

Pathological gambling – addiction or impulse control disorder?

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Summary: Pathological gambling is the most widespread and severe form of non-chemical addiction. It is challenging to categorize pathological gambling into just one category, ie. into a disorder characterized by impulsivity or into behavioral addiction, since there are obvious overlaps. With the above in mind, the changes within the latest Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and the eleventh revision of the International Classification of Diseases (ICD-11) are not surprising. Although not listed in the diagnostic criteria, impulsivity and neuropsychological deficits are an integral part of gambling disorder. For this reason, they are essential for a more complete understanding of the profile of pathological gamblers. The strongest arguments in favor of the reclassification of pathological gambling under the category of addiction are: similarities with the diagnostic characteristics of addiction to psychoactive substances (PAS); high degree of comorbidity between these two disorders; their common features including aspects related to the reward system; findings that the same brain structures are involved in both disorders. There are similarities in the way gambling disorders are reclassified within DSM-5 and ICD-11. As in DSM-5, pathological gambling is recognized as a form of addiction. In ICD-11, it was renamed gambling disorder and classified as behavioral addictions. The latest revisions of both classifications (DSM and ICD) have the same development path and essentially the same foundations, and a change in the perception of gambling within diagnostics is clearly visible. Pathological gambling is a very complex disease that is accompanied by neuropsychological deficits and impulsive behavior, both characteristic of addicts and people with impulse control disorders. Reclassification is significant for several reasons. First, there are similarities with the diagnostic characteristics of chemical addiction. Second, there is a high degree of comorbidity between impulse control disorders and addiction. Third, both involve the reward system and activate the same parts of the brain. It is assumed that these similarities led to the reclassification in both DSM-5 and ICD-11. It is still not entirely clear how this change in the perception of gambling within diagnostics will affect the actual treatment of pathological gambling.

Keywords : pathological gambling; behavioral addiction; impulsiveness; ICD classification; DSM classification

Introduction

Pathological gambling is the most prevalent and severe form of non-chemical addiction. Considering the risk factors and consequences of pathological gambling, it is taken as the main representative of all non-chemical addictions. Addictions are often characterized as forms of impulsive behavior, but it is important to mention here that the concept of impulsive behavior is layered and includes different psychological domains. It is challenging to categorize pathological gambling into just one category, ie. into a disorder characterized by impulsivity or into behavioral addiction, since there are obvious overlaps. Historically, pathological gambling has long been viewed as an

impulse control disorder, but has recently been reclassified as a behavioral addiction. Unlike chemical addictions, this type does not involve substance consumption. There is a compulsion to repeat the act of gambling despite the obvious negative social, family, professional and health consequences. With the above in mind, the changes within the latest classifications are not surprising. Although not listed in the diagnostic criteria, impulsivity and neuropsychological deficits are an integral part of gambling disorder. For this reason, they are essential for a more complete understanding of the profile of pathological gamblers.

Classification according to DSM

In 1980, pathological gambling was first introduced as a separate psychiatric entity in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-3) of the American Psychiatric Association (APA) [1]. In the next edition, DSM-4 characterized it as impulse control disorder not elsewhere classified together with pyromania, kleptomania and trichotillomania [2]. Pathological gambling within DSM-4 is considered if five or more of the following criteria are met:

1. preoccupation with gambling;
2. the need to gamble with increasing amounts in order to achieve the desired excitement;
3. there are previous unsuccessful attempts to control, reduce and stop gambling;
4. trying to reduce gambling leads to tension and anxiety;
5. gambling is used as an escape from problems and from a dysphoric mood (eg feelings of powerlessness, guilt, anxiety, depression);
6. turning to gambling as a way to recover previously lost money;
7. lying to friends, family and therapists as part of minimizing the problem;
8. resorting to criminal acts such as forgery, fraud, theft or embezzlement in order to obtain money for further gambling;
9. jeopardizing family and friendship ties, as well as loss of job, educational and career opportunities due to gambling;
10. relying on others to get out of a desperate financial situation caused by gambling.

Also, the last criterion is that the gambling is not part of the manic episode.

Unlike DSM-4, in DSM-5 pathological gambling is called gambling disorder. In the fifth edition of this manual, gambling disorder was classified together with substance use disorders and recognized as a non-substance addictive disorder [3]. In the latest DSM-5 manual, criteria related to committing illegal acts such as forgery, fraud, theft and embezzlement were removed. Since the number of criteria is reduced, four or more criteria must be met to establish a diagnosis of gambling disorder. Also, a time frame that must be met is given, which is the persistence of complaints for the last twelve months since the diagnosis.

Modern understandings classify pathological gambling as a so-called behavioral addiction. All addictions have in common that they activate the brain's reward system, which is involved in reinforcing behavior and creating memories. Just as psychoactive substances directly activate this system, behavioral addictions do so through adaptive behavior. The pharmacological mechanisms by which each psychoactive substance leads to a feeling of pleasure are different, but ultimately all of these mechanisms act on the reward system producing a feeling of pleasure or euphoria [4]. Neurobiological research has shown that behavioral addictions act almost equally on certain neurotransmitter systems as psychoactive substances, thus confirming the hypothesis of their common development mechanisms [4]. Current research shows that the ventral striatum (dopaminergic neurotransmission) and ventromedial prefrontal cortex (impulse control and reward system) are brain structures that could be responsible for the development of craving in cocaine addicts as well as pathological gamblers [5,6]. From a pharmacotherapeutic point of view, it is also possible to see the similarity between persons with gambling disorder and persons addicted to PAS. The opioid antagonist naltrexone used to treat opiate addicts has shown short-term significant efficacy in reducing the urge to gamble in pathological gamblers in two studies conducted in New York [7]. There are data on the use of SSRIs and mood stabilizers in the treatment of pathological gambling. These data should be taken with a grain of salt considering the unproven efficacy due to the sample size, the questionable methodology of individual studies, as well as the high placebo effect [7]. In addition to the above facts that make pathological gambling closer to substance addiction, there are also those that distance it from the previous classification as part of impulse control disorders. Namely, the overwhelming impulsive drive that exists in kleptomania and pyromania and the feeling of relief after the action is performed - is not characteristic of pathological gambling. In contrast, the act of gambling itself is described as pleasurable, and discomfort occurs after a loss and cessation of gambling [8]. There are studies that show that people addicted to gambling have a large number of first-degree relatives diagnosed with addiction to various PAS [9]. This fact could support the genetic influence of pathological gambling and PAS addiction. The

strongest arguments in favor of the reclassification of pathological gambling under the category of addiction are: similarities with the diagnostic characteristics of PAS addiction; high degree of comorbidity between these two disorders; their common features including aspects related to the reward system; findings that the same brain structures are involved in both disorders. Also, research on compulsivity suggests these similarities, especially in the later stages of the disorder [10]. There is an increasing number of facts that point to the similarity between pathological gambling and PAS addiction. The assumption is that this is exactly what led to its reclassification in DSM-5, and apparently also in ICD-11.

Classification according to ICD

Regarding the tenth revision of the International Classification of Diseases (ICD-10), which is currently valid in our region, pathological gambling (F63.0) is classified as a disorder of habits and impulses, together with kleptomania, pyromania and trichotillomania [11]. Without clearly defined diagnostic criteria, the basic characteristic of pathological gambling is persistent repetition of gambling that continues and often increases despite serious social consequences such as impoverishment, disturbed family relationships and disruption of personal life. Also, it is important to distinguish pathological gambling from gambling and betting, excessive gambling of manic patients and gambling of sociopathic personalities.

The eleventh revision of the International Classification of Diseases (ICD-11) [12] led to several novelties that brought the ICD and DSM classification closer together. Gambling disorder (6C50) within ICD-11 is classified under behavioral addictions together with addictions to psychoactive substances. This change is significant since the term behavioral addiction has not been used in any of the ICD and DSM classifications until now. For the first time, the disorder of playing video games ("gaming" disorder) was included in the same group of behavioral addictions. Also, both disorders are subclassified into online and offline disorders, where online involves gambling via the Internet or similar networks, while offline manifests itself in the real world. Within ICD-11, a descriptive definition is given that gambling disorder is characterized by persistent or recurrent behavior involving gambling that may be online

(6C50.1), offline (6C50.0) or unspecified (6C50.Z). There are clearly three criteria that must be met for the diagnosis of gambling disorder [12]:

A persistent pattern of gambling behavior that can be online or offline, and manifests as follows:

Lack of control over gambling behavior (eg gambling initiation, frequency, intensity, duration, termination, context);

Organizing life priorities so that gambling is at the very top of the ladder, while other life interests and activities become less important;

Continuation or escalation of gambling despite negative consequences (eg, marital conflict, significant financial losses, negative impact on health).

The pattern of gambling behavior can be continuous or episodic and recurrent, but always manifests itself over a longer period of time (eg 12 months). Gambling behavior is not manifested as part of another mental disorder (eg manic episode) nor is it a consequence of taking a substance or medication.

A pattern of gambling behavior leads to significant distress or deterioration in personal, family, social, educational, career, and other areas of life.

As mentioned, there are similarities in the way gambling disorders are reclassified within DSM-5 and ICD-11. As in DSM-5, pathological gambling is recognized as a form of addiction. In ICD-11, it was renamed gambling disorder and classified as behavioral addictions.

The latest revisions of both classifications (DSM and ICD) have the same development path and essentially the same foundations, and a change in the perception of gambling within diagnostics is clearly visible.

Impulsivity and neuropsychological deficits in pathological gambling compared to PAS addicts

Impulsive behavior most often occurs in specific psychiatric disorders such as hyperkinetic disorder (ADHD), borderline and dissociative personality disorder, PAS addiction, mania, and pathological gambling [13]. Impulsivity consists of at least two dimensions: disinhibition (or impulsive action), and impulsive decision-making (or impulsive choices).[14] It is a complex behavior characterized by lower sensitivity to the negative consequences of behavior, inadequate sensory processing of

stimuli, a tendency to prefer immediate rewards compared to more valuable but delayed rewards, risky behavior when making decisions, as well as adherence to harmful or punishable behavior [15]. Although impulsivity is not explicitly listed as a symptom of PAS use disorders in the DSM and ICD classifications, many theories suggest that impulsivity influences and leads to the progression of addiction. In addition, impulsivity may be associated with greater likelihood of initiation of PAS use, rapid escalation of use, inability to reduce or stop use, and greater likelihood of relapse despite motivation to maintain abstinence [16]. Research has shown that PAS addicts (more specifically heroin addicts) have a strong tendency to value immediate gains over long-term ones. Interestingly, pathological gamblers exhibited the same behavior and a similar cognitive profile to addicts [17]. In addition, a meta-analysis by a group of American scientists found that pathological gamblers without substance abuse comorbidity are characterized by motor impulsivity, which was determined both at the behavioral level and by the self-report method. This can be concluded that it is an element of their psychopathology that feeds the need to gamble despite the negative consequences [18].

Cognitive distortions are an integral part of gambling disorders, but they are not a diagnostic criterion, despite the fact that they can be treated as a predictor of gambling problems [19]. One of the most representative forms of cognitive distortion in pathological gamblers is the so-called the illusion of control. This phrase was coined by Ellen Langer and defined as the expectation of success even though the chances of success are objectively less likely than assumed [20]. In addition to the illusion of control, other cognitive distortions include a special form of predictive control (the belief that it is possible to predict the outcome of future gambling by analyzing previous patterns) and the tendency to positively interpret previous experiences in a way that favors the decision to continue gambling [21].

By examining studies on disorders conditioned by the use of PAS, a parallel was observed with cognitive distortions in pathological gamblers: there are expectations related to the gambling experience, i.e. the belief that gambling will make the person feel better, and the inability to stop gambling, i.e. loss of control [22]. One of the criteria for diagnosing

PAS addiction according to ICD-10 is the loss of control over taking the substance and the inability to stop.

Many 21st century studies point to a deficit of executive functions in pathological gamblers. Executive functions include a set of processes that enable self-management and available resources to achieve a specific goal. These include inhibition, emotion control, initiation, working memory, self-control, abstract thinking, problem solving, organizational skills, understanding rules, and categorization. Dysfunctionality in terms of planning [23], reduced cognitive flexibility [24], as well as lack of behavioral inhibition [24,25,26,27] have been described in a number of different studies. Also, the achieved performance on the IGT (Iowa Gambling Task) test, which was designed to assess decision-making capacity, showed that there is a deficit in pathological gamblers [23,28,29]. Gambling disorder is also characterized by low self-control, which is thought to be related to executive function deficits. Thus, psychological "myopia" for the consequences of actions and what may happen in the future is often part of the profile of a pathological gambler [30].

Research has proven a neuropsychological deficit in PAS addicts, and precisely because of this deficit, addicts continue to consume substances and have difficulty maintaining abstinence (if they start treatment). For example, one study showed that 68% of respondents in the group of PAS addicts showed a deficit in executive functions, while this percentage was 3% within the control group [31]. A deficit in terms of cognitive flexibility was observed especially in opiate and cocaine addicts, a deficit in attention and impulse control in amphetamine addicts, a deficit in terms of cognitive flexibility and attention in cannabis users, while memory and learning disorders were observed to the greatest extent in smokers [32]. Despite the fact that impulsivity and cognitive deficit are not part of the diagnosis within the classifications, we cannot ignore them considering their frequency in pathological gamblers.

CONCLUSION

Gambling disorder is an often neglected public health problem due to its high prevalence and the consequences it causes both for the

individual and for society. Looking at the latest literature, the global prevalence of pathological gambling is between 0.5% and 3%, while the prevalence of subclinical gambling is estimated to be three to four times higher [33], which speaks to the magnitude and complexity of the gambling problem. Addiction is often directly linked to impulsivity. Impulsive behavior is marked as an indicator of potential substance use, as well as a progression towards more dangerous and frequent consumption. Pathological gambling and substance dependence have undeniable similarities when looking at the onset and development of the disease, comorbidities, and even etiology. Therefore, it is not surprising that the new classification within DSM-5 and ICD-11 places gambling disorder in the addiction group and categorizes it as a behavioral addiction. The very name change to gambling disorder is explained in the literature as an attempt to reduce the stigma associated with the term "pathological" [34]. When it comes to reclassification and arguments for and against, it is impossible to make a final judgment.

Pathological gambling is a very complex disease that is accompanied by neuropsychological deficits and impulsive behavior, both characteristic of addicts and people with impulse control disorders. Given the high overlap, it is challenging to look at gambling within just one of the categories. Nevertheless, the reclassification is significant for several reasons. First, there are similarities with the diagnostic characteristics of chemical addiction. Second, there is a high degree of comorbidity between impulse control disorders and addiction. Third, both involve the reward system and activate the same parts of the brain. It is assumed that these similarities led to the reclassification in both DSM-5 and ICD-11. It is still not entirely clear how this change in the perception of gambling within diagnostics will affect the actual treatment of pathological gambling.

Conflict of interest: Maša Čomić: none. Vladimir Knežević: none. Aleksandra Dickov: none. Dragana Ratković: none. Minja Abazović: none

LITERATURE :

- Pichot P. DSM-III: the 3d edition of the Diagnostic and Statistical Manual of Mental Disorders from the American Psychiatric Association. *Revue neurologique*. 1986 Jan 1;142(5):489-99.
- Bell CC. DSM-IV: diagnostic and statistical manual of mental disorders. *Jama*. 1994 Sep 14;272(10):828-9.
- American Psychiatric Association. DSM 5 diagnostic and statistical manual of mental disorders. 2013 (pp. 947-p).
- Bodor D. Usporedba psihosocijalnoga funkcioniranja osoba koje se liječe zbog ovisnosti o kockanju i alkoholu (Doctoral dissertation, University of Zagreb. School of Dental Medicine. Chair of Psychiatry and Medical Psychology), 2018.
- Yargic I. Biological mechanisms underlying addiction. *Int J Hum Health Sci (IJHHS)* [Internet]. 2018;2(3):107. Available from: <http://dx.doi.org/10.31344/ijhhs.v2i3.37>
- Clark L, Boileau I, Zack M. Neuroimaging of reward mechanisms in Gambling disorder: an integrative review. *Molecular psychiatry*. 2019 May;24(5):674-93.
- Hollander E, Sood E, Pallanti S, Baldini-Rossi N, Baker B. Pharmacological treatments of pathological gambling. *Journal of gambling studies*. 2005 Mar;21(1):99-108.
- Fauth-Bühler M, Mann K, Potenza MN. Pathological gambling: a review of the neurobiological evidence relevant for its classification as an addictive disorder. *Addiction biology*. 2017 Jul;22(4):885-97.
- Grant JE, Chamberlain SR. Family History of Substance Use Disorders: Significance for Mental Health in Young Adults Who Gamble. *JOURNAL OF BEHAVIORAL ADDICTIONS*. 2020;9(2):289-97.
- Fauth-Bühler M, Mann K, Potenza MN. Pathological gambling: a review of the neurobiological evidence relevant for its classification as an addictive disorder. *Addiction biology*. 2017 Jul;22(4):885-97.
- ICD-10 Classification of Mental and Behavioural Disorders. Geneva, World Health Organization, 1992. (Svetska zdravstvena organizacija. ICD-10. Klasifikacija mentalnih poremećaja i poremećaja ponašanja. Izdavač srpskog prevoda Zavod za udžbenike i nastavna sredstva, Beograd, 1992.)
- World Health Organization. ICD-11 for mortality and morbidity statistics (2018).
- Batinić B, Duišin D, Vukosavljević-Gvozden T. Neurobiološke osnove impulsivnog i kompulzivnog ponašanja-implikacije za farmakološke i psihološke intervencije. *Engrami*. 2017;39(1):17-32.
- Cavicchioli M, Movalli M, Bruni A, Terragni R, Bellintani S, Ricchiuti A, Borgia E, Borelli G, Elena GM, Piazza L, Begarani M. The Complexity of Impulsivity Dimensions among Abstinent Individuals with Substance Use Disorders. *Journal of Psychoactive Drugs*. 2022 Aug 25:1-2.
- MacKillop J, Weafer J, C Gray J, Oshri A, Palmer A, de Wit H. The latent structure of impulsivity: impulsive choice, impulsive action, and impulsive personality traits. *Psychopharmacology*. 2016 Sep;233(18):3361-70.
- Kozak K, Lucatch AM, Lowe DJ, Balodis IM, MacKillop J, George TP. The neurobiology of impulsivity and substance use disorders: implications for treatment. *Annals of the New York Academy of Sciences*. 2019 Sep;1451(1):71-91.
- Banich MT, Compton RJ. *Cognitive neuroscience*. Cambridge University Press; 2018 Apr 5.
- Chowdhury NS, Livesey EJ, Blaszczyński A, Harris JA. Pathological gambling and motor impulsivity: a systematic review with meta-analysis. *Journal of gambling studies*. 2017 Dec;33(4):1213-39.
- Goodie AS, Fortune EE, Shotwell JJ. Cognitive distortions in disordered gambling. *In Gambling disorder 2019* (pp. 49-71). Springer, Cham.

20. Eben C, Chen Z, Billieux J, Verbruggen F. Outcome sequences and illusion of control-Part I: An online replication of Langer & Roth (1975). *International Gambling Studies*. 2022 Nov 9;1-2.
21. Ledgerwood DM, Dyshniku F, McCarthy JE, Ostojic-Aitkens D, Forfitt J, Rumble SC. Gambling-related cognitive distortions in residential treatment for gambling disorder. *Journal of Gambling Studies*. 2020 Jun;36(2):669-83.
22. Nigro G, Ciccarelli M, Cosenza M. The illusion of handy wins: Problem gambling, chasing, and affective decision-making. *Journal of affective disorders*. 2018 Jan 1;225:256-9.
23. Ledgerwood DM, Orr ES, Kaploun KA, Milosevic A, Frisch GR, Rupcich N, Lundahl LH. Executive function in pathological gamblers and healthy controls. *Journal of Gambling Studies*. 2012 Mar;28(1):89-103.
24. Odlaug BL, Chamberlain SR, Kim SW, Schreiber LR, Grant JE. A neurocognitive comparison of cognitive flexibility and response inhibition in gamblers with varying degrees of clinical severity. *Psychological medicine*. 2011 Oct;41(10):2111-9.
25. Grant JE, Odlaug BL, Chamberlain SR, Schreiber LR. Neurocognitive dysfunction in strategic and non-strategic gamblers. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*. 2012 Aug 7;38(2):336-40.
26. Kalechstein AD, Fong T, Rosenthal RJ, Davis A, Vanyo H, Newton TF. Pathological gamblers demonstrate frontal lobe impairment consistent with that of methamphetamine-dependent individuals. *The Journal of neuropsychiatry and clinical neurosciences*. 2007 Jul;19(3):298-303.
27. Roca M, Torralva T, López P, Cetkovich M, Clark L, Manes F. Executive functions in pathologic gamblers selected in an ecologic setting. *Cognitive and Behavioral Neurology*. 2008 Mar 1;21(1):1-4.
28. Brevers D, Cleeremans A, Goudriaan AE, Bechara A, Kornreich C, Verbanck P, Noël X. Decision making under ambiguity but not under risk is related to problem gambling severity. *Psychiatry research*. 2012 Dec 30;200(2-3):568-74.
29. Mallorquí-Bagué N, Fagundo AB, Jimenez-Murcia S, De La Torre R, Baños RM, Botella C, Casanueva FF, Crujeiras AB, Fernández-García JC, Fernández-Real JM, Frühbeck G. Decision making impairment: a shared vulnerability in obesity, gambling disorder and substance use disorders?. *PLoS One*. 2016 Sep 30;11(9):e0163901.
30. Verdejo-García A, Alcázar-Córcoles MA, Albein-Urios N. Neuropsychological interventions for decision-making in addiction: a systematic review. *Neuropsychology Review*. 2019 Mar;29(1):79-92.
31. Al Hakeem M, Chowdhury KU. Executive functions of people with drug addiction. *Dhaka University Journal of Biological Sciences*. 2020 Jan 10;29(1):27-36.
32. Gupta A, Murthy P, Rao S. Brief screening for cognitive impairment in addictive disorders. *Indian Journal of Psychiatry*. 2018 Feb;60(Suppl 4):S451.
33. Abbott MW. The changing epidemiology of gambling disorder and gambling-related harm: public health implications. *Public health*. 2020 Jul 1;184:41-5.
34. Grant JE, Chamberlain SR. Gambling disorder and its relationship with substance use disorders: Implications for nosological revisions and treatment. *The American Journal on Addictions*. 2015 Mar;24(2):126-31.