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VIEWPOINT

Heterogeneity of gaming disorder: A clinically-based typology for developing personalized interventions

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ABSTRACT

Background: The eleventh revision of the *International Classification of Diseases* (ICD-11) defines the three key diagnostic criteria for gaming disorder (GD). These are loss of control over gaming, gaming as a priority over daily activities, and impaired functioning due to gaming. While this definition has implications for the prevention and treatment of GD, there is significant heterogeneity in the symptoms and etiology of GD among individuals, which results in different treatment needs. Cognitive control, emotional regulation, and reward sensitivity are three critical dimensions in the etiology model for GD. Aspects such as gender, comorbidity, motivation for gaming, stage or severity of GD, and risk factors all contribute to the heterogeneity of etiology among individuals with the disorder. *Method:* On the basis of clinical symptoms and comorbidity characteristics among approximately 400 patients with gaming disorder, the present paper proposes a clinical typology of patients with GD based on the authors' clinical experience in treating individuals with GD. *Results:* The findings indicated three common types of patients with GD: (i) impulsive male patients with attention deficit hyperactivity disorder (ADHD), (ii) dysphoria patients with dysfunctional coping skills, and (iii) isolated patients with social anxiety. The paper also discusses the presentation and treatment priority for these patients. *Conclusion:* Personalized treatments for patients with GD should be developed to fit their individual needs. Future studies should examine the heterogeneity of GD and confirm these types, as well as obtain evidence-based information that can help in the development of personalized treatment. Treatment resources should be developed, and professionals should be trained to provide integrated individualized treatment.

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KEYWORDS

typology of gaming disorder, personalized treatment, heterogeneity, cognitive control, emotion regulation, reward sensitivity, comorbidity

INTRODUCTION

Emerging empirical evidence indicates that the worldwide mental health impact and treatment demand of gaming disorder (GD) are driving a need to establish practical diagnostic criteria for identifying individuals who require therapeutic help (Reed et al., 2022). The eleventh revision of the *International Classification of Diseases* (ICD-11) defines GD as a loss of control regarding gaming behavior, which takes precedence over essential daily activities and has negative consequences, including functional impairment (World Health Organization, 2019). The *ICD-11* GD criteria provides a practical means of diagnosing GD so that effective treatments can be administered (Billieux et al., 2017; Ko, Lin, Lin, & Yen, 2020; Müller et al., 2022). Kuss, Pontes, and Griffiths (2018) and Dong and Potenza (2014) reported that cognitive control function (Heuer, Mennig, Schubö, & Barke, 2021), emotional regulation ability, and reward sensitivity (Wang et al., 2021; Zhou et al., 2021) are three domains that play important roles in the development of GD. However, Ko, Lin, Lin, and Yen (2020) highlighted the heterogeneity in the etiology of GD and suggested that this heterogeneity could mean that personalization is required in terms of interventions and treatment.

PERSONALIZED TREATMENT

The aim of personalized medicine is to identify the treatment with the best outcome for the individual (Cutter & Liu, 2012). Personalized treatment of psychiatric disorders is determined by individual factors, clinical characteristics, and biological markers (Simon & Perlis, 2010). Consequently, comprehensive data from research on the heterogeneity of a disorder are essential to implement relevant treatments that are bespoke to the individual. Because genetic data for GD are very limited (Yen et al., 2022), the optimal individualized treatment for GD may be dependent on clinical characteristics (Sharman, Roberts, Harris, Lockwood, & Bowden-Jones, 2022).

FACTORS AFFECTING THERAPEUTIC TREATMENT OF GAMING DISORDER

Impulsivity (Gentile, Swing, Lim, & Khoo, 2012), lack of deliberation, and risk-taking potential (Ko et al., 2017) may contribute to a person's loss of control during gaming, underlining the cognitive control impairment of individuals with GD (Dong & Potenza, 2014). This impairment prevents them from stopping gaming when they need to perform other tasks. Therefore, cognitive control impairment may be a critical factor in developing GD (Gentile et al., 2012).

High emotional vulnerability, impaired emotional regulation (Kuss et al., 2018), frustration intolerance (Lin, Yen, Lin, & Ko, 2021; Yu, Mao, & Wu, 2018), and inadequate coping ability or resilience (Lin, Yen, Lin, & Ko, 2021) can lead to depression, anxiety, or irritability among patients with GD, as negative consequences of excessive gaming. This impairment makes individuals continue their gaming. The bidirectional interaction between negative consequences and emotional difficulties may lead to a vicious cycle. Therefore, this aspect may form one of the key factors in the continuance of GD and relapse under stress.

The reward sensitivity for and expected reward from gaming may contribute to a weak reward response to daily activities other than gaming (Zhou et al., 2021). Consequently, individuals might prefer gaming rather than meeting their responsibilities in life, such as educational and/or occupational tasks, as well as other leisure time activities (Criterion 2 of the ICD-11-GD definition). This may result in anhedonia when not gaming (Yen et al., 2022), engaging in gaming to overcome boredom, and leading to procrastination of daily activities (Yeh et al., 2017), which may prevent individuals with GD from performing any alternative activities. This inadequate motivation in daily life could be a key issue underlying individuals' resistance to treatment, resulting in an isolated life. Restoring a rewarding response to daily life activities other than gaming is essential in helping an individual with GD recover from the disorder. Therefore, treatments should address these three aspects in the etiology of GD as well as the various stages of development and maintenance of GD.

From a clinical perspective, heterogeneity can arise from various factors including (but not limited to) gender (Dong & Potenza, 2022), comorbidity (González-Bueso et al., 2020; Ko et al., 2021), motivation for gaming (Király et al., 2022), stage or severity of the disorder (Granero et al., 2021), age, region (Kim et al., 2022), and other risk factors (such as impulsivity) (Jeong et al., 2021). For instance, males with GD are more likely to be impulsive compared to females with GD, whereas females with GD are more likely to be lonely, have mood problems (Dong & Potenza, 2022), and play videogames to avoid everyday problems (i.e., escape motive; Király et al., 2015, 2022). Comorbidity is perhaps the most familiar aspect that clinicians have to address regarding the heterogeneity of GD. The mechanisms underlying psychiatric comorbidities include self-medication (i.e., self-intervention for psychiatric symptoms; Khantzian, 1987), negative consequences (i.e., psychiatric symptoms resulting from GD), a shared mechanism (i.e., common mechanism underlying the association), and bi-direction (i.e., conditions affecting each other; Huang, Liu, Su, Lin, & Ko, 2016). These four mechanisms may determine which disorder should be treated with priority. For example, a self-medication model might suggest that a major depression episode should be treated prior to GD because of its primary role and clinical severity. An individual's motivation for gaming, such as immersion/escapism or habit/boredom, plays a role in the psychological mechanisms that lead to the development and maintenance of GD (Király et al., 2022). According to previous studies, depression (e.g., Gentile et al., 2012; Ostinelli et al., 2021) and impulsivity (e.g., Kim et al., 2019; Şalvarlı & Griffiths, 2021) are two of the most evaluated factors of GD. They have been associated with GD differently on the type of comorbid psychiatric disorder. For example, impulsivity appears more in

the comorbidity with ADHD (Cabelguen et al., 2021) and depression is more severe among those individuals with GD who have a comorbid depressive and/or anxiety disorder (Ko et al., 2021). These factors are all essential in determining the heterogeneity of GD.

TYPES OF PATIENTS WITH GAMING DISORDER

This paper presents a new clinical typology of disordered gaming by pooling clinical data from approximately 400 patients with GD over the past ten years from psychiatric outpatients' clinics in Taiwan and Japan. The diagnoses of GD were typically based on clinical interviews using the DSM-5 (American Psychiatric Association, 2013) as these were the only criteria available from 2013. Since 2019, the ICD-11 criteria (WHO, 2019) have also been incorporated into the clinical interviews. There are two studies that have demonstrated the similarity between the two sets of criteria (Higuchi, Nakayama, Matsuzaki, Mihara, & Kitayuguchi, 2021; Yen, Lin, Wu, & Ko, 2022). Approximately 80% of the patients were male, approximately three-quarters were under 18 years of age, and approximately two-thirds were high school students. Psychiatric comorbidities (i.e., ADHD, depressive or social anxiety disorder) among patients were assessed by psychiatrists using the DSM-5 criteria of the respective disorders. Based on these clinical evaluations, the present authors propose three types of patients with GD: (1) impulsive male patients with attention deficit hyperactivity disorder (ADHD); (2) dysphoria patients with dysfunctional coping skills; and (3) isolated patients with social anxiety. There appear to be other types as well, such as patients with psychotic disorders or autism spectrum disorder (Torres-Rodríguez, Griffiths, Carbonell, Farriols-Hernando, & Torres-Jimenez, 2019). Treatment regarding these latter types is determined predominantly by the nature of the psychotic or autistic disorder, and therefore it is not discussed here.

The first type involves impulsive male patients with ADHD. They are characterized by impulsivity and irritability (Ko et al., 2021; Torres-Rodríguez et al., 2019; Yen et al., 2017) and are partly similar to the impulsive/aggressive type of GD reported by Lee, Lee, and Choo (2017). The onset of ADHD before the age of 12 years (APA, 2013) usually precedes that of GD. The attention deficit usually impairs individuals' daily life functions but preserves their performance in gaming (Bioulac et al., 2012). Individuals with ADHD are prone to respond to small, immediate rewards over valuable, delayed incentives (Modesto-Lowe, Chaplin, Soovajian, & Meyer, 2013). Therefore, they are motivated by pleasure from achievement in gaming (Morsink et al., 2017). However, the accompanying impulsivity makes it difficult for them to control their gaming despite repeated negative consequences. Their risk-taking and inadequate deliberation attenuate their motivation to change (Pollak, Dekkers, Shoham, & Huizenga, 2019). Pharmacological or behavioral interventions in treating the attention deficit and promoting cognitive control and deliberation are required as an initial step before the patients' gaming symptoms can be alleviated. Improvement in impulse control and executive ability will benefit remission from addictive gaming. Fortunately, individuals with ADHD respond relatively positively to treatment (Martín-Fernández et al., 2016) because they are usually likely to pursue alternative activities suggested during the intervention process based on the authors' clinical experience.

The second type involves dysphoria patients with dysfunctional coping skills. Although research is not conclusive, it is most likely that the interaction between depression and GD is bidirectional (Huang et al., 2016; Teng, Pontes, Nie, Griffiths, & Guo, 2021). Individuals with GD will likely experience negative consequences in their occupation, education and/or personal relationships (Ko, Király, Demetrovics, Chang, & Yen, 2020). They have low frustration tolerance (Lin, Yen, Lin, & Ko, 2021), low resilience, and dysfunctional coping skills (Lin, Yen, Lin, & Ko, 2021) when facing these problems. Because gaming is usually the most readily available way of coping with stress for individuals with GD (Lin, Yen, Lin, Chou et al., 2021), an aggressive interruption of gaming could result in serious reactions, such as extreme irritability or self-harming behaviors, in the case of such individuals. If their mood is not sufficiently improved or they do not cope well with stress, they could experience a vicious cycle and remain caught in depression and GD. Therefore, if depression reaches clinical significance or is associated with suicidal risk, interventions for depression, such as antidepressants, should be provided as soon as possible. Psychotherapy, such as emotion regulation therapy, which promotes emotional regulation and offers functional coping strategies, could buffer stress regulation (Renna, Quintero, Fresco, & Mennin, 2017). These interventions could help the patient with GD manage their stress during abstinence from gaming (Yen et al., 2022).

The third type comprises isolated patients with social anxiety. These patients usually exhibit strong behavior inhibition and sensitivity to aversion (Wang et al., 2017). Because they experience less anxiety online than offline (Yen et al., 2012), they tend to withdraw from the real world and enjoy online gaming. This is similar to a phenomenon known as "hikikomori" (Kato, Shinfuku, & Tateno, 2020) that is associated with internet addiction in Japan (Tateno et al., 2019). These individuals usually have a cooperative attitude and have insight into their problems in the authors' clinical experience. However, they experience difficulty regarding change because of the anxiety associated with change itself, resulting in an unalterable course of GD. Moreover, both treatments for anxiety and a rehabilitation program, including social skills training or job coaching, are required to find alternative goals in their daily lives and eventually treat their GD.

CHALLENGES AND FUTURE DIRECTIONS IN IMPLEMENTING PERSONALIZED TREATMENT

There are specific challenges in implementing personalized treatment for GD. The evidence-based information available

for determining the appropriate treatment is very limited (King et al., 2017; King, Wölfling, & Potenza, 2020). Case studies (such as those outlined by Torres-Rodríguez et al., 2019) are necessary to demonstrate the clinical characteristics, such as the course of the disorder or gaming motivation of a specific type of patient (Tateno & Kato, 2022). Additionally, a classification analysis with large clinical and research samples is required to support the heterogeneity of GD. Case-control studies could examine the etiology, negative consequences, and treatment needs for specific types of patients with GD. Cross-cultural studies could identify the similarities and differences of each type of patient with GD in different cultures. For example, evaluating hikikomori (Tateno et al., 2019) among isolated patients experiencing GD with social anxiety (the third type) in Japan. Classification theories should be proposed based on clinical experience and empirical research evidence (Lee et al., 2017). Lastly and most importantly, individualized treatment studies for specific types of patients with GD should be conducted to provide the best solutions for identifying the best treatment.

An integrated team of multidisciplinary professionals is essential but usually unavailable to provide a personalized treatment plan. Mental health professionals, such as psychiatrists, psychologists, social workers, and occupational therapists, should participate in the work related to GD based on a reasonable referral system, such as Screening, Brief Intervention, and Referral to Treatment based on the ICD-11 GD criteria (Yen et al., 2022). They should collaboratively work with other health providers, educators, and volunteers in the community to address the functional impairment caused by GD. Therefore, training, communication, and collaborative work for multidisciplinary professionals should be developed. The services for medication, psychotherapy, family therapy, rehabilitation programs, and supportive systems should be integrated. Consequently, all these services could be provided to satisfy the individualized needs of patients with GD.

CONCLUSION

Despite the aforementioned limitations of personalized treatment, patients with GD require treatment that corresponds to their needs. The etiology of their GD, psychiatric comorbidities, stage of the disorder (severity, course, and insight of the patient), gaming motivations, and personal characteristics should be assessed to determine the optimal treatment. A treatment model and resources should be developed to satisfy the needs of individuals with GD. Future studies focusing on the heterogeneity of GD would contribute to the development of personalized treatment.

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