TECHNICAL COMMENTARY

Impulsivity-related disorders

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Introduction

Impulsivity-related disorders include intermittent explosive disorder characterised by uncontrolled fits of extreme anger and violence, pyromania characterised by irresistible urges to light fires, kleptomania characterised by irresistible urges to steal, and conduct disorder characterised by repetitive and persistent behaviours that violate societal rules and the basic rights of other people.

Related disorders include trichotillomania characterised by uncontrollable hair twisting and pulling, skin-picking disorder, pathological gambling, compulsive sexual behaviour and exhibitionism, compulsive buying, internet addiction, video or computer game addiction, food addiction, work addiction, tanning addiction and physical exercise addiction.

Method

We have included only systematic reviews (systematic literature search, detailed methodology with inclusion/exclusion criteria) published in full text, in English, from the year 2010 that report results separately for people with a diagnosis of bipolar or related disorders. Reviews were identified by searching the databases MEDLINE, EMBASE, and PsycINFO. Hand searching reference lists of identified reviews was also conducted. When multiple copies of review topics were found, only the most recent and/or comprehensive review was included. Reviews with pooled data were prioritised for inclusion.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist that describes a preferred way to present a meta-analysis[1]. Reviews with less than 50% of items checked have been excluded from the library. The PRISMA flow diagram is a suggested way of providing information about studies included and excluded with reasons for exclusion. Where no flow diagram has been presented by individual reviews, but identified studies have been described in the text, reviews have been checked for this item. Note that early reviews may have been guided by less stringent reporting checklists than the PRISMA, and that some reviews may have been limited by journal guidelines.

Evidence was graded using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach where high quality evidence such as that gained from randomised controlled trials (RCTs) may be downgraded to moderate or low if review and study quality is limited, if there is inconsistency in results, indirect comparisons, imprecise or sparse data and high probability of reporting bias. It may also be downgraded if risks associated with the intervention or other matter under review are high. Conversely, low quality evidence such as that gained from observational studies may be upgraded if effect sizes are large or if there is a dose dependent response. We have also taken into account sample size and whether results are consistent, precise and direct with low associated risks (see end of table for an explanation of these terms)[2]. The resulting table represents an objective summary of the available evidence, although the conclusions are solely the opinion of staff of NeuRA (Neuroscience Research Australia).

Results

We found three systematic reviews that met our inclusion criteria[3-5].

- Moderate quality evidence finds the prevalence of bipolar disorder in problem gamblers is around 9%. This rate is lower than in people with nicotine dependence (56.4%), major depressive disorder (29.9%), alcohol use disorders (21.2%), anxiety disorders (17.6%), social phobia (14.9%), generalised anxiety disorder (14.4%), panic

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disorder (13.7%), post-traumatic stress disorder (12.3%), cannabis use disorder (11.5%), attention-deficit hyperactivity disorder (9.3%), and adjustment disorder (9.2%).

- Risk factors for problem gambling in people with bipolar disorder include suicidal ideation or attempt, history of rapid cycling, and younger age at illness onset.
- Moderate to low quality evidence suggests more harmful behavioural addictions in general in people with bipolar disorder than controls without the disorder, including sex addictions and compulsive buying.
- Low quality evidence is unable to determine any benefits of pharmaceutical treatments for problem gambling in people with bipolar disorder.

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Di Nicola M, De Risio L, Pettorruso M, Caselli G, De Crescenzo F, Swierkosz-Lenart K, Martinotti G, Camardese G, Di Giannantonio M

Bipolar disorder and gambling disorder comorbidity: current evidence and implications for pharmacological treatment

Journal of Affective Disorders 2014; 167: 285-98

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Comparison	**Pharmaceutical treatments for gambling behaviour in people with bipolar disorder.**
Summary of evidence	**Low quality evidence (one small study for each medication, unclear precision, direct) is unable to determine the benefits of pharmaceutical treatments for gambling behaviours.**
Gambling behaviours (problem or disorder)	
Lithium 1 RCT (N = 29) found that gambling behaviour reduced after 10 weeks of treatment compared to placebo. Topiramate 1 RCT (N = 42) found no differences in gambling behaviour between topiramate and placebo after 14 weeks of treatment. Olanzapine 1 RCT (N = 42) found no differences in gambling behaviour between olanzapine and placebo after 12 weeks of treatment. Quetiapine 1 case series (N = 8) found that gambling behaviour reduced after 8 weeks of treatment and remained reduced at 57-month follow-up. Lithium + topiramate 1 case report found that gambling behaviour reduced after 2 months of treatment and remained reduced at follow-up (time not reported).	
Consistency in results	Unable to assess; one study for each medication.
Precision in results	Unable to assess; no CIs are reported.
Directness of results	Direct

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Dowling NA, Cowlishaw S, Jackson AC, Merkouris SS, Francis KL, Christensen DR

Prevalence of psychiatric co-morbidity in treatment-seeking problem gamblers: A systematic review and meta-analysis

Australian and New Zealand Journal of Psychiatry 2015; 49: 519-39

View review abstract online

Comparison	**Prevalence of bipolar disorder in problem gamblers.**
Summary of evidence	**Moderate quality evidence (large sample size, inconsistent, imprecise, direct) finds the prevalence of bipolar disorder in problem gamblers is around 9%. This rate is lower than in people with nicotine dependence (56.4%), major depressive disorder (29.9%), alcohol use disorders (21.2%), anxiety disorders (17.6%), social phobia (14.9%), generalised anxiety disorder (14.4%), panic disorder (13.7%), post-traumatic stress disorder (12.3%), cannabis use disorder (11.5%), attention-deficit hyperactivity disorder (9.3%), and adjustment disorder (9.2%).**
Problem gambling and gambling disorder	
The prevalence of bipolar disorder in problem gamblers is around 9%; 10 studies, N = 658, prevalence = 8.8%, 95%CI 4.4 to 17.1, I^2 = 82% This rate was lower than in people with nicotine dependence (56.4%), major depressive disorder (29.9%), alcohol use disorders (21.2%), anxiety disorders (17.6%), social phobia (14.9%), generalised anxiety disorder (14.4%), panic disorder (13.7%), post-traumatic stress disorder (12.3%), cannabis use disorder (11.5%), attention-deficit hyperactivity disorder (9.3%), and adjustment disorder (9.2%).	
Consistency in results	Inconsistent
Precision in results	Imprecise
Directness of results	Direct

Varo C, Murru A, Salagre E, Jimenez E, Sole B, Montejo L, Carvalho AF, Stubbs B, Grande I, Martinez-Aran A, Vieta E, Reinares M

Behavioral addictions in bipolar disorders: A systematic review

European Neuropsychopharmacology 2018; Nov 9

View review abstract online

Comparison	**Behavioural addictions in people with bipolar disorder.**
Summary of evidence	**Moderate to low quality evidence (medium to large samples, unclear consistency and precision, direct) suggests more harmful behavioural addictions in people with bipolar disorder than controls, including problem gambling, sex addictions and compulsive buying. Risk factors for problem gambling include suicidal ideation or attempt, history of rapid cycling, and younger age at illness onset.**

All addictions

1 study (N = 100) found higher scores on harmful behavioural addictions and novelty seeking in people with bipolar disorder than controls ($p < 0.05$).

Problem gambling

1 study (N = 358) found the rate of problem gambling was significant higher in people with bipolar disorder than controls (7% vs. 1%, $p < 0.001$).

1 study (N = 211) found the rate of problem gambling was significant higher in men than women with bipolar disorder (5% vs. 0%, $p = 0.01$).

1 study (N = 635) found 10.55% of the sample had moderate or severe problem gambling, with risk factors identified as suicidal ideation or attempt (OR = 3.44, $p = 0.02$), history of rapid cycling (OR = 2.63, $p = 0.008$), and younger age at illness onset (OR = 0.94, $p = 0.002$).

1 study (N = 275) found the rate of problem gambling was lower in people with bipolar disorder than in people with depressive disorder (4% vs. 7%, p not reported), although a larger study (N = 579) found no significant differences between bipolar disorder and major depression (12.5% vs. 12.4%, $p > 0.05$).

Sex addictions

1 study (N = 358) found sexual addiction was significant higher in people with bipolar disorder than controls (3% vs. 2%, $p < 0.001$).

Compulsive buying

1 study (N = 358) found compulsive buying was significant higher in people with bipolar disorder than controls (17% vs. 6%, *p* = 0.042).	
Consistency in results	Unable to assess; no measure of consistency is reported.
Precision in results	Unable to assess; no measure of precision is reported.
Directness of results	Direct

Explanation of acronyms

CI = confidence interval, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), N = number of participants, vs. = versus

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Explanation of technical terms

* Bias has the potential to affect reviews of both RCT and observational studies. Forms of bias include; reporting bias – selective reporting of results; publication bias - trials that are not formally published tend to show less effect than published trials, further if there are statistically significant differences between groups in a trial, these trial results tend to get published before those of trials without significant differences; language bias – only including English language reports; funding bias - source of funding for the primary research with selective reporting of results within primary studies; outcome variable selection bias; database bias - including reports from some databases and not others; citation bias - preferential citation of authors. Trials can also be subject to bias when evaluators are not blind to treatment condition and selection bias of participants if trial samples are small[6].

† Different effect measures are reported by different reviews.

Prevalence refers to how many existing cases there are at a particular point in time. Incidence refers to how many new cases there are per population in a specified time period. Incidence is usually reported as the number of new cases per 100,000 people per year. Alternatively some studies present the number of new cases that have accumulated over several years against a person-years denominator. This denominator is the sum of individual units of time that the persons in the population are at risk of becoming a case. It takes into account the size of the underlying population sample and its age structure over the duration of observation.

Reliability and validity refers to how accurate the instrument is. Sensitivity is the proportion of actual positives that are correctly identified (100% sensitivity = correct identification of all actual positives) and specificity is the proportion of negatives that are correctly identified (100% specificity = not identifying anyone as positive if they are truly not).

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post treatment) and in a randomised trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardised mean differences are divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous) that allows results from different scales to be combined and compared. Each study's mean difference is then given a weighting depending on the size of the sample and the variability in the data. Less than 0.4 represents a small effect, around 0.5 a medium effect, and over 0.8 represents a large effect[6].

Odds ratio (OR) or relative risk (RR) refers to the probability of a reduction (< 1) or an increase (> 1) in a particular outcome in a treatment group, or a group exposed to a risk factor, relative to the comparison group. For example, a RR of 0.75 translates to a reduction in risk of an outcome of 25% relative to those not receiving the treatment or not exposed to the risk factor. Conversely, a RR of 1.25 translates to an increased risk of 25% relative to those not receiving treatment or not having been exposed to a risk factor. A RR or OR of 1.00 means there is no difference between groups. A medium effect is considered if RR > 2 or < 0.5 and a large effect if RR > 5 or < 0.2[7]. lnOR stands for logarithmic OR where a lnOR of 0 shows no difference between groups. Hazard ratios

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measure the effect of an explanatory variable on the hazard or risk of an event.

Correlation coefficients (eg, r) indicate the strength of association or relationship between variables. They can provide an indirect indication of prediction, but do not confirm causality due to possible and often unforseen confounding variables. An r of 0.10 represents a weak association, 0.25 a medium association and 0.40 and over represents a strong association. Unstandardised (*b*) regression coefficients indicate the average change in the dependent variable associated with a 1 unit change in the independent variable, statistically controlling for the other independent variables. Standardised regression coefficients represent the change being in units of standard deviations to allow comparison across different scales.

‡ Inconsistency refers to differing estimates of effect across studies (i.e. heterogeneity or variability in results) that is not explained by subgroup analyses and therefore reduces confidence in the effect estimate. I^2 is the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance) - 0% to 40%: heterogeneity might not be important, 30% to 60%: may represent moderate heterogeneity, 50% to 90%: may represent considerable heterogeneity and over this is considerable heterogeneity. I^2 can be calculated from Q (chi-square) for the test of heterogeneity with the following formula[6];

$$I^2 = \left(\frac{Q - df}{Q}\right) \times 100\%$$

§ Imprecision refers to wide confidence intervals indicating a lack of confidence in the effect estimate. Based on GRADE recommendations, a result for continuous data (standardised mean differences, not weighted mean differences) is considered imprecise if the upper or lower confidence limit crosses an effect size of 0.5 in either direction, and for binary and correlation data, an effect size of 0.25. GRADE also recommends downgrading the evidence when sample size is smaller than 300 (for binary data) and 400 (for continuous data), although for some topics, these criteria should be relaxed[8].

‖ Indirectness of comparison occurs when a comparison of intervention A versus B is not available but A was compared with C and B was compared with C that allows indirect comparisons of the magnitude of effect of A versus B. Indirectness of population, comparator and/or outcome can also occur when the available evidence regarding a particular population, intervention, comparator, or outcome is not available and is therefore inferred from available evidence. These inferred treatment effect sizes are of lower quality than those gained from head-to-head comparisons of A and B.

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