their onset after the pathological gaming began, however no causal relationship could be established⁴⁴.

-ATTENTION DEFICIT HYPERACTIVITY DISORDER-

Attention deficit hyperactivity disorder (ADHD) is considered a risk factor for substance and behavioral addictions and has been positively associated with addictive technological behaviours⁴¹. It has also been correlated with the prognosis of addictive disorders, given it can make the transitioning to addiction develop faster and occur for longer periods²⁴.

ADHD was found to be a prime comorbid disorder of IGD among young adults²⁴. Probable IGD was observed 3,34 times more among those with probable ADHD in comparison to individuals without ADHD⁴⁵.

The amount of time spent playing correlates positively with the increase in attention problems⁴⁶, furthermore more attention problems can predict the worsening of IGD symptoms²².

One study showed that when controlling for variables such as aggression and negative affect, the presence of probable ADHD was still a factor in the severity of IGD⁴⁷. Additionally, aggression and negative affect were also considered in the severity of IGD, making an individual who presents a combination of the three aspects highly susceptible to IGD⁴⁷.

Another research linked probable ADHD to increased severity of IGD^{24,26} and higher neuroticism levels, but extraversion was lower⁴³.

-OBSESSIVE-COMPULSIVE SPECTRUM-

Obsessive-compulsive disorder (OCD) is another psychiatric disorder which seem to support a predisposing environment for addictive behaviors development⁴¹.

OCD has been described to share many common factors with other internet-related disorders⁴¹. Obsessive-compulsive symptoms were shown to be highly predictive of internet addiction⁴⁸.

When comparing IGD with OCD, both display impaired response inhibition of interfering stimuli and cognitive inflexibility⁴⁹. Focusing on impulsivity and compulsivity, both IGD and OCD present patterns of behavioral repetition associated with impairments in function⁴⁹.

A German study found that impulsivity was a common ground for behaviors such as substance use, gambling and game playing, explaining it is a core aspect of substance use disorders and may potentiate the development or maintenance of excessive behavioral patterns³⁴.

DISCUSSION

The main purpose of this review was to explore the state of current literature summarizing and characterizing the comorbidities associated with IGD and describing the relationship between both. This seems to be pivotal to better understand IGD as a well-determined clinical entity.

The comorbidities most prominently highlighted as associated with IGD were anxiety, depression, ADHD, and OCD.

Depression is consistently appraised as an IGD risk factor though it is still not clear how this relationship functions. There is no concrete evidence as to if and how much this is a bidirectional relationship. The strong link between IGC and escapism³⁹ sheds some light on how gamers indulge in gaming to escape and cope with depressive or anxiety symptoms, indicating IGD to be the result of a maladaptive coping strategy or a dissociative strategy. This clinical aspect may also be modulated by personality and neurodevelopmental characteristics as some literature pointed out⁴³ which needs more research.

Regarding ADHD, it is associated with a proneness to developing addictions. Impaired impulse control and/or coping with restless thoughts and behaviors⁴¹ could be associated with the indulgence in problematic gaming behavior.

In people with OCD proneness, some addictive behaviors (such as IGD) might emerge as a coping mechanism for OCD symptoms, or, in some cases, an OCD-related behavior may over time become addictive.

In contrast with the previous results some authors have found only partial or no associations with depression, anxiety and ADHD⁵⁰. Nonconsensual results combined with eventual publication bias complicate the understanding of these relationships and their directionality, highlighting the complexity of comorbid psychopathology in IGD.

The fact that very few longitudinal studies have been performed is also a limiting factor for better understanding whether a specific psychiatric disorder supports the development of IGD, or a person diagnosed with IGD later develops a comorbid

psychopathology, or both problems overlap in biological, sociodemographic or psychological mechanisms, making people vulnerable to both conditions.

Most evidence suggests a higher prevalence of IGD in males, with females reporting playing less and having less affinity for competition games. Furthermore, in males, problematic gaming might increase the probability of comorbid states but the same might not apply to the female gender.

LIMITATIONS

This review has limitations that need to be mentioned. To this day, very few longitudinal research has studied the causal relationship between IGD and comorbidities. The relationship of such associations and its directionality is a complicated subject given that existing literature shows contradictory results as well as a possible publication bias. Furthermore, other variables (game genre, online vs offline games) should also be more explored as to how they might influence the presentation of IGD and its comorbid states.

Information on IGD primarily comes from Asian countries, where most studies are performed. However, more and more countries are turning their focus towards this disorder but still with few extensive research data. IGD in the Portuguese population is also very limited, which means these results might not reflect some European realities and, particularly, Portuguese context.

Lastly, narrative reviews can give a comprehensive perspective on specific topics, however a lack of systematic selection of studies could lead to biased interpretation of results.

CONCLUSIONS

There has been a great amount of research concerning the potential for video gaming to become a disorder. Its potential harms have suggested that it is an important condition from a developmental perspective, given it is most prevalent in adolescence and young adulthood.

Currently research is not completely consensual on how prevalent it is, and how harmful it can potentially be. Several mental disorders have been associated with IGD, mainly affective regulation one, making it important to better understand these relationships in order to establish if it should be classified as a behavioral addiction or in another context. Excessive use of videogames is associated with the neglect of sleep, hobbies and social life which, in some cases and if prolonged, can become very detrimental.

In order to learn the natural course of this disorder as well as precipitating and protective factors more longitudinal studies need to be performed. The identification of IGD comorbidities is a key factor for health professionals to be able to develop a clinical formulation and informing treatment strategies for the patients and their families. Moreover, this knowledge may be relevant for domains of health and education, regarding the increase of mental health literacy.

Researchers also need to converge and make sure that all are studying the same disorder. In fact, valid and reliable psychometric measures are few and recent, needing more research. At the same time, knowledge on similar pathologies should be considered and applied on research and clinical settings as it could improve outcomes for people living with or susceptible to develop IGD.

Finally, this review highlighted persistent doubts on whether excessive use of videogames is a unique condition or instead the manifestation of an underlying psychopathology which is perceived as something new.

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