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FULL-LENGTH REPORT



Psychopathological status and personality correlates of problem gambling severity in sports bettors undergoing treatment for gambling disorder

SUSANA JIMÉNEZ-MURCIA^{1,2,3*} , MÓNICA GIMÉNEZ², ROSER GRANERO^{1,5}, HIBAI LÓPEZ-GONZÁLEZ², MÓNICA GÓMEZ-PEÑA², LAURA MORAGAS², ISABEL BAENAS^{1,2}, AMPARO DEL PINO-GUTIÉRREZ^{1,2,6}, ESTER CODINA², TERESA MENA-MORENO^{1,2}, EDUARDO VALENCIANO-MENDOZA^{2,4}, BERNAT MORA-MALTAS², SUSANA VALERO-SOLÍS², SANDRA RIVAS-PÉREZ², ELÍAS GUILLÉN-GUZMÁN⁷, JOSÉ M. MENCHÓN^{2,3,4} and FERNANDO FERNÁNDEZ-ARANDA^{1,2,3}

¹ CIBER Fisiopatología Obesidad y Nutrición (CIBEROBn), Instituto de Salud Carlos III, Madrid, Spain

² Department of Psychiatry, University Hospital of Bellvitge-IDIBELL, Barcelona, Spain

³ Department of Clinical Sciences, School of Medicine and Health Sciences, University of Barcelona, Barcelona, Spain

⁴ CIBER Salud Mental (CIBERSam), Instituto de Salud Carlos III, Madrid, Spain

⁵ Department of Psychobiology and Methodology, Autonomous University of Barcelona, Barcelona, Spain

⁶ Department of Public Health, Mental Health and Perinatal Nursing, School of Nursing, University of Barcelona, Barcelona, Spain

⁷ Department of Child and Adolescent Psychiatry and Psychology, Institute of Neurosciences, Hospital Clinic Barcelona, Barcelona, Spain

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ABSTRACT

Background and aims: Sports betting has been barely explored independently from other gambling behaviors. Little evidence is available regarding the factors affecting its severity in a clinical sample. The current study explores new determinants for sports betting severity in Spain by the inclusion of psychopathological distress and personality factors. **Methods:** A sample of 352 Spanish sports bettors undergoing treatment for gambling disorder was recruited. Multiple regression models were used to evaluate the effects of sociodemographic variables, the age of onset of gambling behavior, the global psychopathological distress (SCL-90R GSI) and the personality profile (TCI-R) on sports betting severity and their influence over frequency (bets per episode) and debts due to gambling. **Results:** We found that older age, higher psychopathological distress, lower self-directedness level, and higher novelty seeking level were predictors of gambling severity in Spanish sports bettors. The highest betting frequency was found in men, with the lowest education levels but the highest social status, the highest psychopathological distress, reward dependence score, and self-transcendence trait and the lowest persistence score. Debts were also associated to higher score in cooperativeness as well as older age. **Discussion and conclusions:** Our findings call for further exploration of factors affecting sports betting severity regarded as a separate gambling entity subtype, as some of the traditional factors typically found in gamblers do not apply to sports bettors or apply inversely in our country. Consequently, sports bettors might deserve specific clinical approaches to tackle the singularities of their gambling behavior.

*Corresponding author.
E-mail: sjimenez@bellvitgehospital.cat

KEYWORDS

gambling, sports betting, multiple regression, personality, psychopathological distress, severity

INTRODUCTION

Gambling problems emerge in multiple forms depending, among other things, on the gambling type gamblers become involved in (Stevens & Young, 2010). The development of gambling disorder (GD) is also sensitive to situational and structural factors of gambling products [e.g., game frequency, accessibility, game duration, reward schedule (Parke & Griffiths, 2007)] that might precipitate the onset of gambling problems, make it more difficult for gamblers to discontinue gambling, or relapse.

The expansion of sports betting and gambling advertising during sport-related events is a relatively recent fact compared to other gambling activities. In Western regions (i.e., North America, Australia, and Europe) sports betting is quite prevalent, especially due to the increase in online access (Gainsbury, Russell, Hing et al., 2015). In some countries sports betting appears to be the fastest-growing form of gambling, doubling in popularity over the last decade (Gainsbury, Russell, Hing et al., 2015). A British annual report from the Gambling Commission stated that sports betting participation notably increased during 2016 (Sullivan, 2018). In fact, given the global nature of online sports betting, combined with the pervasiveness of gambling advertising, sponsorships, with exposure to promotions everywhere and from a young age (Nyemcsok et al., 2018; Pitt, Thomas, Bestman, Stoneham, & Daube, 2016), sports betting has arguably become an inherently normal component of sport. Consequently, a very recent study based on interviews found that 78% of young people under the age of 17 and 86% of adults thought that betting had become a normal part of sport (Djohari, Weston, Cassidy, Wemyss, & Thomas, 2019). It is not surprising, then, that betting on sports constitutes a huge global business that generates a large volume of money. The 34th edition of the Australian Gambling Statistics reported an increase of 15% in total sports betting disbursement in 2016–2017 («Gambling: Australian gambling statistics | Queensland Government Statistician's Office», 2018). Similar statistics from Europe estimated the global online gambling gross revenue reaching approximately 25 billion euros from 2017 to 2020, mostly generated by sports betting, lottery and casinos («Gambling industry in Europe: Statistics & Facts | Statista», 2019).

Although the scientific literature regarding sports betting is incipient, there is a consistent idea that sports betting, especially the online form, is rapidly surpassing other forms of gambling in terms of participation (European Gaming & Betting Association, 2018). In this sense, it is a matter of growing concern how sports betting might become 'a gateway drug' causing younger generations to familiarize with gambling and transition from there to other forms of gambling and/or gaming (Zendle & Cairns, 2018). We have

recent examples in the literature in Spain. In a sample of young Spanish students, the frequency of participation in sports betting was high, with 42.6% of the sample having placed sports bets at least once (Labrador & Vallejo-Achón, 2020). In the same vein, a study by Molinaro et al. (2018) carried out across 33 European countries, showed that underage gambling behavior was a really alarming issue. They observed that last year gambling of 16 year-old students was 22.6% (16.2% online and 18.5% land-based). Comparing this age to the legal gambling age in whichever country in Europe (18 years old and up, and even higher in some exceptions where the legal age increases up to 21, 23 or 25), it is clear that a large proportion of 16 year olds gambling are likely to be doing so illegally (<https://gamblersdailydigest.com/gambling-age-around-the-world/>). Adolescents and young sports fans are an extremely vulnerable group to develop gambling problems (Gassman, Emrich, & Pierdzioch, 2012). Young people are highly exposed to advertising, through various channels, which reduces their perception of risk of this activity (Milner, Hing, Vitartas, & Lamont, 2013). Sports betting represents important public health concerns, as well as serious psychological and psychopathological gambling-related harms (Winters & Derevensky, 2019). In summary, considering the distinct risk factors involved in sports betting, a singular approach to this gambling type seems appropriate (Wicker & Soebbing, 2013).

However, little is known about the potential factors predicting, maintaining or worsening sports betting in particular. Most of the literature evaluates gambling problems in general, rather than those specifically related to sports betting. The few papers focused on risk factors of sport betting showed that bettors were mainly young people, more engaged sports bettors and gamblers in general, with a money-oriented motivation, higher erroneous cognitions and gambling urges, alcohol abuse and lower self-control levels (Russell, Hing, & Browne, 2019). Some authors have suggested that singular risk factors such as the combination of skill, knowledge and chance in sports betting products might influence the minimization of risks by society and its widespread acceptance (Cantinotti, Ladouceur, & Jacques, 2004; Lopez-Gonzalez, Griffiths, & Estévez, 2020a). The evaluation of the predictors of impulsive sports betting behavior showed that higher trait impulsiveness was related to higher problem gambling severity (Hing, Lamont, Vitartas, & Fink, 2015; Hing, Li, Vitartas, & Russell, 2018; Hing, Russell, Vitartas, & Lamont, 2016). Also, a relationship between sports betting severity and a higher approval of all gambling promotional techniques has been reported (Hing et al., 2015).

In conclusion, having in mind the social acceleration of sports betting, and its direct link with an increase in other gambling behaviors, the potential factors affecting sports betting severity warrant specific attention, especially given the relationship between bettors' impulsiveness response and severity of gambling (Deans, Thomas, Daube, & Derevensky, 2017; Hing, Russell, Tolchard, & Nower, 2016; Russell, Hing, Browne, Li, & Vitartas, 2018; Thomas, Lewis, McLeod, & Haycock, 2012). Severity of online sports bettors

has been related to a more positive response, attitude and disposition to sports gambling advertising, demonstrating a greater likelihood of using the sponsored products (Hing, Russell, Lamont, & Vitartas, 2017). Internet-based sports gambling severity has been directly associated with the amount of time dedicated to discuss betting before placing bets, and the use of other sports betting-specific online gambling features (Lopez-Gonzalez, Estévez, & Griffiths, 2019). A very recent study of in-play bettors showed that this condition was strongly associated to problem gambling severity (Lopez-Gonzalez, Griffiths, & Estévez, 2020b). A previous study that found that the severity of sport bettors in general (not only online) was directly related to being male, of a young age, unmarried, with higher education levels, working or studying full-time, engaging in different forms of gambling, with a less planned approach to betting, and frequently watching both live and televised sporting events (Hing, Russell, Vitartas et al., 2016).

While more data is available concerning how severity strongly predicts greater intended frequency of sports betting (Hing, Lamont, Vitartas, & Fink, 2014), little is known about the factors affecting such severity. More specifically, is there any psychopathological and/or personality aspect that may be affecting sports betting severity? Furthermore, most of the aforementioned studies rely on community level samples and problem gambling screening tools but do not explore sports betting severity in the context of a clinical setting. The current study seeks to address the lack of research in Spain concerning factors directly affecting sports betting severity, by a multiple regression approach. More purposely, the present study aims to examine the association of different sociodemographic and clinical variables, including global psychopathological distress and the personality profile, with sports betting severity. In addition, models exploring the statistical predictors of debts related to gambling were also carried out. With this, we provide a comprehensive approach to variables affecting sports betting severity in a large sample of Spanish bettors undergoing treatment for gambling disorder, assessing for the first time in literature which and how psychopathological distress and personality aspects may predict sports betting severity.

METHODS

Participants

This study examines treatment-seeking Spanish adult patients ($n = 352$) whose reported primary gambling activity is sports betting. The sample was recruited at the Pathological Gambling Unit of Bellvitge University Hospital of Bellvitge from 2005 until now. Patients were consecutively included in the study, excluding those who did not have an adequate educational level or some kind of cognitive disability that made them unable to complete the self-report measures of the study. Only patients who sought treatment for sports betting as their primary health concern were admitted to this study.

Measures

Diagnostic Questionnaire for Pathological Gambling (according to the Diagnostic and Statistical Manual of Mental Disorders [DSM] criteria) (Stinchfield, 2003). This diagnostic questionnaire allows to assess the presence of GD through 19-items based on the DSM taxonomy [for the DSM-IV-TR, text revision (APA, 2000), and the DSM-5 versions (APA, 2013)]. The Spanish adaptation of the scale achieved good psychometric properties (Cronbach alpha $\alpha = 0.81$ calculated for the general population and $\alpha = 0.77$ for the clinical sample; Jiménez-Murcia et al., 2009). In this study, the total number of DSM-5 criteria for GD was analyzed as a dimensional variable of severity level. Cronbach's alpha in the present sample was 0.797.

Temperament and Character Inventory-Revised (TCI-R) (Cloninger, Przybeck, Svrakic, & Wetzel, 1994). This questionnaire contains 240 items for measuring personality traits structured in 7 personality dimensions: 4 are dimensions related to temperament (novelty seeking, harm avoidance, reward dependence and persistence; consistency for each dimension in our sample was $\alpha = 0.750$, $\alpha = 0.841$, $\alpha = 0.795$, $\alpha = 0.900$, respectively) and 3 were character dimensions (self-directedness, cooperativeness and self-transcendence; consistency for each dimension in our sample was $\alpha = 0.899$, $\alpha = 0.863$, $\alpha = 0.859$, respectively). For the current study, the Spanish version of TCI-R was used (Gutiérrez-Zotes et al., 2004).

Symptom Checklist-Revised (SCL-90-R) (Derogatis, 1975). The SCL-90-R is a 90-item test that evaluates different psychological problems and psychopathological symptoms. The test measures different primary symptom dimensions: somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. This instrument also includes three global indices: (1) a global severity index (GSI), aimed to measure global psychological distress, (2) a positive symptom distress index (PSDI), to evaluate the intensity of symptoms, and (3) a positive symptom total (PST). For the current study, the scale validated in a Spanish population (Derogatis, 2002) was used. The GSI, PSDI and PST present an excellent internal consistency ($\alpha = 0.979$). The primary symptoms present an internal consistency $\alpha \geq 0.800$ in all cases.

South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987). Gambling behavior was measured with this self-report gambling questionnaire. It contains 20 items (the total score ranges from 0 to 20) based on DSM-III (APA, 1980) and DSM-III-R (APA, 1987) criteria. We used the Spanish validation of this questionnaire (Echeburúa, Baez, Fernández-Montalvo, & Páez, 1994), which showed a good internal consistency (0.717) in the current sample.

Statistical analysis

Statistical analysis was carried out with Stata16 for Windows (Stata-Corp, 2019). Multiple regression models estimated the specific capacity of the sociodemographic variables, the age of onset of the sports betting activity, the global psychopathological distress (SCL-90R GSI) and the personality profile



(TCI-R) on the criteria measuring the gambling severity. Logistic regression was used for the dependent variable “presence of debts related with the gambling behavior” [defined as a binary variable (yes *versus* no)], and negative binomial regression was used for the dependent variables defined as count variables (DSM-5 total criteria for GD, SOGS total, bets per episode and debts due to the gambling). So, the presence of debt was explored in two ways: as a dichotomous variable (yes/no) and as a quantitative variable (level of debt in euros). In addition, and due to the high likelihood of comorbid forms of gambling in GD patients, the “presence of other forms of gambling” (different to sports betting) was also collected and included within the analysis to avoid bias due to the potential confounding effect of this variable. The negative binomial regression is a type of generalized linear model, similar to multiple regressions in which the dependent variable is an observed count that follows the negative binomial distribution (that is, the possible values for the criterion are nonnegative integers: 0,1,2,3, and so on). It can be considered an extension of the Poisson regression for over-dispersed outcomes (Dupont, 2009).

Ethics

This work was performed in accordance with the Helsinki Declaration of 1975 as revised in 1983, and it was approved by the Ethics Committee of University Hospital of Bellvitge. An informed consent was obtained from all the included participants. Parental consent was sought for those younger than 18 years of age.

RESULTS

Characteristics of the sample

Table 1 includes the descriptive characteristics for the sociodemographic and the sports betting related variables

analyzed in this work. Access to sports betting was through Internet platform. The sample comprised 339 men (96.3%) and 13 women (3.7%), and the mean age was 32.1 years-old (standard deviation [SD] = 9.6, range 14–70 years). Most participants achieved secondary or less education levels (82.4%), were single (61.4%) or married (30.1%), employed (66.8%), and were into mean-low to low social position indexes (72.1%). The mean age for the onset of sports betting problems was 25 (SD = 7.6) years-old and the mean duration of the addictive behavior was 3.8 (SD = 3.9) years. The number of patients who reported debts due to the sports betting activity was 226 (64.2%). A total of $n = 130$ (36.9%) participants presented other forms of gambling engaged as a secondary addiction problem. The most common form of comorbid gambling was slot-machines ($n = 78$, 22.2%), followed by casinos ($n = 58$, 16.5%), lotteries ($n = 22$, 6.3%), bingo ($n = 14$, 4.0%) and market stock ($n = 2$, 0.6%).

Multiple regression: variables related to sports betting severity

Table 2 includes the multiple regression models exploring the variables related to sports betting severity between sociodemographic, age of onset of the sports betting activity, psychopathological distress and personality traits. The number of DSM-5 total criteria was predicted for patients with worse psychopathological state and lower self-directedness level. Higher SOGS scores were related to older age, higher psychological distress and higher novelty seeking level. The highest bets per betting episode were registered among men, patients with the lowest education levels but the highest social status, patients with the highest psychopathological distress and gamblers with the highest reward dependence score and the lowest persistence score. Higher bets per betting episode were also related to higher scores in the self-transcendence trait.

Table 1. Characteristics of the patients in the study ($n = 352$)

Sociodemographics		<i>n</i>	%	Age, onset and evolution	Mean	SD
Sex	Women	13	3.7%	Chronological age (yrs-old)	32.1	9.62
	Men	339	96.3%	Onset of the addiction (yrs-old)	25.0	7.64
Education	Primary or less	120	34.1%	Duration of the addiction (yrs)	3.82	3.91
	Secondary	170	48.3%	<i>Gambling disorder severity</i>	<i>Mean</i>	<i>SD</i>
	University	62	17.6%	DSM-5 total criteria	7.22	1.78
Marital status	Single	216	61.4%	SOGS total score	11.12	3.19
	Married-couple	106	30.1%	Bets (euros/episode, maximum)	1,744	2,640
	Divorced-Separated	30	8.5%	Bets (euros/episode, mean)	132	213
Employment	Unemployed	117	33.2%	Debts due to gambling; $n - \%$	226	64.2%
	Employed	235	66.8%	^a Debts (euros); <i>mean - SD</i>	16,209	16,526
Social status	High	10	2.8%			
	Mean-high	35	9.9%			
	Mean	53	15.1%			
	Mean-low	136	38.6%			
	Low	118	33.5%			

Note. OSB: online sports betting. SD: standard deviation.

^a Calculated for patients who reported bets due to the gambling activity.

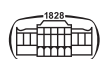


Table 2. Variables associated to the gambling severity: multiple negative binomial

	DSM-5 total criteria			SOGS total score			Bets (episode, max)			Bets (episode, mean)		
	B	SE	P	B	SE	P	B	SE	P	B	SE	P
Sex (men)	0.092	0.1118	0.412	0.046	0.0880	0.598	0.933	0.3461	0.007*	0.310	0.3205	0.334
Education (lower)	0.015	0.0393	0.694	0.024	0.0317	0.450	0.313	0.1058	0.003*	0.061	0.1128	0.590
Marital status (not married)	-0.016	0.0469	0.725	0.021	0.0380	0.572	0.128	0.1258	0.309	-0.080	0.1281	0.534
Employed (unemployed)	-0.083	0.0477	0.083	-0.055	0.0385	0.152	0.219	0.1297	0.092	-0.142	0.1334	0.288
Social status (lower indexes)	0.002	0.0281	0.957	-0.010	0.0225	0.650	-0.350	0.0791	0.001*	-0.078	0.0780	0.319
Other forms of gambling engaged	-0.006	0.0441	0.892	-0.053	0.0357	0.140	0.181	0.1225	0.138	-0.035	0.1294	0.786
Age (years-old)	0.000	0.0031	0.888	0.006	0.0024	0.020*	0.005	0.0089	0.596	0.004	0.0088	0.654
Onset of GD (years-old)	0.000	0.0037	0.986	-0.004	0.0029	0.231	-0.002	0.0103	0.837	0.015	0.0110	0.181
SCL-90R GSI	0.102	0.0444	0.022*	0.140	0.0359	0.001*	0.410	0.1267	0.001*	-0.110	0.1407	0.433
TCI-R Novelty seeking	0.001	0.0018	0.403	0.005	0.0014	0.001*	-0.007	0.0053	0.215	-0.006	0.0049	0.236
TCI-R Harm avoidance	0.001	0.0018	0.604	-0.001	0.0015	0.345	-0.009	0.0049	0.082	0.006	0.0057	0.285
TCI-R Reward dependence	0.002	0.0017	0.146	0.002	0.0013	0.163	0.013	0.0050	0.013*	-0.009	0.0050	0.085
TCI-R Persistence	0.001	0.0012	0.401	0.000	0.0010	0.884	-0.010	0.0036	0.007*	0.000	0.0035	0.992
TCI-R Self-directedness	-0.003	0.0014	0.048*	-0.002	0.0011	0.116	0.000	0.0043	0.954	-0.002	0.0044	0.592
TCI-R Cooperativeness	-0.002	0.0016	0.172	-0.001	0.0013	0.535	-0.004	0.0044	0.377	0.003	0.0051	0.547
TCI-R Self-transcendence	0.000	0.0017	0.880	-0.002	0.0014	0.137	-0.007	0.0051	0.169	0.012	0.0048	0.017*

Note. SE: standard error. *Bold: significant parameter. Sample size: $n = 352$.

Multiple regression: predictors of the debts

Table 3 includes the results of the models exploring the statistical predictors of the debts [as a binary variable (presence of debt) and a quantitative variable (cumulative euros)] related to the betting activity. The risk for having

cumulative debts was related to male sex, being employed, older age, worse psychopathological state, and higher levels in novelty seeking and cooperativeness. The amount of euros cumulated as debts due to sports betting was also higher for men, with lower education levels but higher social status,

Table 3. Variables associated to the debts related to the gambling activity

	^a Presence of debts				^b Debts (euros)		
	B	SE	P	OR	B	SE	P
Sex (men)	1.313	0.655	0.045*	3.718	0.546	0.326	0.045*
Education (lower)	0.226	0.241	0.348	1.253	0.272	0.112	0.015*
Marital status (not married)	0.040	0.285	0.888	1.041	0.029	0.129	0.820
Employed (unemployed)	-0.599	0.276	0.030*	0.549	-0.149	0.127	0.240
Social status (lower indexes)	-0.299	0.176	0.088	0.741	-0.383	0.080	<0.001*
Other forms of gambling engaged	0.073	0.265	0.782	1.076	-0.076	0.125	0.545
Age (years-old)	0.037	0.019	0.053	1.037	0.062	0.009	0.000
Onset of GD (years-old)	0.004	0.023	0.877	1.004	-0.008	0.010	0.452
SCL-90R GSI	0.498	0.278	0.048*	1.646	0.328	0.129	0.011*
TCI-R Novelty seeking	0.023	0.011	0.032*	1.023	0.005	0.005	0.287
TCI-R Harm avoidance	0.000	0.011	0.999	1.000	-0.004	0.005	0.373
TCI-R Reward dependence	-0.012	0.010	0.229	0.988	-0.009	0.005	0.079
TCI-R Persistence	-0.005	0.007	0.525	0.995	0.004	0.003	0.243
TCI-R Self-directedness	-0.008	0.009	0.371	0.992	0.001	0.004	0.814
TCI-R Cooperativeness	0.029	0.010	0.004*	1.029	0.017	0.005	0.001*
TCI-R Self-transcendence	-0.004	0.010	0.665	0.996	-0.007	0.005	0.156

Note. SE: standard error. OR: odds ratio.

*Bold: significant parameter. Sample size: $n = 352$.

^a Logistic regression.

^b Negative binomial regression.



older age, worse psychopathological state and higher score in cooperativeness.

DISCUSSION

To the best of our knowledge, this is the first study in a Spanish sample evaluating the factors affecting the severity of gambling problems in a large clinical sample of sports bettors. In addition, the current approach evaluates for the first time how psychopathological distress and different personality aspects are influencing sports betting severity.

We found that older age, higher psychopathological distress, lower self-directedness level, and higher novelty seeking level were predictors of gambling severity (understood as higher number of DSM-5 criteria) in sports bettors.

A previous study in an Australian sample (Hing, Russell, Vitartas et al., 2016) found that the severity of sports betting in general was directly related to being male, of a young age, unmarried, with higher education levels, working or studying full-time, engaging in different forms of gambling, with a less planned approach to betting, and watching both live and televised sporting events. Both studies are not totally comparable as the Hing and colleagues's model did not evaluate psychopathological distress or personality factors. In addition, their sample was not a treatment-seeking population.

Contrary to literature from Australian bettors, where younger age appears as a risk factor of sport betting behavior (Russell, Hing, & Browne, 2019) and is normally related to higher problem gambling severity (Hing et al., 2017; Hing, Russell, Vitartas et al., 2016), we found that "older" age was more related to higher levels of severity. One plausible hypothesis is that for some gambling behavior typologies and/or samples older age could be related to higher economic incomes which allow gambling more often, betting more money per episode and consequently having more losses and more accumulated debts. Another potential source of disagreement is that our sample is clinical, which might yield different results as compared to non-clinical samples from other studies. In this vein, several studies indicate that the fact of requesting professional treatment is usually associated with higher severity (Braun, Ludwing, Slecza, Bühringer, & Kraus, 2014; Pulford et al., 2009) because mostly only individuals with more severe gambling problems actively seek treatment. Therefore, apart from different legislative jurisdictions where different environmental factors and availability of gambling may influence disorder development trajectory, these differences related to the nature and characteristics of the samples studied can partially explain these apparently contradictory results. In addition, the age characteristics of the current sample (mean age around 32), mean age of onset (25 years) and mean duration of the disease (4 years) may also account for the apparent discrepancies among the Australian study and ours. The comparison of the mean age of our sample with previous studies, not only in Australian samples (Russell, Hing, &

Browne, 2019), but also in previous samples from our hospital (Jiménez-Murcia et al., 2020), shows that the current sample shows a mean age younger than previous studies (a difference of at least 10 years), so the current sample is in a lower age range compared to previous studies, with a short average disease duration. In this sense, online gambling has been associated with a shorter disease course (Hubert & Griffiths, 2018; Landreat et al., 2020).

Similar to other studies (Black et al., 2015; Jiménez-Murcia et al., 2010), we did not find a direct relationship between sports betting severity and onset of disease. However, having in mind that gambling initiation age of onset may condition severity of gambling at older ages specifically, it may be plausible that in our sample, with an early onset, older adult problem gamblers who began gambling earlier in life showed higher severity (they gambled more often) than did their counterparts who began gambling as adults. In this sense, previous research has shown that pathological gambling in general seems to have an age at onset between the mid-twenties to the late thirties (Black et al., 2015; Black, Monahan, Temkit, & Shaw, 2006; Black, Shaw, Forbush, & Allen, 2007; Bland, Newman, Orn, & Stebelsky, 1993; Grant & Kim, 2001). Interestingly, the study from Bland et al. (1993) coincides with our age at onset at 25 years, relating the range from 25 to 29 years at age of onset to heavy betting behavior. More recent data also puts the onset closer to 25 years (23 years) (Kessler et al., 2008). This threshold of 25 years has been previously reported as an early-onset with clear implications for prevention and treatment strategies (Grant, Kim, Odlaug, Buchanan, & Potenza, 2009). At this point, we cannot avoid the phenomenon of the impact of gambling advertising and marketing during sporting events (mainly in televised matches) especially in adolescent and young people, which has been recognized by the scientific community as a health and social problem (Djohari et al., 2019; Pitt, Thomas, & Bestman, 2016) that can contribute to the development of gambling-related problems (Hing et al., 2017; Pitt, Thomas, & Bestman, 2016).

In addition, with respect to the age of gambling onset *per se*, the fact that sports betting may be shaped by different factors, not only personality-related, including socioeconomic status, allows us to speculate about the cultural differences between countries that may condition the access to sports betting in youths and the apparent discrepancies about age and severity between studies. The International Monetary Fund points out how youth unemployment in Spain is a persistent phenomenon, consistently being among the highest in the European Union, with young people working and earning less («Spain: Time to Strengthen Resilience, Promote Inclusive Growth», 2018). These factors may help to explain the age-related results presented here as the Spanish sample may have a *later* access to play, resulting in younger ages being partially underrepresented. In the past, country-related differences regarding younger ages accessing to sports betting has been reported (Humphreys & Perez, 2012). We additionally found that older age was a predictor of gambling-related debts, reinforcing the idea that

in our sample older ages are consistent with more severe sports betting trajectories.

Most of the participants were men, coinciding with what has been reported in previous literature for sports betting (Granero et al., 2020). Being a man has been considered a risk factor for gambling behavior (Hing, Russell, Vitartas et al., 2016; Hing, Russell, Tolchard et al., 2016; Jiménez-Murcia et al., 2020; Kim, von Ranson, Hodgins, McGrath, & Tavares, 2018; Valero-Solís et al., 2018). Our data supports this idea, emphasizing the weight of being a man in sports betting as a predictor for debts, as well as the direct relationship between being a man and the presence of worse economic harmful consequences, with an increase in the amount of debt accumulated and the highest bets per betting episode.

With regards to marital status, problem gambling often results in separation and divorce (Jiménez-Murcia, Tremblay et al., 2017; Shaw, Forbush, Schlinder, Rosenman, & Black, 2007). The prevalence of separated or divorced participants was low in the current sample (8.5%), with most people being single (61%) (here, there is a clear influence of age, as this is a “young sample”). The short mean duration of the disorder reported here is probably explained because marriages lacked time to break up.

The current work incorporates psychopathological and personality factors in categorizing sports betting, aligning with the idea that different and complex pathways models for describing different gambling behaviors should be considered (Blaszczynski & Nower, 2002). We found that sports betting severity was related to higher psychopathological distress. This relationship has been widely reported in general gambling behavior (Ciccarelli, Griffiths, Nigro, & Cosenza, 2017; Nigro, D’Olimpio, Ciccarelli, & Cosenza, 2019), with some therapies especially focused on the amelioration of this emotional distress in gamblers (Menchón, Mestre-Bach, Steward, Fernández-Aranda, & Jiménez-Murcia, 2018). Considering gambling might be understood as a behavioral pattern to relieve emotional distress, the more the stress, the more the severity of the behavior. As a consequence, distress has been also postulated as a moderator between gambling severity and psychopathological problems (Ronzi, Kraus, Hoff, & Potenza, 2018). A previous study from our research group based on a clustering by a psychopathological state showed how there is a type of gamblers who present the highest gambling disorder severity and the most severe levels of emotional distress (Jiménez-Murcia et al., 2019). In that study, severity was related to psychopathological distress, coincidental with our present results.

Our results expand previous findings in gamblers concluding that sports bettors in Spain specifically show a direct relationship between emotional distress and the severity of this subtype of gambling. This is important in order to tackle sports betting and its idiosyncratic characteristics in therapy. In this sense, the highest bets per betting episode, the risk of having accumulated debts and the amount of money accumulated as gambling-related debts were also related to a worse psychopathological state.

Therefore, economic consequences are also related to emotional distress (Oksanen, Savolainen, Sirola, & Kaakinen, 2018), which should be addressed primarily to avoid gambling harm affecting all the life spheres of sports bettors.

With regards to the personality aspects, we found only two particular factors related to sports betting severity: lower self-directness and higher novelty seeking levels. These are very common personality aspects describing gamblers (Alvarez-Moya et al., 2010; Estévez et al., 2017; Janiri, Martinotti, Dario, Schifano, & Brià, 2007). Both components of personality are related to risky behaviors, impulsivity and the capacity to regulate behaviors (Abassi & Abolghasemi, 2015), and considered relevant for impulsivity-related disorders (Del Pino-Gutiérrez et al., 2017), so we can argue in this case that sports bettors present specific temperamental factors directly related to impulsivity, and not related to harm avoidance, as we did not find an association between this latter factor and sports betting severity. Coincidentally, Hing et al. (2018) suggest a dysfunctional self-regulatory capacity in many highly-involved sports bettors who may fail to exercise self-control (Hing, Li, Vitartas et al., 2018). In this sense, lack of self-control has been widely accepted as a key problem in gambling (Bergen, Newby-Clark, & Brown, 2014). Having in mind that sports bettors are more impulsive in general (Russell, Hing, Li, & Vitartas, 2019), and considering the presence of more opportunities to bet impulsively (Hing, Russell, Li, & Vitartas, 2018; Hing, Russell, Vitartas et al., 2016), an impaired self-control is likely to be happen amongst problem sports bettors. Russell et al. (2019) report that higher-risk sports bettors were also more likely to have lower self-control, but that this lack of control should be contextualized as a general gambling behavior characteristic, not as a predictor of sports betting specifically. For this, they used a penalized model that allowed for collinearity amongst predictors (Russell, Hing, & Browne, 2019). Different from us, that study did not explore personality factors. Interestingly, in terms of risk factors for sports betting problems, these authors postulate that there are some variables relevant to all levels of problem gambling severity (i.e., gambling expenditure, number of accounts with different operators, impulsiveness), whereas others are only relevant to those with the highest level of gambling-related problems (i.e., normative data such as age, gender, or being in a single marital status, or number of different types of promotions used [which despite appearing in all levels of gambling are more important in high levels]) (Russell, Hing, Li, et al., 2019). The authors, however, pointed out the need to identify subtypes of gambling severity within sports betting in order to provide a more personalized therapeutic approach.

We found a paradoxical result. The highest bets per betting episode and the debts were mostly registered in patients with the lowest education levels but the highest social status. In other words, the less the education sports bettors have, the more likely they will gamble. With regards to the apparently surprising result in reference to the social status, a possible explanation might be the particularity of the social status distribution in the current sample. While a

very high percentage of patients are in the low and medium-low groups, less than 3% are actually in a high level. Therefore, when we refer to “higher values” we do not mean being in high social classes, but in higher percentiles but always within the most unfavorable social groups. In this respect, it would not be surprising if the highest bets were linked to people with a slightly higher level of purchasing power.

A higher number of bets per episode occurred in sports bettors with a high reward dependence score, the lowest persistence score, and higher scores in the self-transcendence trait, while debts were also dependent on high levels of cooperativeness. High levels of reward dependence, strongly associated with extraversion (De Fruyt, Wiele, & van Heeringen, 2000; Smillie, 2013), have been previously reported in some gamblers as a trait (Hodgins & Holub, 2015; Jiménez-Murcia, Fernández-Aranda et al., 2017; Mestre-Bach et al., 2016). However, different to some of this literature, these levels are not in consonance with the apparent contradictory low persistence scores found for sports bettors. Within the gambling behavior, rewards may acquire different forms (e.g., immediate, delayed, in-play, by chance, strategic or non-strategic, accumulated) (Grant, Odlaug, Chamberlain, & Schreiber, 2012; Ledgerwood & Petry, 2010; Odlaug, Marsh, Kim, & Grant, 2011), and this is especially relevant for sports bets. Depending on the reward, this may condition the persistence levels of sport bettors in the number of bets per episode, and sports betting products include multiple reward types as compared to other gambling activities. This explanation aligns well with the psychobiological model of temperament of Cloninger (Cloninger, Svrakic, & Przybeck, 1993) by which low persistence is an adaptive strategy when reward contingencies change rapidly. For that reason, in the specific case of sports bettors, persistence does not seem to be a common characteristic, and may be a strategy adopted attending the demands of the subtype of gambling. A previous study pointed out that high levels in reward dependence and cooperativeness did not have an effect on gambling severity, arguing that maybe those were effective protective factors (Moragas et al., 2015), in concordance with the lower levels of persistence found here. Current results about perseverance in sports bettors led us to argue about an evaluation of different subtypes of gambling behaviors, not only among gamblers in general, but also within sports bettors in particular. Future studies in different countries should establish groups of comparison according to the type of sport one bets on (i.e., football, tennis), in order to consider different types of potential rewards. In this sense, we have a clear example in tennis which appears as one of the most “addictive” sports. In tennis, bettors can bet on multiple microevents within a single game (Russell et al., 2019), many more than in European football, for instance, because of the characteristics of each type of sport. The key is the frequency and duration of the event, compartmentalized in quick points and games in tennis, which increase the bettors’ ability to bet and re-bet in continuous, short-lived cycles that facilitate

impulsive and excessive behavior. Some sports with less microevents are, theoretically, less attractive for bettors in this regard, meaning that perseverance of bettors may be conditioned by the type of sport.

The participants of this study were recruited during a long period of time, between January 2005 until January 2020, and we might suspect the contribution of a potential moderator effect of the assessment time on the gambling phenotypes. In this regard, the frequency of participants with sports betting as the main reason for treatment seeking showed an increasing trend in this work: $n = 43$ between 2005 and 2010, $n = 130$ between 2010 and 2015 and $n = 179$ between 2016 until now. This increase is strongly related with advances in technology and the universalization of Internet access (which have facilitated fast and easy access to almost all traditional manners of gambling globally) and the changes in the Gambling Law. Regarding online gambling, should it really be considered a new gambling modality, or a simple mode to access to the different gambling activities and platforms? It could be suspected that the structural features of Internet gambling, its interactive and immersive specificities, should affect gambling related harms, but results are yet scarce and differences between online and off-site gambling outcomes are controversial (Baggio et al., 2017; Gainsbury, Liu, Russell, & Teichert, 2016; Gainsbury, Russell, Wood, Hing, & Blaszczynski, 2015). On the other hand, studies carried out across different European countries, with different jurisdictions regarding the legal status of Internet gambling (ranging from prohibition to broad legal access), have found no relevant differences in the prevalence rates of GD depending on the mode of access (Planzer, Gray, & Shaffer, 2014). In our study, we have assessed potential differences in key variables related to the gambling profile for the groups defined by the recruitment time for the main variables of the study: $P = 0.809$ for the progression/duration of the problematic gambling, $P = 0.217$ for the number of DSM criteria, $P = 0.644$ for the gambling severity level according to the SOGS total score and $P = 0.581$ for the global psychopathological distress measured through the SCL-90R GSI.

This study has some limitations that should be mentioned in order to better interpret the results. First, the sample comprised treatment-seeking sports bettors, and consequently the results might not be generalizable to sports bettors who do not seek treatment (and by extension to pathological gamblers in general). In this sense, it should also be considered that although our gamblers were pathological, considering the mean obtained in the SOGS (around 11) they scored at the ‘lower limit’ of the gambling harm spectrum, but still pathological. However, the Spanish version of the test validation (Echeburúa et al., 1994) places the diagnostic efficacy threshold slightly below what the original version of the test placed, achieving the same diagnostic efficacy and even increasing the sensitivity. This goes in line with the scores obtained in other Spanish pathological gamblers samples, but it should be framed in the characteristics of the sample size, as other studies in sports betting gamblers are larger. In this sense,

particularities of the current sample may also account for some of the discrepancies found. Second, the study did not cover all possible sociodemographic and clinical factors affecting severity. Third, the type of sports betting was not available for the participants of this study, and therefore it was not possible to test the contribution of this variable on the gambling severity. Attending to the multiple forms of sports betting, future research should assess the potential moderator or mediational role of the gambling preference on the gambling related harms. In this sense, the results of our study should be interpreted carefully as aspects such as in-play betting, which is directly related to severity (Hing, Russell, et al., 2018), has not been evaluated here specifically.

Some strengths of this work must also be listed. First, the inclusion of a relatively large sample of sports betting gambling patients, treatment seeking for the problems related to their addiction behavior. Second, this study used two instruments to measure gambling related variables, which provide complementary information regarding the gambling profile. While the questionnaire based on the DSM-5 is a diagnostic tool to assess the number of criteria for GD based on the operational definition of this taxonomy, the SOGS is a screening tool which covers cognitive, emotional and other behaviors related to problem gambling. The SOGS includes a set of items measuring lying about gambling activity, losses and debts, taking time off work, arguments with family or close friends, feeling guilty, borrowing money to gamble, and performing illegal acts to finance gambling. This questionnaire is used to examine both the gambling behavior (symptom level) and the consequences of gambling. The use of both measures, based on the DSM-5 criteria and the SOGS contribute to increase the generalization capacity of the study, and allow to external researchers to compare our evidences with the results obtained in their studies. Related with this characteristic, we would like to outline that use of multiple measurement tools provides a complete picture of the disordered gambling.

This work analyzed a sample of sports betting gamblers recruited from a treatment unit at the Bellvitge University Hospital, which oversees the outpatient treatment of cases with behavioral addictions related problems (mainly GD). This unit has obtained the recognition of tertiary care center, which in Spain consist in a level of health care carried out by highly specialized equipment and experts in large hospitals. Patients are referred from the providers of primary or secondary care centers from a catchment area that includes over two million people in the metropolitan area of Barcelona. Therefore, our sample can be considered highly representative of the general public who need treatment due the problematic gambling behavior. The long period of recruitment in this work also facilitates variations due to the own cultural progress and the regulatory/legalization structures (values and beliefs regarding gambling, as well as help-seeking attitudes), and this heterogeneity in the participants should be interpreted as a

characteristic contributing to good generalizability (many different types of patients and situations plus large sample sizes are the keys of how useful the results of a concrete research are for the target populations).

CONCLUSION

To sum up, there are studies evaluating how gambling severity in sports bettors influences gambling behavior (Hing et al., 2014), arguing that severity is a strong predictor to greater intended frequency of sports betting, but there is a lack of literature evaluating factors affecting sports betting severity. The findings in the present study characterize, beyond the sociodemographic and clinical factors, the psychopathological and personality traits in Spanish sports bettors associated with the severity of gambling disorder. These factors and traits, in some cases, even seem to contradict some of the results found in other worldwide samples. These results permit us to flag sports bettors as a subtype of gamblers that should merit tailored therapeutic approaches in response to their singular characteristics.

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