The prevalence and distribution of gambling problems in bipolar disorder in the United Kingdom

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ABSTRACT

Background

North American studies show bipolar disorder is associated with elevated rates of problem gambling; however, little is known about rates in the different presentations of bipolar illness.

Aims

To determine the prevalence and distribution of problem gambling in bipolar disorders in the United Kingdom.

Method

The Problem Gambling Severity Index was used to measure gambling problems in 635 bipolar participants.

Results

Moderate/severe gambling problems were four times higher in bipolar disorder than in the general population, and was associated with bipolar-II disorder (OR=1.74, p=0.036), history of suicidal ideation/attempt (OR=3.44 ,p=0.02) and rapid cycling (OR=2.63, p=0.008).

Conclusions

Approximately 1 in 10 patients with bipolar disorder may be at moderate/severe risk of gambling problems, possibly associated with suicidal behaviour and a rapid cycling course. Elevated rates of gambling problems in bipolar-II disorder highlight the probable significance of modest but unstable mood disturbance in the development and maintenance of gambling problems.

Declaration of interests

Robert D. Rogers provides paid consultancy services for Pfizer Inc. Guy M. Goodwin holds or has held grants from Bailly Thomas charity, Medical Research Council, NIHR, Servier; has received honoraria from AstraZeneca, Eli Lilly, GSK, Lundbeck, Otsuka and Servier, holds shares in P1vital ltd; has served on advisory boards for Cephalon, Lundbeck, Merck, Otsuka, Servier, Takeda and acted as an expert witness for Eli Lilly. Guy M. Goodwin and John R. Geddes are NIHR Senior Investigators.

INTRODUCTION

With the expansion of commercial gambling throughout the United Kingdom, the opportunity and accessibility of gambling has also increased, reflecting similar trends in other jurisdictions[1]. Problem gambling is excessive gambling behaviour that causes harm to the individual, their family and friends or the wider community[2]. The British Gambling Prevalence Survey of 2010 (BGPS)[3] showed marginal increases in problem gambling within the United Kingdom between 2007 and 2010 (from 0.5% to 0.7%) but provided evidence that patterns of gambling participation across sectors of the community are changing; highlighting the need to understand better the individual differences or clinical factors that heighten the risk of gambling-related harm[4].

North American studies have reported a particularly high prevalence of mood disorders, including bipolar disorder, among problem gamblers[5-8], and an increased prevalence of problem gambling in individuals with bipolar disorder[9] which is associated with a poorer quality of life and prognosis[10]. Mood disturbance in the form of hypomanic experiences are also associated with elevated rates of gambling problem symptoms[11], reflecting enhanced motivations to gamble for excitement and to regulate negative emotional states[12]. The present study is the first to determine the prevalence of problem gambling in bipolar disorder in a United Kingdom sample, with a particular focus upon the severity of problem gambling risk reported in individuals with a diagnosis of bipolar II relative to bipolar I. The rich clinical data available on the sample allowed for an exploration of the associations between problem gambling and lifetime clinical variables in bipolar disorder.

METHOD

Participants

Participants were drawn from the Bipolar Disorder Research Network, a United Kingdom-wide on-going research programme into the genetic and non-genetic determinants of affective disorders (BDRN; www.bdrn.org). BDRN inclusion criteria are: main lifetime diagnosis of affective disorder; aged 18 years or over; United Kingdom/Irish white ethnicity (due to the focus on genetics); and ability to give written informed consent. Participants are excluded from BDRN if their mood disorder is a consequence of alcohol or substance abuse, medical illness, medication or an organic brain disorder, or if they are biologically related to another participant. Participants are recruited systematically through NHS mental health services (Community Mental Health Teams and Lithium Clinics) and non-systematically using advertisements for volunteers via the BDRN website, leaflets, posters, media coverage about the research, and also through United Kingdom-based user-led charities, such as Bipolar UK and Depression Alliance.

Inclusion criteria for this study were: a) Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV)[13] best-estimate lifetime diagnosis of bipolar disorder including bipolar I and II, or recurrent major depressive disorder (unipolar depression); and b) completion of the Problem Gambling Severity Index (PGSI)[2].

The research has NHS ethics approval (reference number MREC/97/7/01) and Research and Development approval in all participating United Kingdom NHS trusts / Health Boards.

Psychiatric assessment

Lifetime-ever clinical data for each individual in the BDRN study were collected by a trained BDRN interviewer (research psychologist or psychiatrist) using a semi-structured psychiatric interview, the Schedules for Clinical Assessment in Neuropsychiatry (SCAN)[14]. Further clinical data were gathered from participants' psychiatric case notes. Clinical interview and case note data were combined to make best-estimate lifetime-ever diagnoses according to DSM-IV and ratings of lifetime-ever clinical characteristics. The Global Assessment Scale (GAS)[15] was used to provide a measure of overall level of functioning during each participant's worst lifetime episodes of both depression and mood elevation. GAS scores range from 1 (severe psychiatric disturbance) to 100 (good mental health). In cases of doubt, clinical ratings were made by at least two members of the research team blind to each other's ratings and consensus was reached via discussion where necessary. Inter-rater reliability was high. Mean kappa statistics were 0.85 for DSM-IV diagnoses and ranged between 0.81 and 0.99 for other key clinical categorical variables; mean intra-class correlation coefficients were between 0.91 and 0.97 for key clinical continuous variables.

Gambling assessment

Gambling behaviour was measured using the Problem Gambling Severity Index (PGSI)[2]. This is a validated self-report instrument which measures gambling behaviours over the preceding 12 months. The PGSI is derived from the Canadian Problem Gambling Index (CPGI) and consists of nine items. For each item, respondents answer on a four-point scale where 0 = never, 1 = sometimes, 2 = most of the time, 3 = almost always. Total scores therefore range from 0 to 27 where 0 = non-problem gambler, 1-2 = low-risk gambler, 3-7 = moderate risk gambler and 8 or over = severe risk problem gambler. The PGSI was mailed to 3500 BDRN participants in April 2011 and a reminder was sent one month later. 793 participants (23%) completed and returned the PGSI.

Statistical analyses

Following previous studies[16], we used two definitions of problem gambling to define moderate risk of gambling problems (PGSI score of between 3 and 7) and severe risk of gambling problems (PGSI score of 8 or more).

Statistical analyses were performed using SPSS Version 21To determine the clinical correlates of problem gambling in bipolar disorder, moderate and severe risk gamblers were compared to no/low-risk gamblers (PGSI score of <3) on a range of demographic and clinical variables using chi-square tests, Mann-Whitney U tests (due to significant non-normal distributions of continuous variables) and multivariate binary logistic

regression (using enter method). All tests were two-tailed and tested at a threshold of statistical significance of $p<0.05$.

RESULTS

A total of 750 participants met the inclusion criteria. The mean age at interview was 46.01 years (SD = 11.35) and 70.5% were female (*n* = 529). 84.7% (*n* = 635) had bipolar disorder and 15.3% (*n* = 115) had unipolar depression.

Prevalence of problem gambling in bipolar disorder and unipolar depression

Table 1 shows the prevalence of problem gambling in bipolar disorder and unipolar depression. The prevalence of at least moderate risk gambling in bipolar disorder was 10.6% (95% confidence interval (CI) 8.21 to12.99) and of severe risk was 2.7% (95% CI 1.44 to 3.96). In unipolar depression, the prevalence of at least moderate risk gambling was 5.2% (95% CI 1.14 to 9.26) and 0.9% for severe risk (95% CI 0.83 to 2.63). The difference between bipolar disorder and unipolar depression in the prevalence of both at least moderate risk and severe risk gambling problems did not reach statistical significance (p = 0.087 and 0.336 respectively). The mean PGSI score in the moderate risk gamblers with bipolar disorder was 4.24 (95% CI 3.92 to 4.72; range 3-7; median 4), and in the severe risk group with bipolar disorder was 14.06 (95% CI 11.35 to 16.77; range 8-22; median 13). The sample size of severely-defined problem gamblers with bipolar disorder was too small for further analysis (*n* = 17); therefore, all further analyses described below consider the combined group of patients with bipolar disorder and moderate/severe risk gambling.

[Table 1]

Gambling behaviours of moderate/severe risk gamblers with bipolar disorder

Almost half of the moderate/severe risk gamblers with bipolar disorder (30/67; 46%) reported having gambled online in the preceding 12 months and of these internet gamblers, 57% (17/30) reported that more than half of their gambling was conducted on the internet (25% of the total sample of moderate/severe risk gamblers; 17/67). Response frequencies of the individual PGSI items are shown in Table 2.

[Table 2]

Demographic characteristics of moderate/severe risk problem gamblers with bipolar disorder

Moderate/severe risk of problem gambling was significantly associated with several demographic characteristics (Table 3). The median age at interview was significantly younger in moderate/severe risk gamblers than no/low-risk gamblers (40.5 years vs 46 years) and moderate/severe risk of gamblers was significantly associated with working in service industries (37.5% vs 26.7% in no/low-risk gamblers) and being long-term unemployed (4.7% vs 1.3% in no/low-risk gamblers). However, there was no significant difference in gender distribution between those at moderate/severe and no/low risk of problem gambling (p = 0.09). Levels of education and marital history also did not significantly differ between groups. There was no significant difference in the proportion of patients recruited systematically/non-systematically with and without moderate/severe risk of problem gambling (p = 1.000).

[Table 3]

Clinical characteristics of moderate/severe risk problem gamblers with bipolar disorder

Moderate/severe risk of problem gambling was significantly associated with a several lifetime clinical history variables (Table 4). Moderate/severe risk gamblers were significantly more likely to have a DSM-IV diagnosis of bipolar II disorder (40.3%) than no/low-risk gamblers (28%). 15% of participants with bipolar II disorder (27/186) were moderate/severe gamblers compared to 10% of those with bipolar I disorder (40/409) (OR = 1.736; 95% CI 1.031 to 2.925, p = 0.036). The mean PGSI score was 0.72 (95% CI 0.49 to 0.96; range 0-22; median 0) in the bipolar I participants, and 1.15 (95% CI 0.72 to 1.58; range 0-21; median 0) in the bipolar II disorder participants; a statistically significant difference (U = 3794.5. p = 0.011).

The median age at onset of illness (defined as the age of first impairment due to affective illness) was significantly younger amongst moderate/severe risk gamblers than no/low-risk gamblers (17 years vs 21 years, p = <0.001). Significantly more gamblers at moderate/severe risk of problem gambling had a history of rapid cycling (defined as four or more episodes of mania or hypomania in a 12 month period[14]) than those not at risk (55.6% vs 33.4% respectively, p = 0.010); the median number of episodes of hypomania/mania was significantly higher (10 vs 6, p =0.044). History of suicidal ideation or attempt was significantly more frequent among at moderate/severe risk gamblers (93.7% vs 79.2% in the no/low-risk group, p = 0.004), as was history of alcohol misuse defined using DSM-IV criteria (61.4% vs 47.4%, p = 0.050) and regular smoking (71.7% vs 52.4%, p = 0.006). Finally, at moderate/severe risk gamblers were significantly less impaired during their worst episode of mood elevation than those not at risk (GAS scores in worst episode of mood elevation were 45 and 33 respectively, p = 0.004). The level of impairment during the worst episode of depression was similar in both those with moderate/severe risk of gambling problems and those at no or low risk.

[Table 4]

Finally, binary logistic regression models showed that, after controlling for age at interview and bipolar I/II diagnosis, the clinical history variables that significantly predicted the presence of moderate/severe risk of problem gambling over its absence were: i) history of rapid cycling (OR = 2.627; 95% CI 1.292 to 5.344, p = 0.008); ii) history of suicidal ideation or attempt (OR = 3.438; 95% CI 1.214 to 9.734, p = 0.02); and, iii) younger age at illness onset (OR = 0.936; 95% CI 0.897 to 0.976, p = 0.002).

DISCUSSION

Previously, Lloyd et al[11] found that individuals with a history of hypomanic experiences report more gambling problems online, and that their gambling is driven by the desire to experience enjoyment and to regulate mood[12]. The major finding presented here is that individuals with a diagnosis of bipolar II disorder were at significantly higher risk of gambling problems than individuals with a diagnosis of bipolar I disorder. The characteristic feature of bipolar II disorder is the presence of hypomanic rather than manic symptoms and an absence of the psychotic symptoms often observed in bipolar I disorder[13, 17]. Therefore, these data suggest that the characteristics of mild mood elevation involving enhanced reward focus, sleeplessness and distractibility constitute particular risk factors for problematic use of gambling services. In addition, our finding that a quarter of patients with gambling problems in the present study reported that more than half of their gambling in the last 12 months had involved the internet, highlights the potential for gambling-related harms in bipolar patients using Internet gambling services available 24 hours a day through fast-developing technologies[18].

These observations sit within the broad picture of a relatively high prevalence of gambling problems in bipolar disorder patients in the United Kingdom, with around 1 in 10 individuals with bipolar disorder being at least of moderate risk of problem gambling. The BGPS is the third nationally representative survey to provide data on the 12-month prevalence of problem gambling in the United Kingdom[20]. The BGPS 2010 reported a prevalence of 0.7% for severe risk of problem gambling in the general population and 2.5% for at least moderate risk[20]. Consistent with nationwide surveys of the United States population[8, 18, 21], we found elevated rates of gambling problems in our United Kingdom sample of bipolar disorder patients; specifically, that the 12-month prevalence of both severe and at least moderate risk of problem gambling is around four times higher in individuals with bipolar disorder than in the general population (2.7% and 10.6% respectively). These findings are also largely consistent with those from Canada: Kennedy et al[10] reported a prevalence of 12.3% for at least moderate risk of problem gambling in bipolar disorder individuals; and Quilty et al[19] reported a prevalence of 3% for severe risk and 10% for moderate risk of problem gambling in bipolar disorder.

Similarly, we found the prevalence of severe or moderate risk of problem gambling in participants with a diagnosis of unipolar depression was elevated relative to figures for the general population (severe 0.9%; at least moderate 5.2%). However, this increase was not statistically significant, reflecting the relatively small sample size of unipolar depression patients. Collectively, these data confirm the relatively strong associations between bipolar disorder and gambling problems, suggesting that the characteristic mood disturbance of bipolar disorder can play a powerful role in the development and maintenance of gambling problems.

More generally, our data suggest that patients with bipolar disorder who are at risk of problem gambling are likely to be younger and to have a younger illness onset than those patients at low risk, and also are more likely to work in service industries or be unemployed. In contrast to previous studies in the general population and in bipolar disorder which have shown a higher prevalence of problem gambling in males compared to females[10, 20], no similar gender difference was observed. Therefore, gambling problems may be relatively common in females with bipolar disorder in the United Kingdom. Alcohol misuse in this bipolar disorder sample is significantly more prevalent among males than females (40% vs 29%; $p = 0.02$) as would be expected from United Kingdom general population prevalence figures[22], suggesting that the lack of expected gender difference is specific to gambling rather than a general predilection towards addiction among the females in our sample.

Even after controlling for bipolar I/II diagnoses, we found that rapid cycling and suicidal ideation/attempt were significantly associated with gambling problems. Rapid cycling was over 2.5 times more frequent in those individuals at risk of problem gambling compared to those individuals at low risk and, similarly, those with gambling problems reported having had more lifetime episodes of hypomania/mania. The number of episodes of depression, however, was not significantly elevated. Moderate/severe risk gamblers were also 3.5 times more likely to have considered or attempted suicide. This is supported by Kennedy et al[10] who reported that problem gamblers in a bipolar disorder sample in Canada were more than twice as likely to have been at higher suicide risk in the preceding month compared to non-problem gamblers. Suicide risk is known to be elevated in bipolar disorder[17, 23-25]; and our study demonstrates that co-morbid gambling problems elevates this risk further. However, our data do not suggest that gambling problems are simply a marker of illness severity in bipolar disorder, as illustrated by significantly less functional impairment (i.e. higher GAS scores) in their worst episode of mood elevation among those at risk of problem gambling compared to those at low risk.

This study is the first to determine the prevalence of gambling problems in a United Kingdom sample with bipolar disorder, as well as exploring the associations between risk of problem gambling and lifetime clinical variables. Its strengths include the large, representative sample of patients with bipolar disorder and the rich clinical history data available on these patients. However, despite its strengths, there were several limitations.

First, although widely used and validated, the PGSI is a self-report measure subject to a degree of social desirability and recall bias. Social desirability and recall bias were minimised (at least) to some extent as all questionnaires were completed in a private and confidential manner, encouraging honest reporting and gambling behaviours assessed over the previous 12 months only. *Second*, 23% of invited BDRN participants returned the PGSI questionnaire, which inevitably introduces responder bias to the data. It is difficult to know whether this bias over- or under-estimates the prevalence of gambling problems. Someone who is currently gambling may be more likely to be interested in the research and complete the questionnaire; or, conversely, they may prefer not to disclose their gambling behaviours and, thus, not respond. However, the PGSI was included in a mailshot with a number of other questionnaires, and responders completed all questionnaires, which reduces the likelihood that decision to respond was particularly influenced by the inclusion of the PGSI.

Third, the study was limited by the size of the sample of severe risk gamblers in the bipolar disorder group (n=17), which was insufficient for further analysis. The sample size of individuals with unipolar depression was also small (n=115), so that we can have less confidence in the estimated prevalence rates of gambling problems in this group. *Fourth*, given the exploratory nature of the study we did not control for multiple statistical tests across variables. Therefore, our findings require independent replication. However, some of our statistically significant findings would stand up to correction for multiple comparisons; for example, the associations of moderate/severe risk of problem gambling with suicidal ideation/attempts and younger age of illness onset (see Table 4), *Finally*, the cross sectional design of the study does not allow us to make inferences about causality, that is, whether mood dysregulation in bipolar disorder contributes to problem gambling, or whether problem gambling is used as a way of regulating mood as suggested by Lloyd et al[12].

Understanding the temporal relationship between bipolar disorder and problem gambling, and the mechanisms underlying the links between these disorders, requires longitudinal studies. For example, in the present study, the association between lifetime rapid cycling and gambling problems in the preceding 12 months can be explained by the presence of hypomanic or manic episodes during this period; however, the cross-sectional design makes this hard to assess. Future research would also benefit from assessing motivations for gambling in bipolar disorder. These findings require replication in large independent samples of patients with bipolar disorder. All participants in this study were of United Kingdom white ethnicity and thus future studies should explore problem gambling in other ethnic groups with bipolar disorder.

Implications for clinical practice

Problem gambling, unlike alcohol and drug misuse, is currently not screened for in patients with bipolar disorder as part of routine clinical practice in the United Kingdom. Findings from this study can be used to inform clinicians, not only of the increased risk of problem gambling in bipolar disorder, but also of its association with bipolar II disorder, suicidal behaviour and an unstable rapid cycling illness course. Clinicians should consider assessing gambling problems in patients with bipolar disorder.

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Table 1 Prevalence of problem gambling in bipolar disorder and unipolar depression

	Bipolar Disorder *n* = 635 *n* (%)	**Unipolar depression** *n* = 115 *n* (%)	χ^2	*P*
Moderate/severe risk problem gambling	67 (10.6)	6 (5.2)	3.153	0.087
Severe risk problem gambling	17 (2.7)	1 (0.9)	1.358	0.336

Table 2 Response frequencies of PGSI items in moderate/severe risk problem gamblers with bipolar disorder (*n* = 67)

	*n** (%)	95% CI of %
1. Have you ever bet on more than you could afford to lose?		
Never	21 (31.3)	27.69,34.91
At least sometimes	46 (68.7)	65.09,72.31
2. Have you ever needed to gamble with larger amounts to get the same feeling?		
Never	23 (34.3)	30.59,38.01
At least sometimes	44 (65.7)	61.99,69.41
3. Have you ever gone back to try to win back the money you had lost?		
Never	22 (32.8)	29.14,36.46
At least sometimes	45 (67.2)	63.54,70.86
4. Have you ever borrowed money or sold anything for money to gamble?		
Never	48 (71.6)	68.09,75.11
At least sometimes	19 (28.4)	24.89,31.91
5. Have you felt you might have a problem with gambling?		
Never	40 (59.7)	55.88,63.52
At least sometimes	27 (40.3)	36.48,44.12
6. Have people criticised your betting?		
Never	48 (71.6)	68.09,75.11
At least sometimes	19 (28.4)	24.89,31.91
7. Have you ever felt guilty about the way you gamble?		
Never	22 (32.8)	29.15,36.45
At least sometimes	45 (67.2)	63.55,70.85
8. Any health problems due to gambling?		
Never	29 (43.3)	39.44,47.16
At least sometimes	38 (56.7)	52.85,60.55
9. Any financial problems due to gambling?		
Never	34 (50.7)	46.81,54.59
At least sometimes	35 (49.3)	45.41,53.19

*Ns vary due to missing data.

Table 3 Demographic characteristics of moderate/severe risk problem gamblers and no/low-risk gamblers with bipolar disorder

	Moderate/severe risk problem gambling	**No/low-risk gambling**	*U*	*P*
	*n** = 67	*n** = 568		
	Median (IQR, range)	Median (IQR, range)		
Age at interview, years	40.5 (14, 18-66)	46 (18, 18-76)	15319.0	**0.017**
	n (%)	*n* (%)	χ^2	*P*
Gender				
Male	25 (37.3)	154 (27.1)	3.081	0.086
Female	42 (62.7)	414 (72.9)		
Marital History				
Has married	52 (88.1)	436 (86.2)	0.174	0.841
Has never married	7 (11.9)	70 (13.8)		
Highest education				
None	5 (7.5)	44 (7.7)	2.371	0.499
CSE/O-Level/GCSE	14 (20.9)	124 (21.8)		
A-Level/AS Level	24 (35.8)	144 (25.4)		
Degree	22 (32.8)	206 (36.3)		
Highest occupation				
Professional	37 (57.8)	374 (71.9)		
Service industry	24 (37.5)	139 (26.7)	7.696	**0.021**
Never worked	3 (4.7)	7 (1.3)		
Method of recruitment				
Systematic	16 (25.0)	132 (24.5)	0.007	1.000
Non-systematic	48 (75.0)	406 (75.5)		

* Ns vary due to missing data

Table 4 Lifetime-ever clinical features of moderate/severe risk problem gamblers and no/low-risk gamblers with bipolar disorder

	Moderate/severe risk problem gambler *n** = 67 *n* (%)	**No/low-risk gambler** *n** = 568 *n* (%)	χ^2	*P*
DSM-IV diagnosis	lll			
Bipolar I	40 (59.7)	409 (72.0)	4.382	**0.036**
Bipolar II	27 (40.3)	159 (28.0)		
Polarity of first affective episode				
Depression	48 (84.2)	328 (75.9)	1.945	0.184
(Hypo)mania	9 (15.8)	104 (24.1)		
History of rapid cycling	20 (55.6)	125 (33.4)	7.038	**0.010**
History of psychotic features	33 (62.3)	298 (62.3)	0.000	1.000
History of suicidal ideation or attempt	59 (93.7)	433 (79.2)	7.604	**0.004**
History of alcohol misuse	35 (61.4)	225 (47.4)	4.012	**0.050**
History of smoking	43 (71.7)	263 (52.4)	8.029	**0.006**
History of non-prescription drug misuse	21 (32.3)	138 (25.8)	1.262	0.297
	Median (IQR, range)	Median (IQR, range)	*U*	*P*
Age at onset of illness, years	17 (7, 8-43)	21 (11, 5-68)	12192.0	**<0.001**
Number of episodes of (hypo)mania	10 (16, 1-100)	6 (9, 1-100)	14348.5	**0.044**
Number of episodes of depression	8 (15, 1-100)	8 (16, 0-100)	14922.0	0.335
Global Assessment Scale (GAS) score				
Worst episode of mood elevation	45 (20, 10-60)	33 (30, 9-65)	13758.0	**0.004**
Worst episode of depression	40 (15, 18-55)	40 (12, 3-71)	15308.5	0.663

*Ns vary due to missing data