Gambling Disorder, DSM-5 Criteria and Symptom Severity

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Abstract

Introduction: Gambling Disorder (GD) is a prevalent psychiatric condition whose severity is typically defined by the number of DSM-5 criteria met out of a maximum of nine. The relationships between the levels of gambling severity, thus defined, and other measures of psychopathology and everyday functioning are clinically important.

Methods: Baseline data were collected in patients with GD, conducted from 2001 to 2016. Participants completed clinical interviews and questionnaires. The impact of disease severity (mild, moderate, and severe) on clinical measures was characterized using analysis of variance models.

Results: The sample included 574 adults with GD, of whom 73 [12.7%] had mild, 184 [32.1%] moderate, and 317 [55.2%] severe GD. The moderate and severe cases, compared to mild severity group tended be older, had later age of onset, lost more money to gambling in the preceding year, had worse quality of life, had higher state anxiety and depressive scores, consumed more nicotine via smoking per day, and had lower venturesomeness scores. The moderate and severe groups did not differ significantly on these measures, however. The Yale-Brown Obsessive Compulsive Scale modified for Pathological Gambling (PG-YBOCS) discriminated significantly between all three groups.

Conclusions: Several measures of psychopathology and functional impact of gambling symptoms appear similar between moderate and severe GD cases, while mild cases are clearly differentiated from moderate and severe cases. Thus, the current working definition of GD symptom severity boundaries has important limitations in terms of potential clinical utility.

1.0 Introduction

Gambling is a commonplace activity across cultures, and for some individuals can develop into gambling disorder (GD), a psychiatric condition characterized by persistent, recurrent maladaptive patterns of gambling behavior. GD in turn is associated with impaired functioning, reduced quality of life, and high rates of bankruptcy, divorce, and incarceration [1-2]. In the fifth edition of the Diagnostic and Statistical Manual (DSM-5), GD has been classified as a substance-related disorder [3]. As such, the DSM-5 has used the number of criteria met to define GD severity, mirroring the classification system used for substance use disorders.

In the case of GD, many indicators are available to potentially operationalize clinical severity (e.g., money lost gambling as a percentage of earnings, impairment, or comorbidity) [4]. The committee responsible for GD in DSM-5 decided that a simple count of the criteria was sufficient to determine level of severity, given that this approach had been successfully applied to substance use disorder risk factors and consequences [5-7]. Thus, this simple criteria sum as an overall severity indicator was used for substance use disorders and then extension for GD: mild (four to five criteria), moderate (six to seven), and severe (eight or nine). Recent research, however, suggests that the individual criteria may not all be equivalent in terms of their contributions to the severity of the behavior [8]. For example, jeopardizing important matters, experiencing withdrawal, and needing financial assistance were all associated with a more severe level of GD than were chasing losses or being preoccupied with gambling (Sleczka et al., 2015). In a sample of gamblers recruited from the general population, endorsement of the item 'social, financial, or occupational losses due to gambling' was most indicative of more severe GD [9].

The question remains as to whether simply summing the number of criteria endorsed by an individual accurately reflects GD symptom severity when each is weighted equally. The use

of multiple measures of gambling severity across different samples has made it difficult to compare, and thereby understand, which may be most useful in understanding the severity of this complex disorder. Therefore, we sought to examine the three levels of GD severity as determined by the DSM-5 against other clinical measures to determine if the DSM-5 categories of severity are clinically useful and comport with previous research on GD. This examination may provide a better understanding of thresholds of GD severity and how best to determine them. As is the case with many psychiatric disorders, and because many gamblers can develop a significant problem without meeting all criteria, we hypothesized that the levels of GD severity set forth by the DSM-5 would not coincide with other measures of gambling severity commonly used clinically and in research settings.

2.0 Materials and Methods

2.1 Participants

Participants included 574 adults with GD who had enrolled in various clinical, neuroimaging, and treatment research studies between 2001 and 2016. Data were collected prior to the initiation of any clinical procedures. A diagnosis of *pathological gambling* was confirmed by the primary investigator, a board-certified psychiatrist, using the criteria set forth by the DSM-IV [10] and the diagnoses were later confirmed to be consistent with the current requirements for GD using the DSM-5 [3]. Exclusion criteria for these studies included an inability to provide informed consent and inability to complete required assessment procedures.

All study procedures were carried out in accordance with the Declaration of Helsinki. The Institutional Review Boards of the University of Minnesota and of the University of Chicago

approved the procedures and accompanying consent forms. After study procedures were explained, all subjects provided informed written consent.

After providing informed consent, participants completed a full psychiatric assessment, general demographic questionnaires, self-report and clinician-administered severity measures, as well as measures of impulsivity. Due to the inclusion of subjects from multiple studies, not all measures are available for each subject.

2.2 Assessments

Semi-structured interview was used to assess gambling behavior, including: age at onset of gambling, age at onset of gambling disorder, money lost to gambling, annual income, and problems due to gambling. In addition, the following measures were completed:

Gambling symptoms during the past 12 months were evaluated using the *Structured Clinical Interview for Gambling Disorder (SCI-GD),* a nine-item instrument covering the DSM-5 criteria for GD [10; modified to reflect DSM-5].

Clinical Global Impressions-Severity (CGI): The CGI is a seven point scale used to denote the severity of a given disorder. Scores range from 1 ("Not ill at all") to 7 ("Among the most severe cases") according to an assessment from a trained clinician [11].

Yale-Brown Obsessive-Compulsive Scale modified for Pathological Gambling (PG-YBOCS): The PG-YBOCS is a clinician-administered scale that assesses severity of urges and behaviors related to gambling during the past week, with higher scores indicating greater severity [12].

Gambling Symptom Assessment Scale (GSAS): The GSAS is a reliable, self-report measure that assesses gambling symptom severity over the last week. Scores are based on ten

questions scored from 0-4, with a maximum possible score of 40. The scale covers a range of symptoms related to GD, including the severity, duration, and frequency of both urges and behaviors related to gambling [13].

Hamilton Depression Rating Scale (HAM-D): The HAM-D is a clinician-administered scale which assesses a patient's level of depression during the past month [14].

Hamilton Anxiety Rating Scale (HAM-A): The HAM-A is a clinician-administered scale which assesses a patient's level of anxiety during the past month [15].

Quality of Life Inventory (QoLI): The QoLI is a 16-item, self-report positive psychology scale that assesses areas of life such as health, love, work, recreation, home, friendships, self-esteem, and standard of living [16].

The following paper-pencil measures of impulsivity were also examined, but only in a subset of the sample (added more recently to protocols):

Barratt Impulsiveness Scale 11th version (BIS): The BIS is a 30 question self-report measure that is designed to assess various domains of impulsivity, including attentional impulsivity (AI), motor impulsivity (MI), and non-planning impulsivity (NI) [17].

Eysenck Impulsivity Questionnaire (EIQ): The EIQ is a 54 question self-report measure comprised of three subscales: impulsivity, venturesomeness, and empathy [18]. Impulsivity in the EIQ can be characterized as behaving without thinking and without realizing the risk involved in the behavior, whereas venturesomeness is being conscious of the risk of the behavior but acting anyway.

Data Analysis

Based on the nine criteria for GD in the DSM-5, subjects were categorized as mild (score 4-5), moderate (score of 6-7), or severe GD symptoms (score of 8-9) [3]. Group differences on demographic, clinical, and personality measures were explored using analysis of variance (ANOVA) for continuous variables and chi-square tests for categorical variables. *Post hoc* paired comparisons were undertaken when the initial omnibus tests were statistically significant. No imputation was made for missing data. This being an exploratory study, statistical significance was defined as $p<0.05$ uncorrected. SPSS Statistics version 18 (SPSS Inc., 2009) was used for all analyses.

3.0 Results

574 adults with GD (mean age 44.4 [±13.3] years) were evaluated, of whom 310 (54%) were male. The mean score on the PG-YBOCS for the entire sample was 22.8 (±5.9), and the mean G-SAS score was 35.7 (±10.8), both of which are in keeping with average disease severity being moderate in GD. On average, subjects lost a mean of $18,337 (±22,318) US dollars to gambling in the preceding year. Seventy-three [12.7%] patients had mild severity, 184 [32.1%] had moderate severity, and 317 [55.2%] had severe GD.

In terms of demographic variables, those with fewer DSM-5 criteria (mild severity) were significantly younger than both other groups. The mild severity group had a significantly higher proportion of males when compared to the severe group. The groups did not differ in terms of levels of education.

For the clinical variables, both the moderate and severe groups exhibited significantly older age of GD onset (but not age at first gamble), higher loss of money to gambling in the past year, lower quality of life, higher state anxiety plus depression scores, and more nicotine

consumption (smoking) relative to the mild group. Moderate and severe groups did not differ significantly from each other on these measures. The PG-YBOCS total scores differed significantly between all three groups, whereas the G-SAS and CGI-S measures were significantly higher in the severe group versus both other groups, while mild and moderate groups did not differ significantly from each other on these measures. Weekly gambling frequency was insensitive to group differences. No significant group differences were found for presence of categorical mood, anxiety, and substance use disorders or in terms of the mean number of co-occurring disorders across groups.

On the personality questionnaires, which were available for only a subsection of the total pooled cohort (see Table for N) the moderate and high severity groups had significantly lower Eysenck venturesomeness scores than the mild group. The moderate and high severity groups did not differ from each other on this measure. No other significant group differences were identified.

4.0 Discussion

In this large study of adults with GD we found that key measures of psychopathology and functional impact of gambling symptoms appear similar between moderate and severe GD cases, whereas mild cases are more clearly differentiated from moderate and severe cases. In addition, not all gambling severity scales differed between the mild and moderate severity groups. This is the first study we are aware of that has examined the clinical utility of the severity measure recently published for GD in the DSM-5, and this study suggests that the current working definition of GD symptom severity boundaries has important limitations. This finding therefore may have important implications for both treatment and research.

In terms of treatment of GD, clinicians may find that improvement from severe GD to moderate GD in terms of number of criteria has little, if any, relationship to change in severity of gambling behavior or functional outcomes. Additionally, if the intensity of GD treatment approaches is stratified based on these severity categories, applying treatment differently between moderate and severe GD clients may be a sub-optimal allocation of treatment resources.

For research, these findings may have notable implications for scale selection, participant inclusion criteria, and definitions of treatment response. The PG-YBOCS, unlike the GSAS and CGI-Improvement scales, was able to significantly discriminate mild from moderate groups. Thus, this scale may be preferable as a primary outcome measure in clinical trials (as these two groups appear clinically meaningful). Insensitivities within the GSAS and CGI do not appear to be due to limited statistical power in this study, as the PG-YBOCS was able to discriminate all three groups with high significance. When considering participant selection for future research, these data suggest that the PG-YBOCS woould be the preferred outcome measure for treatment trials if severe gamblers are included. As this category of gamblers did not differ from moderate gamblers on most other measures assessed in this analysis, any improvement they demonstrate could go undetected (i.e. they might decrease their symptom severity from severe to a moderate level)on many outcome measures. This in turn may inform how treatment response is defined, as movement from severe to moderate GD may not be associated with other measures of improvement.

It was potentially interesting that on trait measures, only the venturesomeness subscale of the Eysenck was significantly different between groups based on GD severity. Higher venturesomeness in the mild group might suggest that people prone to habit or less exploratory behavior might be more prone towards getting 'stuck' and more severe disease.

This study has several limitations. First, because both clinical and non-treatment-seeking samples were included, it is unclear how generalizable our results are to individuals with GD in the community. Second, this research used a cross-sectional analysis and, therefore, causal relationships cannot be confirmed; the analysis does, however, provide reliable measures of association. Third, we did not examine the equivalency of different criteria in terms of functional or severity impact in this study as this is a distinct topic from assessing the impact of current thresholds using total criteria met. Having said that, future work may wish to explore the role of different criteria using approaches such as latent class analysis. Despite these limitations, the study sample was relatively large for the majority of measures (personality measures were only collected for a relatively small sub-set of participants), the inclusion/exclusion criteria were relatively broad, and the study used both self-report and interviewer-administered measures with established psychometric properties.

In conclusion, these results suggest that measuring severity of GD using the number of diagnostic criteria, per the DSM-5 guidelines, may have limited clinical and research utility. In addition, it appears that the differences between moderate and severe gamblers based on the DSM-5 are not consistently associated with other measures of disease severity. Clinicians and researchers may therefore want to use alternative measures of GD severity (such as the PG-YBOCS) that allow for more accurate differentiation of groups based on gambling severity.

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Table 1. Demographic Variables of Subjects with Gambling Disorder Based on DSM-5 Level of Severity

Variables	Mild (4-5 criteria) N=73	Moderate (6-7 criteria) N=184	Severe (8-9 criteria) N=317	Omnibus p value #	Mild vs. Moderate	Moderate vs. Severe	Mild vs. Severe
Age	38.7 (17.2)	45.4 (13.5)	45.1 (11.7)	<0.001	***	n.s.	***
Gender, N Male	48 [65.7%]	106 [57.6%]	156 [49.2%]	0.019	n.s.	n.s.	*
Education Level	1.8 (0.5)	1.7 (0.6)	1.6 (0.5)	0.053	---	---	---

Omnibus test is ANOVA for continuous variables and chi-square for categorical variables. * p<0.05, ** p<0.01, *** p<0.001, significant paired difference by *post hoc* test. All values are Mean (Standard Deviation) unless otherwise noted.

DSM-5 = Diagnostic and Statistical Manual, Fifth Edition

Table 2. Clinical Variables of Subjects with Gambling Disorder Based on DSM-5 Level of Severity

Variables	Mild (4-5 criteria) N=73	Moderate (6-7 criteria) N=184	Severe (8-9 criteria) N=317	Omnibus p value #	Mild vs. Moderate	Moderate vs. Severe	Mild vs. Severe
Age at onset of gambling	24.0 (14.7)	26.4 (13.2)	24.4 (12.2)	0.211	---	---	---
Gambling disorder age at onset	31.4 (15.4)	36.7 (14.0)	34.5 (12.8)	0.020	**	n.s.	n.s.
$ Lost (Past Year)	8525 (13154)	17419 (19400)	22984 (25676)	<0.001	*	n.s.	***
G-SAS, Total Score	32.6 (11.3)	34.4 (10.1)	36.7 (11.0)	0.026	n.s.	*	*
PG-YBOCS - Urge - Behavior - Total	7.5 (3.5) 8.6 (3.8) 16.1 (6.8)	10.7 (3.2) 11.5 (3.3) 22.2 (5.3)	12.2 (2.7) 12.7 (2.9) 24.9 (5.0)	<0.001 <0.001 <0.001	*** *** ***	*** ** ***	*** *** ***
Gambling Frequency	4.1 (2.8)	4.7 (3.0)	5.0 (2.5)	n.s.	---	---	---
CGI-S	4.3 (0.5)	4.5 (0.7)	5.0 (0.8)	<0.001	n.s.	***	***
QoLI	44.2 (13.4)	35.0 (16.7)	31.4 (15.1)	<0.001	**	n.s.	***
HAMA	6.0 (6.0)	8.0 (5.4)	8.9 (5.1)	0.009	*	n.s.	**
HAMD	5.5 (4.8)	8.5 (5.7)	8.9 (4.9)	<0.001	**	n.s.	***
Psychiatric Comorbidity -Mood -Anxiety -Substance Use	 7 [18.9%] 2 [5.4%] 18 [25.0%]	 13 [35.6%] 11 [7.7%] 36 [19.6%]	 23 [8.1%] 18 [6.3%] 57 [18.0%]	 0.103 0.805 0.395	 --- --- ---	 --- --- ---	 --- --- ---
Nicotine use (packs per day)	0.3 (0.5)	0.5 (0.5)	0.6 (0.5)	<0.001	**	n.s.	***

Omnibus test is ANOVA for continuous variables and chi-square for categorical variables. * p<0.05, ** p<0.01, *** p<0.001, significant paired difference by *post hoc* test.

CGI-S = Clinical Global Impression–Severity; DSM-5 = Diagnostic and Statistical Manual, Fifth Edition; GSAS = Gambling Symptom Assessment Scale; HAMA = Hamilton Anxiety Rating Scale; HAMD = Hamilton Depression Rating Scale; PG-YBOCS = Yale-Brown Obsessive-Compulsive Scale modified for Pathological Gambling; QoLI = Quality of Life Inventory;

All values are mean (standard deviation) or N (%) unless otherwise noted.

Table 3. Personality Variables of Subjects with Gambling Disorder Based on DSM-5 Level of Severity

Variables	Mild (4-5 criteria) N=36	Moderate (6-7 criteria) N=42	Severe (8-9 criteria) N=31	Omnibus p value #	Mild vs. Moderate	Moderate vs. Severe	Mild vs. Severe
Eysenck Impulsivity Scale						-	
- Impulsiveness	11.1 (3.4)	10.5 (4.3)	11.7 (4.6)	0.480	---	--	---
- Venturesomeness	10.8 (2.9)	8.7 (3.4)	8.6 (4.0)	0.010	**	n.s.	**
- Empathy	13.2 (3.6)	11.9 (3.7)	13.4 (3.4)	0.139	---	---	---
Barratt Impulsiveness Scale							
- Attentional	17.4 (5.3)	18.0 (4.1)	18.8 (4.3)	0.524	---	---	---
- Motor	26.3 (4.5)	26.4 (5.2)	27.2 (5.4)	0.748	---	---	---
- Non-planning	26.4 (5.4)	27.5 (5.4)	29.2 (5.7)	0.135	---	---	---

Omnibus test is ANOVA. * p<0.05, ** p<0.01, *** p<0.001, significant paired difference by *post hoc* test. All values are mean (standard deviation) unless otherwise noted. DSM-5 = Diagnostic and Statistical Manual, Fifth Edition