Impact of Gaming Disorder on First Episode Psychosis Patients' Evolution: Protocol for a Multicentered Prospective Study

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Abstract

Aims: The objective of this study is to underline the impact of Gaming Disorder on the clinical evolution of patients with First Episode Psychosis. The specific aims of the study are to determine the prevalence of gaming disorder among those patients and assess the consequences of gaming on their clinical trajectory. Methods: This is a prospective multicenter cohort study that will enroll 800 patients diagnosed with a first episode psychosis, with a follow-up period of up to 3 years. Using a systematic screening procedure for gaming disorder, the clinical staff will assess patients gaming habits at admission and every 6 months thereafter. Information from patients' medical records will also be extracted using the same timeframe. Results: The patients' characteristics at admission and during follow-up will be presented in the form of descriptive statistics and compared between different subgroups of patients using uni- and multivariate logistic regression models. Repeated measures ANCOVA will also be performed to analyze the impact of gaming disorders on patients' clinical path as assessed by the Positive and Negative Syndrome Scale and the Clinical Global Impression scale, considering covariates such as psychiatric diagnosis, pharmacological treatment, age, sex/gender, and duration of untreated psychosis. Conclusion: These findings will guide the development of prevention, detection, and treatment strategies for the comorbidity between gaming disorder and first episode psychosis, ultimately improving the patients' recovery.

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Abstract

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Methods: This is a prospective multicenter cohort study that will enroll 800 patients diagnosed with a first episode psychosis, with a follow-up period of up to 3 years. Using a systematic screening procedure for gaming disorder, the clinical staff will assess patients gaming habits at admission and every 6 months thereafter. Information from patients' medical records will also be extracted using the same timeframe.

Results: The patients' characteristics at admission and during follow-up will be presented in the form of descriptive statistics and compared between different subgroups of patients using uni- and multivariate logistic regression models. Repeated measures ANCOVA will also be performed to analyze the impact of gaming disorders on patients' clinical path as assessed by the Positive and Negative Syndrome Scale and the Clinical Global Impression scale, considering covariates such as psychiatric diagnosis, pharmacological treatment, age, sex/gender, and duration of untreated psychosis.

Conclusion: These findings will guide the development of prevention, detection, and treatment strategies for the comorbidity between gaming disorder and first episode psychosis, ultimately improving the patients' recovery.

Background

Psychotic disorders (PD), are major mental disorders that affect 3% of the population [1]. They occur during a critical period of life, specifically in late adolescence and early adulthood [2]. Their consequences include an increased rate of suicide and acts of violence[3-5], low employment rates [6], reduced life expectancy by 15 years [7, 8], as well as homelessness and experiences of stigmatization [9, 10]. In Canada, the economic burden of these conditions was estimated to be $7 billion in 2004 while the global estimates indicate a range between 0.02% and 1.65% of the gross domestic product in 2016 [11, 12]. While antipsychotic medications are effective in alleviating certain symptoms, such as delusions and hallucinations, they are not sufficient for achieving full recovery [13]. In fact, PD are frequently associated with psychiatric comorbidities, including substance use disorders, personality disorders, and attention-deficit/hyperactivity disorder (ADHD), which can further exacerbate the consequences associated with PD [14]. Therefore, treating comorbidities is crucial for achieving recovery, particularly in patients with first episode psychosis (FEP), where early intervention has demonstrated the greatest impact on patients' long-term outcomes [15]. Amongst other comorbidities, excessive video gaming has become a cause for concerns for clinicians due to its impact on patients' lives,

in particular among young adults, but a literature review conducted by our team [16] has highlighted a significant paucity of data on video gaming comorbid with FEP, despite recent interest and developments on this topic.

In recent decades, there has been a growing interest about the consequences of excessive video gaming on mental health. This attention has been prompted by the inclusion of Internet Gaming Disorder (IGD) as a "Condition for Further Study" in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DMS-5), in 2013 [17]. The recognition of this disorder as an official diagnosis in the 11th edition of the International Classification of Diseases (ICD-11) under the term Gaming Disorder (GD) has reinforced the importance and urgency to better understand the clinical impacts of this condition [18]. GD is defined as a persistent and recurrent pattern of gaming behavior, involving digital or video gaming, characterized by an impaired control over gaming as well as an increased priority placed on gaming over other activities to the extent that it takes precedence over other interests and daily activities. Individuals with GD continue or escalate their gaming behavior despite experiencing negative consequences such as reduced occupational or academic functioning [18].

The reported prevalence of GD in the general population varies from 0.2% to 20% across studies [18]. This variability can be explained by several factors, including the age of the participants studied, the country where the study was conducted, or the definition of GD used in the study. There are three main categories of risk factors associated with GD: 1) those related to gaming and its practice (e.g. duration and frequency of gaming, online and multiplayer games), 2) individual factors (e.g. isolation, low self-esteem, impulsivity, difficulties in emotion regulation, feelings of stigmatization, sex, gender, young age, low education level), and 3) environmental factors (e.g. family dysfunction, harassment and childhood neglect) [19, 20]. GD has also been associated with other symptoms, mental disorders, and impairments in functioning, such as depression, social anxiety, ADHD, impaired academic performance, and deterioration in interpersonal relationships, but a causal relationship has not been clearly established [21-30]. In terms of treatment, promising results have been achieved with various approaches, including cognitive-behavioral therapy. However, there is currently insufficient data to draw solid conclusions regarding the effectiveness of existing approaches [31].

Regarding the comorbidity between GD and PD, the available literature is limited to a few case reports describing the occurrence of brief psychotic episodes following excessive video game use or abrupt cessation [16]. Research on this comorbidity is therefore scarce and lacks prospective data, which hinders the improvement of prevention, detection, and treatment strategies. However, individuals with PD present several common risk factors with GD: the male gender, social isolation, low self-esteem, difficulties in emotion regulation, impulsivity or behavioral inhibition, and onset of disorders during adolescence or early adulthood [19, 20, 32-34]. Additionally, little is known about the patterns of video game use among individuals with PD (e.g. gaming time, game content, interface [console, mobile, computer, online or offline]). For the affected youth, the consequences of GD added to those of PD may further hinder recovery. Studying GD among young adults with PD is then particularly relevant, as the risk factors common to GD and PD are even more prevalent in this population compared to the overall population with PD alone (e.g., substance use disorders, male predominance, younger age) [35, 36]. Furthermore, it is well established that clinical interventions in FEP significantly influence clinical outcomes of affected individuals [15].

In line with prevalent societal beliefs, video games have often been associated with a negative perception that links them to aggressive and criminal behavior [37]. However, an increasing body of evidence suggests that video games can have beneficial effects and even serve as a therapeutic tool. The term 'serious games' refers to software that incorporates playful elements for educational, training, and therapeutic purposes. Such games have been employed in the treatment of individuals with PD, demonstrating a significant reduction in psychotic symptoms [38, 39]. Additionally, they have shown improvements in cognitive functions, social cognitions, and occupational status [40-43]. Although the understanding of the impact of commercial video games on PD is limited, a recent literature review highlights several advantages of these types of games, with seven studies reporting positive outcomes [44]. Among them, four studies revealed enhanced processing speed, memory, and executive functions through the use of commercial video games, while three studies

demonstrated improvements in aerobic fitness and walking speed in patients who engaged in active video games utilizing the Kinect for Xbox game system [45-48]. These potential benefits in individuals with PD underscore the unique nature of gaming addiction, where the objective is to promote healthy gaming habits rather than complete avoidance, as seen in other forms of addiction. In order to help patients to reach these healthy habits, it is imperative to enhance our comprehension of the influence of gaming on the clinical trajectory of individuals diagnosed with PD.

Using an innovative screening and assessment procedure for GD tailored to young adults with FEP, the aim of this study is to better understand the impact of gaming in people with FEP by: 1) determining the prevalence of GD among FEP patients; 2) determining the consequences of GD on the clinical trajectory of FEP patients; and 3) assessing individual factors that differentiate patients who developed GD among the overall study population

Methods

Study design

This is a prospective multicenter cohort study, akin to our previous work [49], aiming to enroll a total of 800 patients who have been diagnosed with FEP and with follow-up periods of up to 3 years. The recruitment process began on November 1st, 2019, and will extend until November 1st, 2023. Throughout this period, all individuals admitted at the two designated sites will undergo comprehensive GD assessments by clinicians upon admission and subsequently every 6 months, using a specialized screening procedure developed exclusively for this study. During this follow-up period, that will conclude on May 1st 2024, the research team will extract independent variables from the patients' medical records.

Study settings

This study is being conducted within 2 specialized programs for individuals experiencing FEP in the province of Quebec, Canada. These programs, which operate at multidisciplinary clinics, admit annually approximately 200 patients presenting a FEP. The patients are accompanied for up to 3 years on a case management approach that involves close collaboration between a psychiatrist and a designated case manager, who assumes the responsibility of overseeing and coordinating the patient's care and services, and could include either psychologist, social works, occupational therapists, nurses and specialized educators.

Patients are also offered family intervention, individual psychotherapy and community outreach services during their follow-up period. The case managers offer an extensive systematic clinical follow-up, employing standardized questionnaires and involving input from the patients' family members. All relevant clinical data derived from these activities are extensively documented in the patients' medical records. No consent to participate in the study is required given the lack of any contact between the patients and the research staff.

Participants

During the recruitment period, all patients admitted at the two study sites will be included in the study. Clinic admission prerequisites necessitate individuals to be within the age range of 18 to 35 years, hold a primary diagnosis of FEP according to DSM-5 criteria (encompassing both affective and nonaffective psychoses, along with substance-induced psychotic disorder), and exhibit limited exposure to continuous antipsychotic treatment (i.e., six months or less). The only exclusions criteria are related to admittance criteria in the clinics, specifically, organic psychosis and moderate/severe intellectual disability.

Variables

The primary outcome is the prevalence of a GD diagnosis based on ICD-11 criteria established by the treating psychiatrist. As mentioned earlier, the evaluation of this outcome is conducted by the case managers and treating psychiatrists utilizing a specialized GD screening procedure designed explicitly for this study in collaboration with experts in GD and FEP. It is a 3-step procedure that includes: 1) a questionnaire for assessing video gaming habits (frequence and duration of gaming session) , 2) an evaluation of the severity of the gaming habits using the*Internet Gaming Disorder Scale – Short Form (IGDS9-SF)[50]* , and 3) a diagnostic interview assessing the ICD-11 gaming addiction diagnosis criteria. The patients' case managers conduct the initial two steps, while the treating psychiatrist oversees the final step. The results of this procedure are documented in the patients' medical records and subsequently extracted by the research staff. Variables that are related to the clinical manifestations of the FEP are documented using three standardized scales rated by treating psychiatrists every 6 months as part of the patients' systematic follow-up. These variables are recorded in the patients' medical files and extracted by the research staff. The severity of psychotic symptoms is measured using the "*Positive and Negative Syndrome Scale* " (PANSS), which is a routinely used measure that allows clinicians to monitor the progression of symptoms in patients with psychotic disorders [51]. The PANSS-6, a shortened version that has excellent convergent validity with the original PANSS, will be used in this study [52]. The severity of the FEP will also be assessed using the "*Clinical Global Impression – Severity* " (CGI-S) scale, which quantifies the clinical presentation of the disease using simple score ranging between 0 and 7[53, 54]. CGI-S scores have good correlation with PANSS scores [55]. Finally, the individual's functioning level will be evaluated using the "*Social and Occupational Functioning Assessment Scale* " (SOFAS), a graded 0-100 scale quantifying patients' social and occupational functioning [56].

The research staff will extract various independent variables from the patients' medical records, encompassing socio-demographic factors (such as sex at birth, gender identity, ethnicity, employment status, education level, relationship status, living arrangements, and criminal history) and other clinical variables (including the primary DSM-5 psychiatric diagnosis, comorbid DSM-5 psychiatric diagnoses, psychiatric hospitalizations, community treatment order, and medication treatment, which comprises antipsychotics and other psychotropic drugs like antidepressants, benzodiazepines, hypnotics, mood stabilizers, and psychostimulants). Regarding medication information, both current (during the follow-up period) and past (prior to admission in the clinics) medication details will be collected, encompassing dosages, frequency, and route of administration. A patient will be considered exposed to a medication after receiving it for more than one month (or one injection in the case of long-acting injectable antipsychotics). Medications administered on an as-needed basis will not be included in the analysis.

Statistical analyses

To meet the first two objectives, the patients' characteristics at admission and during follow-up will be presented in the form of descriptive statistics and compared between different subgroups of patients using uni- and multivariate logistic regression models. All tests will be performed with a bilateral significance level set at 5%.

To meet the third objective, repeated measures ANCOVA will be performed. In this analysis, the independent variable will be the presence or absence of GD as defined by ICD-11 criteria, while the dependent variables will be the clinical ratings (PANSS-6, CGI-S, SOFAS) measured at admission and repeated every 6 months during the patients' follow-up. The covariates of the analysis will be: 1) the main psychiatric diagnosis; 2) the pharmacological treatment used; 3) the age and sex/gender of the patients; 4) the duration of untreated psychosis; these factors being determinant in the clinical evolution of the patients living with FEP. The results from these analyses will be performed with a bilateral significance level set at 5%.

Discussion

This aims to improve our understanding of the relationship between GD and PD. It will be the first empirical study that explores this comorbidity, which has only been previously discussed in a few case reports. The results will not only confirm or refute the association between GD and PD, but also provide a more detailed description of the factors linking these two conditions and their consequences.

A notable strength of this study is the systematic screening procedure of GD that has been developed, which eliminates any detection bias and improves sensibility. All patients newly admitted to either of the two participating FEP programs will undergo the same screening process, irrespective of their disease progression and treatment history. This systematic approach is particularly crucial given the limited knowledge about the consequences of GD, which may be underestimated by both patients and clinicians. On completion of the study, the screening procedure for is expected to be implemented across all FEP programs in Quebec, and potentially in other regions in Canada as well.

The study's large sample size and extended follow-up duration are also significant strengths, ensuring sufficient statistical power to generate meaningful findings. The lack of a consent requirement, combined with the diverse areas served by the two participating FEP programs, including urban and rural areas, ensures that the sample is representative of the FEP population in Quebec. Consequently, the findings are expected to be generalizable to all FEP programs in the province.

By collecting variables that are routinely documented by clinicians as part of their systematic clinical follow-up, the ecological validity of this study is further strengthened. The close collaboration between our research team and clinicians facilitates knowledge transfer and improves the quality of patient care.

The primary limitation of this research project lies in its dependence on clinician cooperation in adhering to the GD screening procedure, as we have no control over their clinical practices and prescribing patterns. However, we have implemented a monitoring committee to assess clinicians' adherence to the GD screening process on a regular basis. Furthermore, all new clinicians joining the study receive comprehensive training in the utilization of this procedure. By considering these methodological aspects collectively, we anticipate that the results will substantially enhance our understanding of this understudied comorbidity.

Abbreviations

FEP: First-episode psychosis; GD: Gaming Disorder; DSM-5: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; ICD-11: International Classification of Diseases, 11thEdition; PANSS: Positive and Negative Syndrome Scale; CGI: Clinical Global Impression Scale; SOFAS: Social and Occupational Functioning Assessment Scale; REDCap: Research Electronic Data Capture

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Authors contributions

MHL conceptualized the study, developed the screening and assessment procedure for GD implemented it at both study sites, wrote the original draft, reviewed, and edited the final draft. CD and OC wrote the original draft, reviewed and edited the final draft. OC, LB, EF, SB, AME, CD contributed to data collection, reviewed and edited the final draft. CT managed the grant funding and coordinated research activity. ZAAH and JR reviewed the final draft for accuracy, clarity, coherence. AAB supervised the conduct of the study at site #2. YK and IG provided input in developing the screening and assessment procedure for GD, critically reviewing and editing the original draft. MAR and MFD supervised the conduct of the study at site #1,

supervised all stages of the study, and critically reviewed and edited the original draft. MFD coordinated responsibility for the grant funding. All authors reviewed and approved the final draft.

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Data availability

Not applicable.

Declarations

Ethics approval and consent to participate

Ethics approval was obtained at both study sites (MP-13-2022-2470, NSM) and the requirement to obtain consent was waived.

Consent for publication

Not applicable.

Competing interest

OC has received an honorarium from Janssen and Otsuka-Lundbeck Alliance. MFD has received grants from Janssen and Otsuka-Lundbeck Alliance. MAR has received grants from Otsuka-Lundbeck Alliance, Janssen, Sunovion and Mylan. All other authors have no conflicts of interest that are directly relevant to this study.

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