Brazilian Journal of Psychiatry
bjp
Revista Brasileira de Psiquiatria

Braz J Psychiatry. 2020 xxx-xxx;00(00):000-000
doi:10.1590/1516-4446-2019-0760
Brazilian Psychiatric Association

BRIEF COMMUNICATION

Prevalence and risk factors for internet gaming disorder

Rovena B. **Severo**,[1] Jennifer M. **Soares**,[1] Josiara P. **Affonso**,[1] Daniela A. **Giusti**,[1] Adão A. **de Souza Junior**,[2] Vera L. **de Figueiredo**,[1] Karen A. **Pinheiro**,[1] Halley M. **Pontes**[3,4]

[1]*Programa de Pós-Graduação em Saúde e Comportamento, Universidade Católica de Pelotas (UCPel), Pelotas, RS, Brazil.* [2]*Curso de Engenharia Elétrica, Instituto Federal de Educação, Ciência e Tecnologia Sul-Rio-Grandense (IFSul), Pelotas, RS, Brazil.* [3]*Division of Psychology, School of Medicine, Faculty of Health, University of Tasmania, Launceston, Australia.* [4]*The International Cyberpsychology and Addictions Research Laboratory (iCARL), University of Tasmania, Launceston, Australia.*

Objectives: To estimate the prevalence of internet gaming disorder (IGD) and associated risk factors in a sample of secondary and postsecondary students from a public federal institution of higher education (Instituto Federal de Educação, Ciência e Tecnologia) in Southern Brazil.
Methods: The study included a sociodemographic questionnaire, the Beck Depression Inventory (BDI), Self-Report Questionnaire (SRQ-20), Pittsburgh Sleep Quality Index (PSQI-BR), the Mini-Social Phobia Inventory (Mini-SPIN), and the Game Addiction Scale (GAS). Finally, IGD was measured with the Brazilian version of the Internet Gaming Disorder Scale-Short-Form (IGDS9-SF), which has been psychometrically validated in this population.
Results: Overall, 38.2% (n=212) of the sample exhibited IGD symptoms, with 18.2% (n=101) being classed as at-risk gamers. Regression analysis found IGD to be associated with male gender, severe depressive symptoms, poor sleep quality, increased time spent gaming, and total free time spent gaming ($p < 0.001$).
Conclusions: The prevalence of IGD in this sample was relatively high, and associated risk factors found were similar to those previously reported in the literature. Further studies investigating the epidemiology of IGD in Brazilian samples are warranted to better understand treatment needs and inform preventive measures in this population.

Keywords: Addictive behavior; video game; internet; assessment

Introduction

Internet gaming disorder (IGD) was tentatively introduced as a DSM-5 diagnosis in May 2013.[1] According to the DSM-5, IGD is characterized by recurring and persistent use of video games (both online and/or offline), frequently with other players, as reflected by the endorsement of at least five out of nine clinical criteria in the last 12 months. Following the DSM-5 recognition of IGD, the World Health Organization (WHO) decided to include gaming disorder (GD) as an official mental health disorder in the ICD-11.[2] Previous studies have reported that IGD affects 1 to 35.7% of the population, being predominantly associated with male gender,[3,4] depressive disorder, and social anxiety.[5] However, little research on IGD has been conducted in Brazil.[6,7] As a result, little is known about its prevalence in the country, which is concerning, as Brazil is a major consumer of electronic games.[8]

Based on this shortcoming, the aim of the present study was twofold. First, to estimate the prevalence of IGD in a Brazilian sample; second, to identify risk factors associated with IGD related to sociodemographic variables, gaming habits, and common psychiatric disorders.

Method

Participants and procedures

In a cross-sectional design, a paper-and-pencil survey with relevant measures was administered to a sample of secondary students and undergraduates from southern Brazil. Data collection was performed during the months of October and November 2017. Interviewers invited students to take part in the study by visiting classrooms. The psychometric assessment battery was applied within the premises of the institution. Only students who reported having played electronic games in the last 12 months were included. The final sample comprised 610 participants, 555 of whom remained after discarding incomplete forms.

Correspondence: Rovena B. Severo, Programa de Pós-Graduação em Saúde e Comportamento, Universidade Católica de Pelotas (UCPel), Rua Gonçalves Chaves, 373, Centro, CEP 96015-560, Pelotas, RS, Brazil.
E-mail: rovena.bs@gmail.com
Submitted Oct 22 2009, accepted Apr 02 2020.

How to cite this article: Severo RB, Soares JM, Affonso JP, Giusti DA, de Souza Junior AA, de Figueiredo VL, et al. Prevalence and risk factors for internet gaming disorder. Braz J Psychiatry. 2020;00:000-000. http://dx.doi.org/10.1590/1516-4446-2019-0760

Measures

The survey included the Brazilian version of the Internet Gaming Disorder Scale-Short-Form (IGDS9-SF)[1] to assess the severity of IGD symptoms and establish its prevalence. The IGDS9-SF consists of nine items, mapping directly onto the nine DSM-5 criteria for IGD. Based on previous research, cutoff points of IGD $>$ 16 and IGD $>$ 21 were adopted to identify moderate and high risk for IGD.[9]

Additional psychometric tests utilized included the Brazilian versions of the Beck Depression Inventory (BDI),[10] the Mini-Social Phobia Inventory (Mini-SPIN),[11] the Self-Report Questionnaire (SRQ-20),[12] the Pittsburgh Sleep Quality Index (PSQI-BR),[13] the 21-item Brazilian version of the Game Addiction Scale (GAS),[6] and the suicidal ideation question (item 17) of the SRQ-20. Additional questions were designed to collect data on sociodemographic characteristics, gaming behavior, and perceived academic performance.

Data entry and analysis

Data was encoded through double entry and checked using EpiData 3.0. All statistical analyses were performed in SPSS version 22.0 and STATA version 14.2. For univariate analyses, absolute frequency (n), relative frequency (%), mean (μ), and standard deviation (SD) were computed. The chi-square test was used for bivariate analysis, and logistic regression for multivariate analysis regression. More specifically, variables that had achieved at least $p < 0.2$ in the previous bivariate analysis were included in a conceptual model with three hierarchies: first, sociodemographic variables; second, health and behavior indexes; third, gameplay habits. Results including an associated p-value of at least $\leqslant 0.05$ were deemed statistically significant. Finally, results were reported as odds ratios (OR) with a 95% confidence interval (95%CI).

Ethics statement

The study was approved by the ethics committee of Universidade Católica de Pelotas (CAAE 71580017.1. 0000.5339). Written informed consent was obtained from every participant over the age of 18 and from the parents or legal guardians of underage participants.

Results

Data from 555 participants were used in the analyses. Detailed information is summarized on Table 1. The prevalence of IGD found in the sample was 38.2% (n=212), while 18.2% (n=101) of gamers were at high risk for IGD. Furthermore, the GAS indicated a prevalence of 13.5% (n=75) in the sample. The overall prevalence of common mental health disorders was 39.6% (n=218). More specifically, symptoms of moderate and severe depression were present in 13.3% (n=71) and 3.6% (n=19) of the sample respectively, while generalized social phobia affected approximately 28% (n=154) of the sample. Furthermore, suicidal ideation was present in 7.1% (n=39) of all participants. Students reported sleeping an average of 6.7 hours per night (SD = 1.6), while 278 (52.2%) presented with poor sleep quality. The mean age of the sample was 20.3 years (SD = 5.4), 57.5% were male (n=319), and 63.8% were enrolled in secondary school (n=354). Furthermore, a majority of participants (n=360; 65.6%) declared a monthly income three times higher than the national minimum wage. Most participants (n=336; 61.3%) reported not being in a romantic relationship. About a quarter (n=142; 25.6%) reported playing every day; more than a third (n=386; 37.6%) reported playing between 2 and 6 hours a week; and a larger fraction of the sample (n=234; 42.2%) reported playing on their mobile phone/tablet devices. Additionally, the majority of the sample (n=386; 69.8%) spent at least half of their free time gaming. Finally, academic performance was perceived as average by more than half (n=287; 53.6%) of all participants.

Results from the logistic regression indicated that the most relevant IGD risk factors were male gender (OR 2.183, 95%CI 1.336-3.569, p = 0.002), sleep quality (OR 1.783, 95%CI 1.084-2.934, p = 0.23), severe depression symptoms (OR 16.296, 95%CI 3.609-73.593, $p < 0.001$), spending more than half of total free time gaming (OR 2.877, 95%CI 1.726-4.796, $p < 0.001$), and weekly gameplay $\geqslant$ 20 hours (OR 13.474, 95%CI 5.640-32.190, $p < 0.001$).

Discussion

Overall, the results indicated that the prevalence of IGD in this sample was relatively higher than previously reported elsewhere. Although more recent research using large and representative samples have reported an IGD prevalence below 5%,[14] other research has reported high figures (e.g., 15.7%) for IGD in smaller samples,[3] similar to the present results. Some factors may help explain this finding. Firstly, the present study used more lenient cutoffs that were devised to assess individuals at moderate risk of IGD. Thus, the prevalence reported herein is comparable to that of previous research estimating prevalence in ''at-risk'' groups, as higher rates are generally reported among this group of gamers.[4] Secondly, the results found for gamers at high risk (15.7%) were similar to those obtained using a GD scale in the same sample (13.5%) and to similar previous research using the Problem Video Game Playing (PVP) in another sample of Brazilian students (15.8%, n=100).[7] Finally, it is important to note that small (i.e., $n < 1{,}000$), non-representative samples may generate higher prevalence estimates.[3]

The sample utilized in this study presented a slight male predominance, and male gender is traditionally associated to higher levels of IGD.[3] In terms of gender differences, male gamers were 2.183 times more likely to develop IGD than their female counterparts. Even though previous research suggested that adolescents and young adults are at greater risk of developing IGD,[15] the age association was not kept in the logistic regression model in the present study due to mixed findings.

Further analysis indicated that associated risk factors for IGD were similar to those reported in previous cross-sectional research, such as insomnia and depressive symptoms.[3,4] The present study found a similar

Table 1 Sample description, prevalence of internet gaming disorder, and odds ratios for internet gaming disorder according to main sociodemographic and gameplay characteristics

	n (%)	IGD	p-value*	Odds ratio (95%CI)	p-value†
Gender			< 0.001		
Female	236 (42.5)	63 (26.7)		Reference	
Male	319 (57.5)	149 (46.7)		2.183 (1.336-3.569)	0.002
Age			< 0.001		
14-18	268 (48.3)	123 (45.9)		0.953 (0.377-2.697)	0.927
19-23	187 (33.7)	66 (35.3)		1.513 (0.762-3.003)	0.236
> 24	100 (18.0)	23 (23.0)		Reference	
Education			0.001		
Enrolled in secondary school	280 (50.8)	129 (46.1)		1.631 (0.675-3.941)	0.277
Completed secondary school	271 (49.2)	82 (30.3)		Reference	
Family income (BRL)			0.071		
< 2× minimum wage	203 (37.9)	72 (35.5)		0.620 (0.319-1.207)	0.159
3-5× minimum wage	242 (45.1)	86 (35.5)		0.544 (0.284-1.043)	0.067
> 6× minimum wage	91 (17.0)	44 (48.4)		Reference	
Social anxiety – Mini-SPIN			< 0.001		
Yes	154 (28.0)	77 (50.0)		1.266 (0.762-2.104)	0.362
No	396 (72.0)	134 (33.8)		Reference	
Sleep – PSQI			0.001		
Normal	255 (47.8)	80 (31.4)		Reference	
Altered	278 (52.2)	125 (45.0)		1.783 (1.084-2.934)	0.023
Depression – BDI			< 0.001		
Minimal	341 (63.7)	109 (32.0)		Reference	
Mild	104 (19.4)	45 (43.3)		1.461 (0.805-2.651)	0.212
Moderate	71 (13.3)	36 (50.7)		1.579 (0.790-3.155)	0.196
Severe	19 (3.6)	16 (84.2)		16.296 (3.609-73.593)	< 0.001
Suicidal ideation			0.006		
Yes	39 (7.1)	23 (59.0)		0.732 (0.266-2.016)	0.546
No	508 (92.9)	186 (36.6)		Reference	
Perceived academic performance			0.004		
High	175 (32.7)	50 (28.6)		Reference	
Average	287 (53.6)	121 (42.2)		1.408 (0.848-2.337)	0.187
Low	73 (13.6)	34 (46.6)		1.064 (0.494-2.286)	0.873
Daily gaming			< 0.001		
Yes	142 (25.6)	90 (63.4)		1.304 (0.756-2.249)	0.340
No	413 (74.4)	122 (29.5)		Reference	
Free time spent on gaming			< 0.001		
Less than half	386 (69.8)	97 (25.1)		Reference	
Half or more than half	167 (30.2)	115 (68.9)		2.877 (1.726-4.796)	< 0.001
Weekly time spent gaming, hours			< 0.001		
< 1 hour	151 (28.1)	14 (8.8)		Reference	
2-6 hours	202 (37.6)	74 (36.6)		4.891 (2.489-9.611)	< 0.001
7-19 hours	101 (18.8)	57 (56.4.0)		7.830 (3.647-16.813)	< 0.001
⩾ 20 hours	83 (15.5)	62 (74.7)		13.474 (5.640-32.190)	< 0.001

Values expressed as n (%).
95%CI = 95% confidence interval; BDI = Beck Depression Inventory; IGD = internet gaming disorder; Mini-SPIN = Mini-Social Phobia Inventory; PSQI = Pittsburgh Sleep Quality Index.
* Bivariate analysis, $p < 0.2$.
† Multivariate analysis, $p \leqslant 0.05$.

association between sleep problems and IGD-severity. Moreover, most participants at risk for IGD presented severe symptoms of depression.

The present study also found supporting evidence for the association between increased time spent gaming and increased likelihood of developing IGD. More specifically, participants who reported gaming ⩾ 20 hours a week were 13.5 times more likely to present with IGD in comparison to those who reported playing ⩽ 1 hour a week. Overall, these findings parallel the results of previous research investigating time spent gaming and associated risk of IGD.[5]

In conclusion, this study found a relatively higher prevalence and risk of IGD than those reported in previous

international literature. The prevalence of high risk for IGD, as measured by the IGD9S-SF, was comparable to the prevalence of GD risk measured by the GAS in the same sample. It was also similar to results previously reported using another instrument (PVP) in a different sample of Brazilian undergraduates.[7] Finally, associations were found between IGD and male gender, increased depressive symptoms, poorer sleep quality, increased time spent gaming, and total free time spent on gaming.

The present study has limitations worth considering. These include the relatively small sample size, the recruitment technique employed (which yielded a non-representative sample), and the use of self-report instruments. It is important that future studies investigate the epidemiology of IGD in larger, representative, population-based samples. These potential limitations notwithstanding, our findings help bridge the research gap on IGD in Brazilian samples and provides useful epidemiological data that can be used for cross-cultural comparisons in international research. Finally, the study also contributes to the identification of risk factors that can increase vulnerability to IGD, a result that can help early detection and open new avenues of discussion on the topic.

Disclosure

The authors report no conflicts of interest.

References

1 Pontes HM, Griffiths MD. Measuring DSM-5 Internet gaming disorder: development and validation of a short psychometric scale. Comput Human Behav. 2015;45:137-43.
2 Pontes HM, Schivinski B, Sindermann C, Li M, Becker B, Zhou M, et al. Measurement and conceptualization of gaming disorder according to the world health organization framework: the development of the gaming disorder test. Int J Ment Health Addict. 2019 Jun 3:1-21. http://dx.doi.org/10.1007/s11469-019-00088-z
3 Fam JY. Prevalence of internet gaming disorder in adolescents: a meta-analysis across three decades. Scand J Psychol. 2018;59:524-31.
4 Hawi NS, Samaha M, Griffiths MD. Internet gaming disorder in Lebanon: relationships with age, sleep habits, and academic achievement. J Behav Addict. 2018;7:70-8.
5 Torres-Rodríguez A, Griffiths MD, Carbonell X, Oberst U. Internet gaming disorder in adolescence: psychological characteristics of a clinical sample. J Behav Addict. 2018;7:707-18.
6 Lemos IL, Conti MA, Sougey EB. Avaliação da equivalência semântica e consistência interna da Game Addiction Scale (GAS): versão em português. Braz J Psychiatry. 2015;64:8-16.
7 Suzuki FTI, Matias MV, Silva MTA, de Oliveira MP. O uso de videogames, jogos de computador e internet por uma amostra de universitários da Universidade de São Paulo. Braz J Psychiatry. 2009;58:162-8.
8 Price waterhouse Coopers Brasil (PwC). Somos gamers [Internet]. [cited 2019 Nov 5]. www.pwc.com.br/pt/outlook-17/somos-gamers.html
9 Severo RB, Barbosa AP, Fouchy DR, da Cunha Coelho FM, Pinheiro RT, de Figueiredo VL, et al. Development and psychometric validation of internet gaming disorder scale-short-form (IGDS9-SF) in a Brazilian sample. Addict Behav. 2020;103:106191.
10 Cunha JA. Manual da versão em português das Escalas Beck. São Paulo: Casa do Psicólogo; 2001.
11 D'El Rey GJ, Lacava JP, Cardoso R. Consistência interna da versão em português do Mini-Inventário de Fobia Social (Mini-SPIN). Rev Psiquiatr Clin. 2007;34:266-9.
12 Gonçalves DM, Stein AT, Kapczinski F. [Performance of the self-reporting questionnaire as a psychiatric screening questionnaire: a comparative study with structured clinical interview for DSM-IV-TR]. Cad Saude Publica. 2008;24:380-90.
13 Bertolazi AN, Fagondes SC, Hoff LS, Dartora EG, da Silva Miozzo IC, de Barba ME, et al. Validation of the Brazilian Portuguese version of the Pittsburgh sleep quality index. Sleep Med. 2011;12:70-5.
14 Kuss DJ, Pontes HM. Internet addiction. Göttingen: Hogrefe; 2019.
15 Stavropoulos V, Burleigh TL, Beard CL, Gomez R, Griffiths MD. Being there: a preliminary study examining the role of presence in internet gaming disorder. Int J Ment Health Addict. 2019;17:880-90.