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Gambling Disorder Due to Brazilian Animal Game ("Jogo do bicho"): Gambling Behavior and Psychopathology

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Abstract Gambling is currently widespread across the globe and despite legally restricted, it is significantly common in Brazil. A traditional and common form of gambling in Brazil is the Brazilian animal game (BAG)—"Jogo do bicho" in Portuguese. In 2013, BAG activities collected approximately 19 billion Brazilian reais—equivalent to more than 8 billon American dollars, a figure almost 60 % higher than legal lotteries. Although a common form of gambling, the gambling behavior and psychopathology of gambling disorder (GD) associated with BAG has never been systematically studied. The aim of this study is to conduct, the first research approaching GD due to BAG. We assessed 897 participants of whom 63 subjects (7.0 %) presented with GD due to BAG and 834 with GD associated with other forms of gambling. After comparing these two groups, major differences were found in demographics, gambling behavior elements and psychopathological variables. This research reinforces the need for further research on BAG and the need for specific approaches in GD. The particularities of BAG may affect treatment strategies as, for example, suggest some adaptations in social and psychotherapeutic approaches. We also highlight the need to acknowledge the "hidden" BAG as a potential addictive game.

Keywords Gambling disorder · Brazilian animal game · Jogo do bicho · Lottery · Illegal lottery

Introduction

Gambling is currently widespread across the globe (Blume and Tavares 2004; Tavares et al. 2010; Ziolkowski 2014) and despite legally restricted, it is significantly common in

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Brazil (Tavares et al. 2010; Tavares 2014). In fact, there has been debates about the exact boundary between social gambling (gambling habit) and gambling disorder—GD (Reilly and Smith 2013). There are some reasons for the controversy surrounding GD. First, when this condition was first introduced in Diagnostic and Statistical of Mental Disorders Third Edition (American Psychiatric Association 1980), its diagnostic criteria had almost any evidentiary basis (National Research Council 1999) what historically raised doubts about the formal existence of the disorder. Second, individuals who gamble recreationally could potentially have greater well-being relative to non-gamblers and this appears to be particularly common in older adults (Desai et al. 2004). Third, only a small proportion of the subjects who gamble develop GD. For example, for each individual with GD there are approximately nine subjects presenting with social gambling (Tavares et al. 2010). However, during the last two decades the understanding of GD has evolved, an increasing amount of research has been dedicated to the topic and currently there is relevant scientific support to this condition, including psychopathology, neurochemicals tests, brain imaging and genetic studies (Reilly and Smith 2013; American Psychiatric Association 2013). In short, when gambling behavior becomes repetitive, problematic, persistent and leads to clinically relevant impairment or distress to the subject, we may characterize the behavior as GD (American Psychiatric Association 2013).

Nationally representative data suggest that the prevalence of GD is about 1 % of the Brazilian adult population (Tavares et al. 2010), which is significant and similar to other countries (Alegría et al. 2009; Lupi et al. 2014). GD usually generates several relevant negative consequences such as financial problems, legal issues, relational conflicts and professional difficulties (Wenzel and Dahl 2009).

A traditional and common form of gambling in Brazil is the Brazilian animal game (BAG)—"Jogo do bicho" in Portuguese (Tavares 2014). In 2013, BAG activities collected approximately 19 billion Brazilian reais—equivalent to more than 8 billon American dollars-US$, a figure almost 60 % higher than legal lotteries (Brazilian House of Representatives 2014). Although a common form of gambling, the gambling behavior and psychopathology of GD associated with BAG has never been systematically studied.

BAG was developed in late nineteenth century in the city of Rio de Janeiro, the former Brazilian capital (Vaz 2011; Tavares 2014). Baron João Batista Viana Drummond, who was the owner of the city's Zoo, created a game where each entrance ticket for the Zoo had a stamp of one of 25 animals on the back. By the end of the day the administration of the Zoo unveiled a picture that revealed the chosen animal (Bueno 2012). If someone had the animal stamped in his/her ticket, he/she would win 20 times the value paid for entrance (Bueno 2012). BAG went far beyond the limits of the Zoo, and the game evolved, broadening the possibilities of bets, and became hugely popular first in Rio de Janeiro and, then throughout Brazil (Bueno 2012; Vaz 2011; Chazkel 2011; Da Matta and Soarez 1999; Misse 2007; Mathias et al. 2009). Two of the main reasons for the growth in popularity were: (1) BAG was simple and (2) literacy did not affect participation (Tavares 2014). BAG, together with many other games, was formally forbidden in 1946 by the Brazilian president Eurico Gaspar Dutra (Brazilian Law 9125 1946). However, the illegitimacy did not diminish the interest in BAG, which has been called the "unbeatable adversary" (Da Matta and Soarez 1999). Currently, the still illegal BAG has a well-structured organization behind it, often associated with organized crime (Da Matta and Soarez 1999; Misse 2007) and can be easily found in Brazil's streets (Tavares 2014). It is estimated that there are approximately 350,000 illegal places where you can gamble on BAG (Brazilian House of Representatives 2014). Although several studies address the need for specific therapeutic

approaches in GD (Raylu and Oei 2002; Petry et al. 2005), to our knowledge, there is no research addressing GD due to BAG.

The majority of the available research regarding BAG has used sociological, anthropological and historical approaches. Da Matta and Soarez (1999) described the history of BAG, its influence on Brazilian culture and the symbolic meanings associated with the game (Da Matta and Soarez 1999). A similar approach was used by Chazkel (2011), who additionally described judicial issues related to BAG (Chazkel 2011). The work conducted by Misse (2007) described the association of the game with organized crime, Carnival and drug dealing (Misse 2007). Vaz (2011) reports on BAG as a means of describing illegal gambling in Rio de Janeiro and New York and how they are correlated with corruption (Vaz 2011). Mathias et al. (2009) conducted the only work that collected some kind of medical measure in BAG. They investigated the association between substance-use disorders and gambling problems in 147 patients. They found that BAG, along with lottery, were the most played games by people with substance-use disorders and GD (Mathias et al. 2009). The rates were not provided and there was not a psychopathological approach to BAG. There is scant research literature concerning BAG. For example, we performed a search in PUBMED using the keywords "animal game" OR "jogo do bicho" AND "gambling" in October, 2014 and found no reports.

In light of the current issues with the literature, the aim of this study is to conduct, the first study approaching gambling behavior and psychopathology of GD due to BAG. We assessed in a standardized and systematic way demographics, gambling behavior and psychopathological variables in 897 adults (63 with GD due to BAG and 834 patients with GD associated with other forms of gambling as a comparison group). Our hypothesis is that GD due to BAG presents in unique clinical ways and that this comparison may lead to a better understanding of its presentation and might suggest more tailored and effective therapeutic approaches.

Methods

Sample

We assessed 897 participants [mean age (Standard-deviation) = 44.7 (10.8); 55.9 % male, 44.1 % female] of whom 63 subjects (7.0 %) presented with GD due to BAG and 834 with GD associated with other forms of gambling.

The sample was enlisted at the Gambling Outpatient Unit of the Institute of Psychiatry at the University of São Paulo Hospital. The individuals sought the Institute voluntarily to participate in clinical treatment. A small percentage of individuals participated in trials or was referred from other low-complexity health care facilities in São Paulo city. The sample was enlisted from 1996 to 2014.

Exclusion criteria were: (1) unstable medical illnesses or need for emergency care, (2) relevant abnormalities on physical examination, (3) <5 years of formal education (4) psychotic symptoms and (5) refusal to participate in the research.

Measures

GD Diagnosis

We used the Structured Clinical Interview for Pathological Gambling as our diagnostic instrument (Grant et al. 2004). It is based on the criteria of Fifth Edition of the Diagnostic

and Statistical Manual of Mental Disorders—DSM-5—(American Psychiatric Association 2013). The criteria obtained before the release of DSM-5 were electronically saved and, then, retrospectively processed for a proper adaptation to current DSM-5 GD criteria.

Main Types of Games Played

Patients were assessed for *main types of games played*. Each subject was asked to list, preferably 1, or also 2 main forms of gambling if the patient considered that both forms of gambling were equally important. This choice should be made regarding frequency of gambling, amount money bet, negative consequences and worries associated with the game.

We considered with *GD due to BAG* the participants who listed this game as the only main form of gambling or as 1 of 2 main forms of gambling (when the subject considered that 2 forms of gambling were equally important).

Demographics

All participants were evaluated for *age, gender, ethnicity, educational level* and *marital status.*

Gambling Behavior Variables

We evaluated the following variables associated with gambling behavior including GD course, specific DSM-5 criteria and illegal acts correlated to gambling:

- *GD course:* we assessed *age of onset of recreational gambling, age of onset of GD, age of onset of treatment, lag between onset of recreational gambling and onset of GD, lag between onset of GD and onset of treatment.* According to Grant and Potenza, the course of GD can give important information about triggers and progression of the disorder (Grant and Potenza 2008).
- We separately evaluated *DSM-5 GD criteria directly associated with GD negative consequences*: (1) Gambling led to significant problems in relationships or professionally; (2) Dependence on others financially (American Psychiatric Association 2013).
- *Illegal acts associated with gambling*: an important behavior when evaluating GD because it is associated with a range of other disruptive behaviors and personal impairment (Granero et al. 2014).

Psychopathological Variables

We assessed several variables associated with psychopathology, which focus mainly on phenomenology and severity:

- *DSM-5 GD criteria* associated with psychopathology: (1) need to increase the amount of money on bets; (2) feelings of restlessness or irritability when stops gambling; (3) unsuccessful attempts to stop or reduce gambling; (4) significant preoccupation with gambling; (5) use of gambling as a way to relieve uncomfortable emotions; (6) chasing (after losing money, tries to recover) and (7) lies about involvement with gambling (American Psychiatric Association 2013).

- Urges to gamble during the past week: which can be reliably measured by the first 4 questions of the Gambling Symptoms Assessment Scale, G-SAS (Kim et al. 2009).
- *GD severity:* GD severity was assessed in two different ways; (1) by the total number of DSM-5 criteria endorsed, which is related to different levels of severity (American Psychiatric Association 2013); and (2) by the total G-SAS score (Kim et al. 2009).
- *Psychiatric comorbidities:* some participants ($n = 175$) underwent a psychiatric interview based on the criteria of the Mini International Neuropsychiatric Interview (M.I.N.I.), a semi-structured interview that assessed the prevalence of main comorbidities of "Axis I". This instrument is usually performed in approximately 45 min and was applied by professionals after a brief clinical training. The Brazilian Version of MINI was validated and showed a satisfactory reliability (Amorim 2000).

Statistical Analysis

First, a univariate comparison between the two groups was conducted. They were compared for demographics, psychopathological variables and gambling behavior variables. We used Chi square test for categorical variables. ANOVA and Mann–Whitney's tests were conducted to assess, respectively, continuous variables with normal and non-parametric distributions. A significance level (p) of .05 or less was assumed.

We also performed a binary logistic regression model where we introduced all the clinically significant and statistically relevant variables (p of .05 or less) from the preliminary univariate analysis. A forward strategy was used to achieve a final model that suggest the most significant variables that differentiate the patients with GD due to BAG and subjects with GD associated with other forms of gambling.

Ethical Issues

This study was approved by the ethics committee of the Clinics Hospital of the University of São Paulo (Brazil). We collected written informed consent from all participants of this research. This study followed the principles of the Declaration of Helsinki (World Medical Association, 2000).

Results

The demographic comparison between patients with GD due to BAG compared to GD associated with other games demonstrated relevant differences in all variables evaluated except ethnicity, which was not statistically significant (Table 1 presents the results for demographics). In short, BAG gamblers were older, predominantly males, achieved a lower educational level and were more frequently partnered.

Table 2 displays the main forms of games played by the comparison group, which consisted of subjects with GD due to other games. Non-strategic games were the most common, particularly the electronic machines.

In terms of gambling behavior the comparison also showed significant differences (Table 3). BAG players sought treatment for the first time at an older age, had slower progression from recreational gambling to GD and a longer lag time between GD and seeking treatment. The patients with GD due to BAG depended financially on others more frequently when compared to GD associated with other games.

Table 1 Demographics of patients with gambling disorder due to Brazilian animal game (BAG) compared to gambling disorder GD associated with other games

Demographic variable	BAG $n = 63$	Other games $n = 834$	Test's coefficient	Test's p value
Age (in years)	47.5 (SD = 11.3)	44.5 (SD = 10.8)	F = 4.517	.034
Gender				
Male	52 (82.5 %)	385 (46.2 %)	$\chi^2 = 19.571$	<.001
Female	11 (17.5 %)	449 (53.8 %)		
Race				
Caucasian	42 (66.7 %)	636 (76.3 %)	$\chi^2 = 2.921$	.087
Non-caucasian	21 (33.3 %)	198 (23.7 %)		
Educational level				
High school[a] or less	45 (71.4 %)	448 (53.7 %)	$\chi^2 = 7.423$	.006
More than high school	18 (28.6 %)	386 (46.3 %)		
Marital status				
With partner	49 (77.8 %)	519 (62.2 %)	$\chi^2 = 6.096$	.014
Without partner	14 (22.2 %)	315 (37.8 %)		

SD standard deviation

[a] Brazilian educational level comparable to High School in the United States

Table 2 Description of main forms of games played by patients with gambling disorder associated with games other than Brazilian Animal Game (comparison group)

Main forms of gambling[a]	n of subjects (total $n = 834$)	Percentage of comparison group (%)[b]
Any strategic game	124	14.9
Card games	85	10.2
Non-card strategic game (horses, dogs, stock market, sports)	46	5.5
Any non-strategic game	766	91.8
Electronic machines (slots, keno, different kinds of video-bingo)	660	79.1
Bingo	95	11.4
Lottery	66	7.9
Video poker	64	7.7
Pull tabs	9	1.1

[a] Each subject listed, preferably 1, or also 2 main forms of gambling if the patient considered that both forms of gambling were equally important. This choice was made considering frequency of gambling, amount money bet, negative consequences and worries associated with the game

[b] As each individual could choose up to 2 main forms of gambling, the sum of category percentages can surpass 100 %

With respect to the psychopathological variables (Table 4) BAG gamblers endorsed less frequently the criteria "unsuccessful attempts to stop or reduce gambling" and "gambles to relieve uncomfortable emotions". There was no statistical difference on GD severity or psychiatric comorbidities between the samples.

Table 3 Gambling behavior variables of patients with Gambling Disorder (GD) due to Brazilian animal game (BAG) compared to GD associated with other games

Gambling behavior variable	BAG $n = 61$ Mean (SD)	Other games $n = 817$ Mean (SD)	Test's coefficient	Test's p value
GD course				
Age when started recreational gambling	28.3 (±13.9)	31.1 (±12.7)	$F = 2.832$	.093
Age when developed GD	40.4 (±12.4)	38.4 (±11.3)	$F = 1.668$	.197
Lag between start of recreational gambling and GD	12.1 (±9.8)	7.35 (±8.7)	$F = 16.997$	<.001
Age that sought treatment for first time.	47.3 (±11.4)	43.3 (±43.4)	$F = 7.507$	.006
Lag between GD and seeking treatment	6.9 (±9.8)	4.9 (±6.5)	$F = 4.915$	.027
GD consequences				
Gambling led to significant problems in relationships or professionally	41 (67.2 %)	575 (70.4 %)	$\chi^2 = .272$	.602
Depend on others financially	56 (91.8 %)	661 (80.9 %)	$\chi^2 = 4.501$	.034
Illegal acts due to gambling	25 (41 %)	354 (43.3 %)	$\chi^2 = .127$	.721

SD standard deviation

Finally, we conducted a forward binary logistic regression to analyze which factors critically discriminate the two samples. In this model the main form of game was the dependent variable (BAG group vs. other games) and the covariates were the clinically relevant and statistically significant elements. The final model obtained (Table 5) suggests the factors that are highly relevant to differentiate the samples.

Discussion

We performed, to our knowledge, the first study on GD due to BAG. For this purpose we assessed demographics, gambling behavior and psychopathological variables in 897 adults. Sixty-three subjects endorsed BAG as their main form of gambling, and 834 patients presented with GD associated with other forms of gambling. Some of the key results were: (1) there were several important differences between the samples on demographics, which might directly influence treatment strategies; (2) subjects with GD due to BAG more frequently presented with financial dependence on others; (3) BAG gamblers had a slower progression from recreational gambling to GD, took more time to seek treatment and less frequently endorsed the criterion "unsuccessful attempts to stop or reduce gambling".

With respect to the demographics, BAG gamblers were predominantly males (82.5 vs. 46.2 % of other games). A recent representative research conducted in the United States with 4,905 participants regarding lottery and illegal lottery-like games showed that men gambled in these games more frequently than women (Barnes et al. 2011). Another study showed that males tend to gamble higher figures than females in lottery (Welte et al. 2002). An analogous rationale may potentially be true for BAG, a particular kind of lottery-like game. Therefore, males might be more susceptible to develop GD due to BAG.

Our data also showed that BAG gamblers tend to achieve a lower formal educational level (only 28.6 % continued studies after high school vs. 46.3 % of other games). The

Table 4 Psychopathological variables of patients with gambling disorder due to Brazilian animal game (BAG) compared to gambling disorder associated with other games

Psychopathological variable	BAG $n = 61$	Other games $n = 817$	Test's coefficient	Test's p value
Needs to increase the amount of money on bets	51 (83.6 %)	623 (76.3 %)	$\chi^2 = 1.72$	.190
Restless or irritable when stops gambling	51 (83.6 %)	647 (79.2 %)	$\chi^2 = .679$	.410
Unsuccessful attempts to stop or reduce gambling	50 (82 %)	742 (90.8 %)	$\chi^2 = 5.035$	.025
Often preoccupied with gambling	54 (88.5 %)	743 (90.9 %)	$\chi^2 = .396$	.529
Gambles to relieve uncomfortable emotions	35 (57.4 %)	606 (74.2 %)	$\chi^2 = 7.131$	.008
Chasing (after losing money, tries to recover)	56 (91.8 %)	732 (89.6 %)	$\chi^2 = .301$	.584
Lies about involvement with gambling	748 (91.6 %)	58 (95.1 %)	$\chi^2 = .938$	.333
Urge to gamble[a]	4.7 (±3)	5.9 (±4.1)	$F = 2.178$	.141
Gambling disorder severity				
According to DSM 5[b]	7.3 (SD = 1.1)	7.4 (SD = 1.3)	$F = .573$	.449
According to G-SAS[c]	23.1 (ST ± 6.2)	25.3 (ST ± 8.2)	$F = 1.894$	.169
Psychiatric comorbidities ($n = 175$)				
Current prevalence of alcohol-use disorders	11 (6.9 %)	1 (6.7 %)	$\chi^2 = .001$	.976
Current prevalence of substance-use disorders	4 (2.5 %)	0 (0 %)	$\chi^2 = .384$	.536
Current prevalence of major depressive disorder	37 (23 %)	3 (20 %)	$\chi^2 = .069$	.792
Current prevalence of any anxiety disorder	14 (8.8 %)	1 (6.7 %)	$\chi^2 = .076$	.783

SD standard deviation

[a] Urge to gamble in the past week, measured by the first four questions of the Gambling Symptoms Assessment Scale (G-SAS)

[b] GD severity measured by the total number of criteria endorsed according to the Fifth edition of Diagnostic and Statistical Manual of Mental Disorders (DSM 5)

[c] Severity measured by the total score of Gambling Symptoms Assessment Scale (G-SAS)

Brazilian national average for this variable is 41.8 % for adults aged 25 or more (Brazilian Government 2014). Several factors may play a role in the association between BAG and low education: (1) BAG is simple to play and bypass literacy problems (Tavares 2014); (2) Although income was not measured in this research, apparently there is an association between educational level and income (U.S. Bureau of Labor Statistics 2013) and Brazilian data accord with this rationale (Brazilian Government 2010). The minimum bet in BAG is extremely low compared to other games, one can gamble figures below US$ .05 (jogodobicho.net 2014). On the other hand, the lower bet on the largest Brazilian legal lottery is, for example, approximately US$ 1,00 (Caixa Econômica 2014). Therefore BAG might be more accessible for subjects who attained lower educational level. The lower income and lower economic reserve also may explain why BAG gamblers depend financially on others more often compared to other-games gamblers. These findings raise the issue of how education might affect the efficacy of psychological treatments for GD due to BAG.

Table 5 Forward binary logistic regression for patients with gambling disorder (GD) due to Brazilian animal game and GD associated with other games, final model

Final model variables	Wald χ^2	*p* value	Odds ratio (OR)	95 % OR interval	
				Lower	Upper
Age	8.199	.004	1.040	1.013	1.069
Gender	19.927	<.001	5.060	2.483	10.310
Education	9.286	.002	.395	.217	.718
Unsuccessful attempts to stop or reduce gambling	4.489	.034	.449	.214	.942
Depend on others financially	6.029	.014	3.338	1.275	8.737
Lag between start of recreational gambling and GD	4.176	.041	1.027	1.001	1.054
Constant	34.952	<.001	.003	–	–

Model summary: $\chi^2 = 58.064$ degrees of freedom $= 8$, $p < .001$

Cognitive behavioral therapy (CBT) is probably the treatment with the best evidence based treatment GD (Weinstock et al. 2008; Okuda et al. 2009; Cowlishaw et al. 2012) and lower education level may decrease its effectiveness (Thorn et al. 2011). Adaptations in traditional CBT might turn it more efficient for that population (Thorn et al. 2011). BAG also has strong cultural roots and is often associated with irrational belief such as a subjective state of "feeling lucky" or gambling after having dreams that preview the right animal to bet (Da Matta and Soarez 1999). Further research on cognitive functioning of GD associated to BAG is needed for proper tailoring of psychotherapeutic approaches.

In terms of GD course the subjects with GD due to BAG have a longer lag between the start of recreational gambling and the development of the disorder. This may be partially explained by the fact that BAG has a relatively low frequency of reinforcements since there is a reasonable time between the bet and the result. This is especially true when compared to some other games, such as electronic gaming machines, which have a high frequency of reinforcements and consequently a faster progression to GD (Tavares et al. 2003; Williams et al. 2007; Dowling et al. 2005; Nower and Blaszczynski 2008). In addition, BAG gamblers take more time to seek treatment (i.e. have a longer lag between development of GD and seek of treatment). One may speculate that because BAG is traditional, popular and well accepted in Brazil (Tavares 2014) many people fail to think it is causing problems for them and therefore they delay seeking professional help. As a result of longer lags between onset of recreational gambling and GD and between development of GD and seek of treatment, BAG gamblers found in health care services tend to be older. The lower endorsement of the criteria "unsuccessful attempts to stop or reduce gambling" might also be a reflection of the high tolerance that leads to decreased willingness to quit BAG. As the development of responsible gambling campaigns in an illegal game has obvious difficulties, effective government supervision in Brazil seems to be the best possible policy to reduce the rates of GD due to BAG.

We highlight that this study has an important limitation that is the use of treatment-seeking patients, which may weaken the potential of generalization to population level. Nonetheless, the results of this research are clearly useful in clinical practice. Another limitation is the relatively small sample of subjects with GD due to BAG. However, our Outpatient Unit took 18 years to actively enlist those gamblers what may correlate to the high acceptance of this form of gambling. In light of these issues and as this is the first study conducted on GD due to BAG, we might consider the sample reasonable.

This research reinforces the need for further research on BAG and the need for specific approaches in GD. This study showed that there are highly important differences in several demographics, gambling behavior and psychopathological variables between individuals presenting with GD associated to BAG compared to GD due to other games. These particularities of BAG may directly affect treatment strategies as, for example, suggest some adaptations in psychotherapeutic approaches. We also highlight the need to acknowledge the "hidden" BAG as a potential addictive game.

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