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A familial subtype of gambling disorder

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ABSTRACT

Background: Although family history of psychiatric disorders has often been considered potentially useful in understanding clinical presentations in patients, it is less clear what a positive gambling family history means for people with gambling disorder. We sought to understand the clinical impact of having a first-degree relative with gambling disorder in a sample of adults with gambling disorder. **Methods:** Data from 455 participants (aged 18–65 years) who had participated in previous pharmacological and psychotherapeutic clinical trials for gambling disorder were pooled in a secondary analysis. Demographic and clinical variables were compared between those who did versus did not have one or more first-degree relative(s) with gambling disorder. Additionally, we examined whether a family history of gambling disorder was associated with treatment outcome. **Results:** 223 (49.0%) participants had at least one first-degree family member(s) with gambling disorder. In terms of clinical variables, family history of gambling disorder was significantly associated with being female, having an earlier age of gambling onset, longer duration of untreated gambling illness, a greater likelihood of developing legal problems secondary to gambling, and higher rates of alcohol use disorder in family members. Family history of gambling disorder was also associated with a greater gambling symptom improvement from pharmacotherapy. **Conclusions:** These results indicate that gamblers with a first-degree family member with a gambling disorder may have a unique clinical presentation and better response to treatment interventions.

FULL-LENGTH REPORT



KEYWORDS

family history, gambling, addiction, treatment

INTRODUCTION

Gambling disorder is a psychiatric disorder with a current global prevalence of 0.4–2% and is associated with impaired psychosocial functioning, reduced quality of life, financial problems, and suicidality (Hodgins, Stea, & Grant, 2011; Potenza et al., 2019). Family history is a routine part of a clinical assessment of gambling disorder, as it is with all psychiatric conditions, but the utility of the assessment in the case of gambling disorder remains unclear. In the related condition of alcohol use disorder, family history of alcoholism has helped identify predictive factors that may or may not result in treatment differences (Conlin, Hoffman, Steinley, Vergés, & Sher, 2023; Drake et al., 1995; Garbutt et al., 2014; Hashimoto et al., 2022). In the case of gambling disorder, a family history of problem gambling has been associated with greater awareness of a person's gambling problems (Gooding, Kim, Williams, & Williams, 2023), perhaps the type of gambling that a gambling disordered person prefers (Sharman et al., 2019), and parental separation/divorce and financial hardship (Dowling et al., 2021). That has been the extent, however, of the examination of family history of gambling disorder in people with this condition. Understanding differences between gambling individuals with positive and negative family histories of gambling disorder may be important in order to identify potentially clinical subtypes and improve treatment outcomes. Family history has found to be important in other areas of mental ill health. For example, in the 1970s George Winokur found that people with positive family histories of major

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depressive disorder (i.e. a familial subtype of depression) responded better to tricyclic antidepressants and electroconvulsive therapy (ECT) than those with negative family histories (a finding later supported by other researchers as well) (Lundin et al., 2024; Winokur, 1979). In the case of major depressive disorder, a positive family history of depression has also been found to predict treatment to sertraline in primary care patients (Archer et al., 2024). A similar finding of improved treatment response to selective serotonin reuptake inhibitors (SSRIs) was reported in adults with OCD who had a first-degree relative with OCD as compared to those without such a family history (Erzegovesi et al., 2001). Additionally, Garbutt et al. (2014) systematically reviewed 622 studies in an effort to understand variables that predicted treatment to naltrexone in alcohol use disorder. They found some evidence for a family history of alcohol problems, and a polymorphism of the μ -opioid receptor gene, with efficacy of naltrexone.

The purpose of this study was to investigate whether family history of gambling disorder affects the clinical presentation of gambling disorder, and its response to treatment. As such we sought to explore the potential value of a clinical subtype of gambling disorder linked to positive family history.

METHODS

Participants

Data were aggregated from participants who attended clinical trials at the University of Chicago and the University of Minnesota, USA, led by one of the authors (JEG) (see [Supplemental file](#)). All diagnoses of gambling disorder were made by an experienced board-certified psychiatrist, using the criteria set forth by the 4th Edition of the Diagnostic and Statistical Manual (DSM-IV) (American Psychiatric Association, APA, 1994) and the diagnoses were later confirmed to be consistent with the current requirements for gambling disorder using the DSM-5 criteria (American Psychiatric Association, APA, 2013). Diagnosis was made using a validated instrument (Grant, Steinberg, Kim, Rounsaville, & Potenza, 2004).

The exclusionary criteria for these studies were: history of psychotic or bipolar disorder, any current (past 3 months) illicit drug use, or inability to provide informed consent. Data from ten published clinical trials (one involving psychotherapy, two using a nutraceutical, and seven using pharmacotherapy) were included (Grant et al. 2003, 2007, 2008, 2010, 2013, 2014; Grant & Potenza, 2006; Kim et al., 2001, 2002; Kim & Grant, 2001). Trials were from 8 weeks to 16 weeks in duration. The interventions included cognitive-behavioral therapy, N-acetyl cysteine, naltrexone, escitalopram, paroxetine, memantine, and tolcapone.

Our rationale for merging the data from these ten studies was that they all focus on interventions for gambling disorder, specifically pharmacotherapy. Despite the different interventions, they share common endpoints, such as gambling severity and treatment response. Combining these datasets increases statistical power and allows for a more comprehensive analysis of treatment effects and family history.

Assessments

Demographic variables, including age, gender, and highest level of education completed, were recorded for all participants. Subjects received a psychiatric evaluation, which included the Mini International Neuropsychiatric Inventory (MINI) (Sheehan et al., 1988); the Structured Clinical Interview for Pathological Gambling (SCI-PG) (Grant et al., 2004) later adapted for DSM-5; Gambling Symptom Assessment Scale (GSAS) to measure overall self-reported symptom severity for the past week (Kim, Grant, Potenza, Blanco, & Hollander, 2009); Yale-Brown Obsessive-Compulsive Scale modified for Pathological Gambling (PG-YBOCS), a clinician-administered scale, to quantify symptom severity over the past seven days (Pallanti, DeCaria, Grant, Urpe, & Hollander, 2005); Hamilton Depression Rating Scale (HAM-D) to measure severity of depressive symptoms (Hamilton, 1960); Hamilton Anxiety Rating Scale (HAM-A) to measure severity of anxiety symptoms (Hamilton, 1959); and the Sheehan Disability Scale (SDS) to measure overall disability/functioning (Sheehan, 1983).

We undertook the family history method where the proband is asked about psychiatric problems in their relatives, despite its methodological limitations (Andreasen, Endicott, Spitzer, & Winokur, 1977; Kendler et al., 1991). Participants were asked about the presence of gambling disorder in all first-degree relatives. Gambling disorder in relatives was defined as the chronic engagement in gambling resulting in either noticeable social and occupational dysfunction or the need for a twelve-step program or formal treatment. All information about relatives came from the proband. No direct evaluations of the first-degree relatives were performed.

Data analysis

Differences in demographic and clinical variables between the groups (those with vs without a family history of gambling disorder) were characterized using analysis of variance (ANOVA) for continuous normally distributed measures; Mann-Whitney *U* tests for continuous non-normally distributed measures; and likelihood ratio chi-square tests for categorical data. Statistical significance was defined as $p < 0.05$.

In order to identify the influence of a positive family history of gambling disorder on treatment outcome, we examined differences in the change on the Gambling Symptom Assessment Scale (G-SAS) (Kim et al., 2009) in people who had received active treatment (i.e. the intervention groups rather than those who received placebo). Least squares regression was then used to explore potential effects of confounds. We also examined the influence of family history on G-SAS change in people who had received placebo.

Ethics

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



consent forms for each of the studies. For each of the studies, after all procedures were explained, all participants provided informed written consent. Each study was carried out in accordance with the latest version of the Declaration of Helsinki.

RESULTS

Of the 455 adults with gambling disorder, 223 (49.0%) reported a positive family history of gambling disorder in one or more first-degree family members. Comparisons between the two groups on the variables of interest are summarized

in Table 1. For demographic variables, family history of gambling disorder was significantly associated with female gender.

For gambling clinical variables (Table 2), family history of gambling disorder was significantly associated with earlier age of first gambling, longer duration of untreated illness, and greater likelihood of having legal problems secondary to gambling.

For other clinical variables (Table 3), family history of gambling disorder was significantly associated with a positive family history of alcohol use disorders.

We also compared GSAS change between those with and without a family history of gambling (restricted to people

Table 1. Demographic characteristics of those with versus without a family history of gambling disorder

	Family history of gambling disorder				Statistical test	<i>p</i>	
	No (<i>n</i> = 232)		Yes (<i>n</i> = 223)				
	Mean/ <i>n</i>	Std Dev/%	Mean/ <i>n</i>	Std Dev/%			
Age, years	47.7	11.7	47.6	10.4	25,217	0.759	
Sex	Female	107	46.3%	137	61.4%	LR 10.471	0.001**
	Male	124	53.7%	86	38.6%		
Relationship/Marital Status	Single	74	32.2%	62	27.9%	LR 7.754	0.051
	Married	91	39.6%	109	49.1%		
	Divorced	54	23.5%	48	21.6%		
	Other	11	4.7%	3	1.4%		
Racial-ethnic group	Caucasian	176	90.3%	186	90.3%	LR 0.000	0.991
	Other	19	9.7%	20	9.7%		
Education level		3.05	1.02	3.09	0.98	23,600	0.691
Number of current comorbidities (mainstream mental disorders)	0	85	52.1%	89	54.3%	LR 1.319	0.517
	1	62	39.0%	54	32.9%		
	>1	16	9.9%	21	12.8%		
Tobacco use	No	114	50.4%	98	43.9%	LR 1.332	0.248
	Yes	117	50.6%	125	56.1%		

Statistical tests are analysis of variance (Mann-Whitney *U* test was used for non-parametric comparisons, with ‘U’ reported under statistical test) except where indicated LR = Likelihood ratio chi-square test. Education level is a score reflecting the highest level of education obtained to date, ranging from 0 (did not complete initial basic schooling) through to 5 (higher degree completed). Note that total cell sizes per group may differ due to missing data for some variables. **p* < 0.05, ***p* < 0.01.

Table 2. Gambling clinical characteristics for those with versus without a family history of gambling disorder

	Family history of gambling disorder				Statistical test	<i>p</i>	
	No (<i>n</i> = 232)		Yes (<i>n</i> = 223)				
	Mean/ <i>n</i>	Std Dev/%	Mean/ <i>n</i>	Std Dev/%			
Dollars lost to gambling in the past year	26,046	37,462	24,651	25,835	16,510	0.556	
GSAS	33.9	10.7	36.1	12.9	20,073	0.295	
PG-YBOCS	21.3	5.6	20.7	4.9	8,986	0.342	
Age when first started to gamble, years	30.9	14.5	27.1	13.5	15,664	0.011*	
Duration of Untreated Illness, years	8.8	7.5	11.4	8.5	20,040	<0.001**	
Legal problems linked to gambling	No	135	64.0%	107	49.5%	LR 9.106	0.003**
	Yes	76	36.0%	109	50.5%		
Previous Gambling Treatment	No	85	57.4%	94	52.8%	LR 0.698	0.403
	Yes	63	42.6%	84	47.2%		

Statistical tests are analysis of variance (Mann-Whitney *U* test was used for non-parametric comparisons, with ‘U’ reported under statistical test) except where indicated LR = Likelihood ratio chi square test. GSAS = Gambling Symptom Assessment Scale; PG-YBOCS = Yale-Brown Obsessive-Compulsive Scale Modified for Pathological Gambling. Note that total cell sizes per group may differ due to missing data for some variables. **p* < 0.05, ***p* < 0.01.

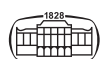


Table 3. Other clinical characteristics in those with versus without a family history of gambling disorder

	Family history of gambling disorder					
	No (<i>n</i> = 232)		Yes (<i>n</i> = 223)		Statistical test	<i>p</i>
	Mean/ <i>n</i>	Std Dev/%	Mean/ <i>n</i>	Std Dev/%		
HAMA	7.8	4.6	7.1	4.6	17,242	0.094
HAMD	7.4	4.0	7.0	4.2	17,857	0.262
Sheehan Disability Scale	14.8	6.6	14.3	6.9	7,506	0.463
Family history of alcohol use disorder (1' relative)	No	136	58.6%	83	LR 20.647	<0.001**
	Yes	96	41.4%	139		

Statistical tests are analysis of variance (Mann-Whitney *U* test was used for non-parametric comparisons, with 'U' value reported under statistical test) except where indicated LR = Likelihood ratio chi square test. HAMA = Hamilton Anxiety Rating Scale; HAMD = Hamilton Depression Rating Scale. Note that total cell sizes per group may differ due to missing data for some variables. **p* < 0.05, ***p* < 0.01.

who were assigned to active treatment in the double-blind clinical trials, *n* = 351). There was a significantly greater symptom improvement (reduction in GSAS) in those with a family history versus those without (mean improvement in GSAS family history positive 16.8 [SD 14.0] versus family history negative 13.1 [11.7]; *F* = 3.953, *p* = 0.048). This effect of family history on GSAS in those who had received active treatment remained statistically significant (*F* = 4.895, *p* = 0.029) in a least squares regression model controlling for potential confounders of sex, age at first gambling/DUI, legal problems, and family history of alcohol use disorder; effects of these potential confounders were non-significant (each *p* > 0.50).

GSAS change did not differ significantly as a function of family history in people who had received placebo (*n* = 176), across the studies (mean improvement in GSAS family history positive 12.0 [SD 11.7] versus family history negative 12.4 [14.8]; *F* = 0.0274, *p* = 0.8668). This indicated that the earlier findings were specific to active treatment conditions.

DISCUSSION

This study examined demographic and clinical associations with family history of gambling disorder in a large sample of adults with well characterized gambling disorder. The study found that a familial subtype of gambling disorder is common and has a number of important clinical associations.

For the demographic measures, family history of gambling disorder was associated with a higher likelihood of female gender. There are of course several reasons why this association may be present. Based on evidence so far, it seems unlikely that gambling (and gambling disorder) has a stronger genetic link in women than in men (e.g. Slutske & Richmond-Rakerd, 2014; Xuan et al., 2017). As such, it would appear unlikely that the link between female gender and family history of gambling disorder, observed in our study, reflects differences in gender-related genetic propensity for gambling. Earlier literature found that females were more likely to gamble due to depression (Grant & Kim, 2001). The finding of a familial link in females, which was not examined in the earlier literature focusing on gender differences (Grant & Kim, 2002; Ladd & Petry, 2002;

Potenza et al., 2001) may enlarge our understanding of the role of depression as well. One could hypothesize that growing up in a family with a gambling parent, and as these data further show, a family member with alcoholism as well (see Table 3), that a person may struggle with mood symptoms and gamble as a means of escape from these family dynamics. Research indicates that gambling disorder and alcohol use disorder do tend to co-aggregate within families (e.g. Black, Monahan, Temkit, & Shaw, 2006). This is further in keeping with possible associations between family environment and childhood trauma that may be especially important for the development of gambling disorder in women (Estevez, 2023). Relatedly, type-2 gambling, per Blaszczynski's model, may be more common in women and reflect a role for mood/anxiety and perhaps prior trauma (Nower, Blaszczynski, & Anthony, 2022). The data in this study do not show higher depression scores in the familial group but this could be due to the fact that we only examined depressive symptoms over the week prior to inclusion in the study. These familial findings do suggest that further examination may be called for in the area of gender in gambling disorder to further clarify what processes may account for this association.

For the clinical measures, family history of gambling disorder was associated with earlier age of onset of gambling. This has been found in other psychiatric disorders as well (i.e. earlier onset of alcoholism linked to familial alcoholism (Bogenschutz, Scott Tonigan, & Pettinati, 2009; Cook & Winokur, 1985; Pilatti, Caneto, Garimaldi, Vera Bdel, & Pautassi, 2014); earlier onset of OCD linked to positive family history (Sharma, Sundar, Thennarasu, & Reddy, 2015; Swedo, Leonard, & Rapoport, 1992; Brakoulias et al., 2016). In terms of common environmental mediators that may contribute to the link between earlier onset and family history, a likely explanation is that observing one's parents gambling could lead to 'modelling' whereby offspring are more likely to gamble (e.g. Dowling et al., 2021). Perhaps earlier interventions would be useful in families predisposed to gambling disorder to prevent years of untreated illness. We observed that family history was also linked to higher levels of legal problems due to gambling – this did not appear to reflect current severity of gambling disorder since severity was not associated significantly with family history



status. Potentially this link with legal problems could reflect the longer duration of untreated illness, i.e. a greater time period over which to accrue legal problems due to gambling. Of note is that we defined legal problems in a broad sense that included not only e.g. violence but also aspects such as writing bad checks and embezzlement.

Perhaps most importantly, the familial version of gambling disorder responded better to treatment interventions in general than the non-familial version. This was specific to the active interventions, as no such effect was seen when considering those who had received placebo. Prior work in other conditions, including alcohol use disorder, suggests that family history may be linked to treatment seeking/engagement through life (Milne et al., 2009). In the context of psychological treatments for gambling disorder, several studies report better outcomes in females than in men (Merkouris, Thomas, Browning, & Dowling, 2016), and so gender may account for this finding herein (i.e. female gender linked to family history linked to better treatment response). Reassuringly for patients, these findings militate against the notion that family history of gambling means a person's symptoms will not respond to treatment or is somehow 'hard wired' and permanent.

There are several limitations to this study. Participants included in the study were seeking treatment for gambling disorder. Thus, these findings may not generalize to other people with gambling disorder who do not seek treatment. Second, we did not differentiate between parental and sibling family history of gambling disorder. We used a well-established method to establish family history but we did not interview family members directly. Due to the cross-sectional nature of the data, the study can only show association – not causality. Longitudinal research in this area would be valuable. We did not report socioeconomic status though we note that education level did not differ as a function of family history of gambling disorder.

In conclusion, despite family history constituting an important aspect of the clinical presentation of mental disorders, surprisingly little research has explored how it may impact the clinical presentation of gambling disorder and its response to treatment. This study, in a treatment-seeking sample of people with gambling disorder, found that family history of gambling disorder had a number of important clinical associations – notably with female gender, earlier age of gambling onset (plus longer typical duration of untreated illness), legal problems due to gambling, family history of alcohol use disorder, and greater response to treatment interventions. Future work should further explore the nature of these associations using a longitudinal approach.

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Authors' contribution: All authors contributed to the design, methodology, data collection and analyses, and the drafting and rewriting of the final manuscript.

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SUPPLEMENTARY DATA

Supplementary data to this article can be found online at <https://doi.org/10.1556/2006.2024.00042>.

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