

Gambling disorder and obsessive–compulsive personality disorder: A frequent but understudied comorbidity

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Background and aims: Epidemiological data have suggested that the prevalence of co-occurring personality disorders is particularly high in people with gambling disorder (GD). Among the personality disorders, obsessive–compulsive personality disorder (OCPD) appears to be the most common problem. The objective of this study was to investigate the clinical presentation of GD with and without co-occurring OCPD. **Methods:** We studied 25 subjects with current GD and lifetime diagnosis of OCPD. They were matched for age and gender with 25 individuals with current GD but no lifetime diagnosis of any personality disorder. **Results:** Subjects with GD and OCPD demonstrated (a) lower severity of gambling symptoms, (b) slower progression from recreational gambling to full-blown GD, (c) preferred individual forms of betting, (d) identified more triggers to gambling (specially the availability of money and stress); and (e) reported less negative impact on relational problems due to GD. **Conclusions:** Our research provides further insight on GD co-occurring with OCPD, such as increasing social support and improvement of coping skills, especially to deal with financial difficulties and stress. Our findings may lead to more customized and effective therapeutic approaches to this frequent comorbidity.

Keywords: gambling disorder, obsessive–compulsive personality disorder, personality disorder, behavioral addictions, gambling problems, comorbidity

INTRODUCTION

Gambling disorder (GD) is associated with serious adverse impacts at individual, familial, and social levels. For example, reduced quality of life, higher rates of criminal and legal problems, and suicide are some of the common negative consequences associated with the disorder (Black, Moyer, & Schlosser, 2003; Grant & Kim, 2005; Petry & Kiluk, 2002; Petry, Stinson, & Grant, 2005). GD shows high levels of co-occurring psychiatric disorders (Crockford & el-Guebaly, 1998; Dowling et al., 2015; Petry et al., 2005). Epidemiologic data have suggested that the prevalence of co-occurring personality disorders is particularly high in disordered gamblers with a lifetime prevalence estimated at 60.8% (Petry et al., 2005). Among the personality disorders, obsessive–compulsive personality disorder (OCPD) appears to be the most common problem among disordered gamblers at approximately 30% (Petry et al., 2005). Therefore, based on Petry et al.'s (2005) research, an estimated 259,676 adults possess both GD and a lifetime diagnosis of OCPD in the USA alone. Although the co-occurrence of GD and OCPD is very common, information regarding the clinical presentation of this comorbidity is very scarce. This lack of knowledge limits more customized and more effective treatments for the comorbidity.

OCPD is characterized by a strong desire for perfectionism, control, and orderliness (American Psychiatric

Association [APA], 2013). Subjects with OCPD tend to present with inflexibility, rigidity, and stubbornness (APA, 2013). This behavioral pattern is often associated with a lower quality of life and problems in overall psychosocial functioning (Diedrich & Voderholzer, 2015; Mancebo, Eisen, Grant, & Rasmussen, 2005; Pinto, Steinglass, Greene, Weber, & Simpson, 2014). In addition, OCPD is correlated with increased health costs (Bender et al., 2001, 2006; Diedrich & Voderholzer, 2015; Fineberg, Reghunandan, Kolli, & Atmaca, 2014; Sansone, Hendricks, Gaither, & Reddington, 2004; Sansone, Hendricks, Sellbom, & Reddington, 2003). Research has indicated that personality disorders overall, and specifically OCPD, affect the psychopathology and response to treatment in several disorders associated with the impulsive–compulsive spectrum, such as obsessive–compulsive disorder, alcohol-use disorders, and substance-use disorders (Hasin, Stinson, Ogburn, & Grant, 2007; Mancebo et al., 2005; Newton-Howes, Tyrer, & Johnson, 2006). These findings incentivize further research on the co-occurrence of GD and OCPD. However, clinical knowledge on this important comorbidity is considerably scant.

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In light of the discussion, the objective of this study was to investigate the clinical presentation of GD with and without comorbid OCPD. Based on previous research and clinical experience, some of our main hypotheses were: (a) subjects with GD and co-occurring OCPD would show worse overall functioning when compared to disordered gamblers without the comorbidity; (b) due to the need for control over their environment, people with GD and OCPD would prefer individual forms of gambling; and (c) GD comorbid with OCPD would have different triggers, such as loneliness and stress, to gambling, and to relapse. A deeper understanding of GD comorbid with OCPD may lead to more customized and effective therapeutic approaches.

METHODS

Sample

We studied 25 subjects with current GD and lifetime diagnosis of OCPD. They were matched for age (exact age: ± 1 year) and gender with 25 individuals with current GD but no lifetime diagnosis of any personality disorder. The sample ($n = 50$) had mean (standard deviation) and median ages of 44.8 (± 11.8) and 44.0 years, respectively. Twenty-two subjects (44.0%) were males. The groups (GD with OCPD and GD without OCPD) were enlisted from clinical trials on treatments for GD (pharmacotherapy or cognitive behavioral therapy). The assessments were conducted before the initiation of the interventions of the clinical trial. Participants were recruited through advertisements on the Internet, public places, and newspapers. The enlistment took place in the Minneapolis and Chicago metropolitan areas. All studied individuals were evaluated by a research-trained and board-certified psychiatrist. The participants received monetary compensation in the form of 50 US dollar gift cards to local stores.

In order to participate in this study, subjects met the following inclusion criteria: (a) 18 years of age or older, (b) current GD diagnosis according to the fifth edition of *Diagnostic and Statistical Manual for Mental Disorders* (DSM-5; APA, 2013), and (c) ability to come to the assessment center for clinical evaluation. The exclusion criteria of this study were: (a) need of emergency care, (b) presence of unstable medical illness, (c) significant abnormalities on physical evaluation, (d) inability to complete the research procedures, (e) active psychotic symptoms, and (f) refusal to provide written consent to participate.

Measures

Demographics. In addition to age and gender (matched variables), this study assessed educational level, marital status, and ethnicity.

Assessment of personality disorders. All participants were evaluated with the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (First, Benjamin, Gibbon, Spitzer, & Williams, 1997). No changes were made in the criteria of personality disorders in DSM-5 in relation to DSM-IV (APA, 2013).

Gambling behavior.

- Severity of GD and overall psychosocial functioning: this study assessed GD severity with the Gambling Symptom Assessment Scale (G-SAS; Kim, Grant, Potenza, Blanco, & Hollander, 2009). The G-SAS assesses gambling symptoms in the week prior to the evaluation. This instrument provides a score between 0 and 48 reflective of mild, moderate, severe, or extreme gambling (Kim et al., 2009). Moreover, we investigated the subject's overall psychosocial functioning using the Clinical Global Impression Scale (Guy, 1976). This is a 7-point scale that evaluates the general functioning of the individual.
- Gambling-associated variables: we assessed (age at onset of recreational gambling) and (age at onset of GD). The difference between the latter and the former variables provided the lag between recreational and GD. Furthermore, we investigated which forms of gambling were used by participants and which triggers were associated with gambling activity. Negative consequences caused by the gambling behavior (financial problems, loss of property, relational difficulties, legal problems, and work-related difficulties) were also evaluated.

Co-occurring psychiatric disorders and symptoms.

- Co-occurring psychiatric disorders: we investigated psychiatric comorbidities with the Mini-International Neuropsychiatric Interview (Hergueta, Baker, & Dunbar, 1998). In addition, we evaluated impulse-control disorders using the Minnesota Impulsive Disorders Interview (Grant, 2008). Finally, we assessed current tobacco smoking (past 3 months) with an open question.
- Co-occurring psychiatric symptoms: this study evaluated anxiety and depressive symptoms using the Hamilton Anxiety Scale (Maier, Buller, Philipp, & Heuser, 1988) and the Hamilton Depression Rating Scale (Williams, 1988), respectively. Both scales assess symptoms in the week prior to the evaluation and have been widely used in mental health research.

Statistical analysis

The sample was divided into two groups: (a) GD with OCPD and (b) GD without OCPD or any other personality disorder. Initially, we conducted a univariate comparison between the groups. We used Pearson's χ^2 test for categorical variables. In situations where the categorical variables had cells with five or less subjects, Fisher's exact test was performed instead. With respect to continuous variables, we first conducted a one-sample Kolmogorov–Smirnov test to assess the distribution of the values. Student's *t*-test and Mann–Whitney's *U* test were used for variables distributed parametrically and non-parametrically, respectively.

We also performed binary logistic regressions (GD with OCPD vs. GD without OCPD) to investigate the variables that ultimately discriminated the two groups. We used both forward and backward strategies. In this model, we introduced the variables with $p < .10$. This study set the level of significance (p) at .05.

Ethics

The current research was approved by the Institutional Review of Boards of both Universities involved in the study. The researchers explained all the study procedures and provided time for individuals to ask question. All participants gave written informed consent. The proceedings were conducted in accordance with the guidelines of the Declaration of Helsinki, which established the ethical rules for research with humans.

RESULTS

After the matching process for age and gender, the groups of disordered gambling with and without co-occurring OCPD presented with very similar demographics (Table 1).

In terms of co-occurring personality disorders, 12 subjects (48%) of the group with lifetime prevalence of OCPD also presented at least one additional personality disorder (Table 2).

As some individuals of the group GD + OCPD also presented additional personality disorder(s), we were concerned about the potential confounding impact of the other personality disorders in this study. Therefore, we conducted further analyses to better understand the influence of the additional personality disorders. We performed a comparison between the subjects with only OCPD as personality disorder and the individuals with OCPD and other personality disorder(s). Ultimately, the two groups did not differ in any clinical variable (gambling behavior, co-occurring psychiatric disorders, and symptoms; see Supplementary Table 1). Consequently, it is very likely that the differences between subjects with and without OCPD are due to this personality disorder.

With regard to gambling behavior, subjects with GD and OCPD demonstrated a lower severity of gambling symptoms assessed by the G-SAS. Disordered gamblers with OCPD had a slower progression from recreational gambling to meeting criteria for GD. Those with GD and OCPD also played card games less frequently and identified more triggers to gambling. Furthermore, individuals with GD + OCPD reported less relational problems related to their gambling (Table 3). The two groups did not significantly differ in terms of impairment in overall psychosocial functioning.

With respect to co-occurring psychiatric disorders and psychiatric symptoms, the group GD + OCPD demonstrated higher prevalence of substance-use disorders (Table 4).

Finally, we conducted binary logistic regressions where we inserted the variables with $p < .10$. The variables introduced in this analysis were: (severity of GD measured by the G-SAS), (lag between recreational gambling and GD), (cards as a form of gambling), (having money as a trigger to gambling), (stress as a trigger to gambling), (loneliness as a trigger to gambling), (depressive symptoms as a trigger to gambling), (advertising as a trigger to gambling), (relational problems due to GD), and (substance-use disorder). Both forward and backward strategies led to the same final model. They suggested that the variables that critically differentiated disordered gamblers with OCPD from those without were: (a) (severity of GD measured by the G-SAS), $\text{EXP}(B) = 0.836$, 95% CI for $\text{EXP}(B) = \{0.712: 0.982\}$, significance = 0.029; (b) (lag between recreational gambling and GD), $\text{EXP}(B) = 1.178$, 95% CI for $\text{EXP}(B) = \{1.023: 1.357\}$, significance = 0.023; and (c) (cards as a form of gambling), $\text{EXP}(B) = 0.001$, 95% CI for $\text{EXP}(B) = \{0.000: 0.098\}$, significance = 0.005, constant $\text{EXP}(B) = 1,594.295$, significance = 0.024; model summary: $\chi^2 = 30.717$; degrees of freedom = 3; significance < 0.001; reference values: 0 = without OCPD; 1 = with OCPD.

Table 1. Demographics in adults with gambling disorder *with* and *without* comorbid obsessive-compulsive personality disorder (OCPD; $n = 50$)

		Total sample ($n = 50$)	Gambling disorder <i>with</i> OCPD ($n = 25$)	Gambling disorder <i>without</i> OCPD ($n = 25$)	Statistical test's coefficient ^a	p value ^a
Demographics		Mean (SD)/ median or % (n)	Mean (SD)/median or % (n)	Mean (SD)/median or % (n)		
Matched ^b	Age	44.8 (± 11.8)/44.0	44.8 (± 12.0)/44.0	44.8 (± 11.9)/44.0	$U = 312.0$	.992
	Gender					
	Male	44.0 (22)	44.0 (11)	44.0 (11)	$\chi^2 = 0.000$	1.000
	Female	56.0 (28)	56.0 (14)	56.0 (14)		
Educational level						
	High school or less	30.0 (15)	28.0 (7)	32.0 (8)	$\chi^2 = 0.095$	.758
	More than high school	70.0 (35)	72.0 (18)	68.0 (17)		
Marital status						
	With partner	32.0 (16)	28.0 (7)	36.0 (9)	$\chi^2 = 0.368$	.544
	Without partner	68.0 (34)	72.0 (18)	64.0 (16)		
Ethnicity						
	Caucasian	90.0 (45)	88.0 (22)	92.0 (23)	$\chi^2 = 0.222$	1.000 ^c
	Non-Caucasian	10.0 (5)	12.0 (3)	8.0 (2)		

Note. SD: standard deviation; %: relative values; n : absolute values; p : statistical significance; U : Mann-Whitney test; χ^2 : Pearson's χ^2 test.

^aStatistical analyses were conducted between (gambling disorder *with* comorbid OCPD) versus (gambling disorder *without* comorbid OCPD). ^bThe groups (gambling disorder *with* comorbid OCPD) and (gambling disorder *without* comorbid OCPD) were matched for age and gender. ^cFisher's exact test was used due to the existence of cells with five or less subjects.

Table 2. Prevalence of personality disorders^a in adults with gambling disorder and obsessive-compulsive personality disorder^a (OCPD; *n* = 25)

Personality disorders	Adults with gambling disorder and OCPD ^b (<i>n</i> = 25) % (<i>n</i>)
Any personality disorder	100.0 (25)
OCPD	100.0 (25)
Any personality disorder (except OCPD)	48.0 (12)
Avoidant personality disorder	32.0 (8)
Paranoid personality disorder	12.0 (3)
Narcissistic personality disorder	12.0 (3)
Borderline personality disorder	12.0 (3)
Histrionic personality disorder	12.0 (3)
Dependent personality disorder	8.0 (2)
Antisocial personality disorder	4.0 (1)
Schizoid personality disorder	0.0 (0)
Schizotypal personality disorder	0.0 (0)

Note. %: relative values; *n*: absolute values.

^aFor personality disorders, lifetime prevalence was considered.

^bThe lifetime prevalence of any personality disorder was 0.0% in the group (adults without co-occurring OCPD).

DISCUSSION

This study assessed 50 subjects: 25 individuals with GD and comorbid OCPD and 25 participants without co-occurring OCPD. The two groups were matched for age and gender. The matching process led to virtually identical demographics in the two groups (Table 1). Therefore, the effect of potential selection biases might have been significantly reduced using this strategy. To our knowledge, this is the first research to systematically investigate GD with co-occurring OCPD, a very common comorbidity (Petry et al., 2005).

Severity of GD, overall functioning, and lag between recreational gambling and GD

We found that subjects with GD and OCPD demonstrated a lower severity of gambling (G-SAS) and a slower progression from recreational gambling to GD when compared to those without this personality disorder. However, the two groups (i.e., with and without comorbid OCPD) did not differ in terms of the overall psychosocial functioning, measured by the Clinical Global Impression score (Guy, 1976).

The GD + OCPD group presented a statistically lower severity of gambling behavior than GD without OCPD. Nonetheless, it is important to notice that participants with co-occurring OCPD still demonstrated a considerably high severity of gambling problems. For example, 14 out of 25 participants (56.0%) would be categorized as severe or extreme gamblers according to the G-SAS (Kim et al., 2009).

A possible explanation for the slower progression from recreational gambling to GD is that subjects with OCPD are partially protected from impulsive disorders due to traits, such as scrupulosity, orderliness, and control (APA, 2013; Fineberg et al., 2014). These “anti-impulsive”

characteristics may delay the development of impulsive/addictive disorders. Nonetheless, our results showed that these individuals may still achieve significantly detrimental levels of gambling behavior. Similarly, Grant, Mooney, and Kushner (2012) found high rates of alcohol-use disorders in OCPD when compared to the general population, even when controlled for demographics. These results show that people with OCPD are not immune from addictive disorders and potential significant negative consequences.

With respect to the overall functioning, both groups had similar levels of impairment. Since participants with and without comorbid OCPD did not differ much in terms of co-occurring disorders and symptoms (Table 3), it is possible that the personality disorder itself may play a relevant role in this point (overall functioning). As a result of this, it is probable that treating GD alone will not improve overall psychosocial functioning to optimal levels. In this context, pharmacological and non-pharmacological treatments specifically addressing OCPD symptoms might be very important.

Forms of gambling used

This research observed that the GD + OCPD group played cards less frequently when compared to the groups of disordered gamblers without OCPD. The two groups demonstrated very similar use of the other forms of gambling. It is interesting to notice that card games are considered “social forms of gambling” (Coman, Burrows, & Evans, 1997), i.e., they are usually played in groups and involve interaction with others.

People with OCPD often demonstrate significant interpersonal problems and need to control other’s behaviors (Bailey, 1998; Cain, Ansell, Simpson, & Pinto, 2015). Consequently, subjects with GD and OCPD would avoid card games. It might be also possible that individual games provide a better setting for cognitive disturbances common in GD and OCPD, such as illusion of control (Ladouceur, Sylvain, Letarte, Giroux, & Jacques, 1998).

Triggers to gambling

The GD + OCPD group, when compared to the group without OCPD, more frequently reported four of the six triggers to gamble: (a) availability of financial resources, (b) stress, (c) loneliness, and (d) advertisements. The fact that subjects with GD and OCPD identified more triggers overall than those without OCPD may have several explanations. One hypothesis is that individuals with OCPD appear to have impaired attentional set-shifting (Chamberlain et al., 2007; Fineberg et al., 2014). In other words, they tend to have increased cognitive processing of a specific environmental point or stimulus and decreased shift of attention from one place to another. Therefore, they might be more vulnerable to environmental stimuli overall.

Another possible explanation is that subjects with OCPD might be more prone to reporting *trigger-gambling* associations. This may occur due to a more rational personality structure. Finally, individuals with OCPD have problems flexibly responding to unexpected changes in the environment (APA, 2013; Fineberg et al., 2014). Consequently, unplanned

Table 3. Gambling behavior in adults with gambling disorder (GD) *with* and *without* comorbid obsessive–compulsive personality disorder (OCPD; $n = 50$)

Gambling behavior variables	Total sample ($n = 50$)	GD <i>with</i> OCPD ($n = 25$) ^a	GD <i>without</i> OCPD ($n = 25$) ^a	Test's statistical coefficient ^b	p value ^b
	Mean (SD)/median or % (n)	Mean (SD)/median or % (n)	Mean (SD)/median or % (n)		
Severity of GD and overall functioning					
The Gambling Symptom Assessment Scale ($N = 42$) ^c	35.2 (± 12.9)/33.0	30.9 (± 8.0)/32.0	39.5 (± 15.5)/37.0	$t = 2.261$	.029
Clinical global impression ($N = 36$) ^c	4.6 (± 0.8)/4.5	4.6 (± 0.7)/5.0	4.7 (± 0.8)/4.0	$U = 159.0$	.938
Onset of gambling					
Age at onset of recreational gambling ($N = 48$) ^c	27.4 (± 15.3)/23.5	24.7 (± 15.4)/21.5	30.2 (± 15.0)/28.5	$U = 222.0$	.172
Age at Onset of GD ($N = 44$) ^c	35.9 (± 13.0)/34.0	35.8 (± 13.1)/34.0	36.0 (± 13.3)/35.0	$t = 0.057$	.955
Lag between recreational gambling and GD ($N = 44$) ^c	10.1 (± 11.1)/7.5	13.4 (± 11.4)/10.5	6.8 (± 9.9)/2.5	$U = 135.0$	.012
Forms of gambling used					
Electronic gaming machines	72.0 (36)	72.0 (18)	72.0 (18)	$\chi^2 = 0.000$	1.000
Card games	38.0 (19)	12.0 (3)	64.0 (16)	$\chi^2 = 14.346$	<.001^d
Sports	26.0 (13)	24.0 (6)	28.0 (7)	$\chi^2 = 0.104$	.747
Lottery	18.0 (9)	16.0 (4)	20.0 (5)	$\chi^2 = 0.136$	1.000 ^d
Triggers to gambling					
Availability of financial resources	58.0 (29)	80.0 (20)	36.0 (9)	$\chi^2 = 9.634$	.004^d
Stress	42.0 (21)	60.0 (15)	24.0 (6)	$\chi^2 = 6.650$	.010
Loneliness	32.0 (16)	48.0 (12)	16.0 (4)	$\chi^2 = 5.882$	.032^d
Advertisements (radio, TV, billboards, etc.)	24.0 (12)	40.0 (10)	8.0 (2)	$\chi^2 = 7.018$	.018^d
Depressive symptoms	24.0 (12)	36.0 (9)	12.0 (3)	$\chi^2 = 3.947$	.095 ^d
Thoughts	22.0 (11)	24.0 (6)	20.0 (6)	$\chi^2 = 0.117$	1.000 ^d
Negative consequences due to gambling					
Financial problems or loss of property	92.0 (46)	88.0 (22)	96.0 (24)	$\chi^2 = 1.087$	.609 ^d
Relational problems (family, marriage, friends, etc.)	52.0 (26)	36.0 (9)	68.0 (17)	$\chi^2 = 5.128$	.024
Legal problems (theft, tax issues, bad checks, etc.)	48.0 (24)	40.0 (10)	56.0 (14)	$\chi^2 = 1.282$	.258
Work-related problems	22.0 (11)	24.0 (6)	20.0 (5)	$\chi^2 = 0.177$	1.000 ^d

Note. Bold values represent statistically significant ($p < .05$). SD : standard deviation; %: relative values; n : absolute values; p : statistical significance; t : Student's t -test; U : Mann–Whitney test; χ^2 : Pearson's χ^2 test.

^aThe groups (gambling disorder *with* comorbid OCPD) and (gambling disorder *without* comorbid OCPD) were matched for age and gender.

^bStatistical analyses were conducted between (gambling disorder *with* comorbid OCPD) versus (gambling disorder *without* comorbid OCPD). ^c(N) = Number of valid individuals for the specific variable. If the (N) is not displayed, all subjects ($n = 50$) were assessed for the variable. ^dFisher's exact test was used due to the existence of cells with five or less subjects.

elements, such as unexpected inflow of money, stress, or loneliness, might have a higher chance to elicit patterns of inappropriate behavior in people with co-occurring OCPD.

Regarding specific triggers, it is important to highlight the significant vulnerability to psychological stress in individuals with OCPD (APA, 2013). In DSM-I, OCPD was already described as a “*regression from more mature functioning as a result of stress*” (APA, 1952). In this context, an important therapeutic intervention may be techniques to deal with stress. Imaginal relaxation (visualization of relaxing images not associated to gambling + muscle relaxation techniques) has shown to be an effective non-pharmacological strategy for GD (Błaszczynski, Drobny, & Steel, 2005; Dowling, Jackson, & Thomas, 2008; Hodgins

& Peden, 2008). This intervention may be particularly adequate for subjects with co-occurring OCPD.

Our finding that loneliness is a relevant trigger to gambling in the OCPD group is consistent with previous research that has shown significant interpersonal problems in OCPD subjects (Cain et al., 2015; Hopwood et al., 2011; Matano & Locke, 1995). The majority of clinical trials on psychotherapy in OCPD have focused on individual approach (Diedrich & Voderholzer, 2015). However, group therapy may be particularly useful for OCPD (Kupfer & Lewis, 2008). In this psychotherapeutic format, interpersonal difficulties may be better observed and managed. As a result, group therapy might help the development of a healthier interpersonal style and the broadening of social network.

Table 4. Co-occurring psychiatric disorders and symptoms in adults with gambling disorder *with* and *without* comorbid obsessive-compulsive personality disorder (OCPD; $n = 50$)

	Total sample ($n = 50$)	GD <i>with</i> OCPD ($n = 25$) ^a	GD <i>without</i> OCPD ($n = 25$) ^a	Statistical test's coefficient ^b	p value ^b
Co-occurring psychiatric disorders and symptoms	% (n) or mean (SD)/median	% (n) or mean (SD)/median	% (n) or mean (SD)/median		
Co-occurring psychiatric disorders					
Alcohol-use disorder (lifetime prevalence)	22.0 (11)	24.0 (6)	20.0 (5)	$\chi^2 = 0.117$	1.000 ^c
Substance-use disorder (lifetime prevalence)	16.0 (8)	28.0 (7)	4.0 (1)	$\chi^2 = 5.357$	.049^c
Major depressive disorder (lifetime prevalence)	18.0 (9)	8.0 (2)	28.0 (7)	$\chi^2 = 3.388$	.138 ^c
Any anxiety disorder (lifetime prevalence)	14.0 (7)	16.0 (4)	12.0 (3)	$\chi^2 = 0.166$	1.000 ^c
Any impulse control disorder (lifetime prevalence)	12.0 (6)	20.0 (5)	4.0 (1)	$\chi^2 = 3.030$	.189 ^c
Current tobacco smoking	52.0 (26)	52.0 (13)	52.0 (13)	$\chi^2 = 0.000$	1.000
Co-occurring psychiatric symptoms					
Depressive symptoms (HAM-D) ($N = 42$) ^d	7.8 (± 4.2)/7.0	7.9 (± 4.1)/7.0	7.7 (± 4.4)/7.0	$t = -0.127$	.900
Anxiety symptoms (HAM-A) ($N = 42$) ^d	8.0 (± 4.3)/7.0	8.5 (± 3.9)/7.0	7.5 (± 4.8)/7.0	$t = -0.725$	.473

Note. Bold indicates that the p value was lower than .05. %: relative values; n : absolute values; SD: standard deviation; p : statistical significance; χ^2 : Pearson's χ^2 test; t : Student's t -test; HAM-D: Hamilton Depression Rating Scale (Williams, 1988); HAM-A: Hamilton Anxiety Scale (Maier et al., 1988).

^aThe groups (gambling disorder *with* comorbid OCPD) and (gambling disorder *without* comorbid OCPD) were matched for age and gender.

^bStatistical analyses were conducted between (gambling disorder *with* comorbid OCPD) versus (gambling disorder *without* Comorbid OCPD). ^cFisher's exact test was used due to the existence of cells with five or less subjects. ^d(N) = number of valid individuals for the specific variable. If the (N) is not displayed, all subjects ($n = 50$) were assessed for the variable.

Negative consequences due to gambling

This research observed that disordered gamblers with comorbid OCPD reported significantly less relational problems (family, marriage, friends, etc.) than the group without co-occurring OCPD. This finding may be associated with the social isolation in people with OCPD. It has been found that people with OCPD often demonstrate significant interpersonal problems (Bailey, 1998; Cain et al., 2015). Social isolation is frequent in OCPD and this is somehow associated with the need of excessive control (Lynch, Hempel, & Clark, 2015). In this context, the seek for control over life and the maladaptive perfectionism might be correlated with significant difficulties with others and consequently a tendency to isolation. A less active and more isolated social life may less suffer from the negative impacts of GD in relationships.

The identification of negative consequences due to GD has a crucial importance in the treatment of disordered gamblers. Motivational interviewing is a group of patient-centered techniques that have demonstrated to be efficient in GD (Hodgins, Ching, & McEwen, 2009). One of key points of this therapeutic intervention is to find areas where the patients acknowledge the negative impact of maladaptive behavior (Miller & Rollnick, 2012). Our finding suggests that financial problems and loss of property are considered negative consequences very often. Approaching how an effective treatment of GD may improve these problems might be an efficient way to increase compliance to treatment. In mid or

long term, the mental health professional may attempt to increase insight regarding the relational problems, which are probably going to be present.

Limitations

This study's findings should be interpreted in light of its limitations. First, this is a cross-sectional research. Consequently, it is not possible to infer clear causal relationships. Nonetheless, relevant measures of association might be obtained. Second, the sample used was recruited from clinical trials. As a result of this, caution is necessary when generalizing our results to other populations. However, the findings may be considered clinically useful. Finally, the participants were enlisted from a poll of diverse clinical trials, with different designs. Nonetheless, this study used baseline assessments (i.e., data from the first visit and before the initiation of additional interventions). Therefore, it is unlikely that the different designs interfered with our results.

Future directions

OCPD is the most frequent personality disorder in the general population (Grant et al., 2004) and in GD (Petty et al., 2005). These facts, in addition to the limited knowledge on GD with OCPD, warrant further investigations on this comorbidity. One important point that deserves more studies is treatment-seeking rates in GD and OCPD. GD

demonstrates low rates of treatment seek (Cunningham, 2005; Slutske, 2006; Suurvali, Hodgins, Toneatto, & Cunningham, 2008). OCPD is usually considered an ego-syntonic disorder (Fineberg, Sharma, Sivakumaran, Sahakian, & Chamberlain, 2007; Fineberg et al., 2014), and this fact may further reduce the pursuing of treatment in individuals with GD and OCPD. The studies focusing on how to motivate subjects with this comorbidity are highly desirable. Research approaching on how OCPD neurocognitive characteristics (need for control, perfectionism, and rigidity) interact, associated with cognitive dysfunctions of OCPD (illusion of control and superstitious behavior), may also provide useful insight.

CONCLUSIONS

This study found that there are significant differences between GD with comorbid OCPD and GD without OCPD. Our main findings were: (a) subjects with GD and OCPD demonstrated lower severity of gambling symptoms assessed by the G-SAS. Nevertheless, the two groups did not differ in terms of impairment in overall psychosocial functioning; (b) disordered gamblers with OCPD presented slower progression from recreational gambling to full-blown GD; (c) participants with GD and OCPD rarely played card games and preferred individual forms of betting; (d) subjects with the comorbidity, overall, identified more triggers to gambling (specially the availability of money and stress), and (e) individuals with GD + OCPD reported less negative impact on relational problems due to GD. This deeper understanding of GD co-occurring with OCPD provides important insight. Our findings may lead to more customized and effective therapeutic approaches to this frequent comorbidity.

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Authors' contribution: The authors confirm that all persons designated as authors were qualified for authorship. Each author participated sufficiently in the work to take public responsibility for the content. The corresponding author, GCM, affirms that he had access to all data from the study, both what is reported and what is unreported, and also that he had complete freedom to direct its analysis and its reporting, without influence from the sponsors. He also affirms that there was no editorial direction or censorship from the sponsors. He conducted the literature searches, the statistical analysis, and wrote the draft of the manuscript. JEG designed the study, wrote the protocol, supervised the literature searches and statistical analysis, and reviewed the draft of the paper. Both the authors contributed to and have approved the final version of the manuscript.

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