A systematic review and meta-analysis of cognitive-behavioural interventions to reduce problem gambling: hedging our bets?

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CRD summary
The authors concluded that cognitive-behavioural therapy in various forms was effective in reducing gambling behaviours but that caution was warranted because of poor-quality study designs and heterogeneity of included studies. The authors’ cautious conclusions appeared to reflect the evidence provided, but due to potential limitations in the review methodology their reliability is unclear.

Authors' objectives
To determine the effectiveness of cognitive-behavioural therapies (CBT) in reducing gambling behaviour.

Searching
Web of Science was searched from 1980 to 2008 for studies published in English. Search terms were reported. Bibliographies of retrieved articles were scanned for additional studies.

Study selection
Studies published in refereed journals were eligible for inclusion if they evaluated a form of cognitive, behavioural or cognitive-behavioural treatment, or had a substantial component of cognitive-behavioural, cognitive or behavioural methods as treatment for any kind of gambling behaviour or indictant of gambling severity as outcome measures. Studies with a comparison group that included treatment as usual, no treatment or waiting list, or other form of treatment or if they provided pre- and post-treatment only outcome measures were eligible for inclusion. Studies were excluded if they focused only on the characteristics of gamblers, treatment retention or therapeutic alliance only, or evaluated pharmacological treatments or Parkinson symptoms that arose from pharmacological treatments with no data related to effectiveness of CBT.

Treatments in included studies varied widely and included psycho-education, cognitive restructuring, modification of cognitive errors, analysis of triggers and risk situations, problem solving, social skills or assertiveness training, in-vivo exposure, aversion therapy, relaxation and other modalities. Most treatments were delivered in one-to-one sessions. Number and duration of treatment sessions varied between studies. Most studies predominantly had male participants and used the DSM III or IV criteria to diagnose pathological gambling. The most frequent gambling behaviour was use of slot machines, poker, lottery, horse or dog racing, gambling machines and electronic gambling. Outcome measures included direct measures (frequency of gambling and duration of gambling in a specified time period, partial or complete abstinence from gambling) or less direct measures (preoccupation, self-control or urge to gamble). Most of the studies were conducted in USA or Canada; the rest were conducted in Spain and Australia. Time points of data collection ranged from immediate to nine years.

The authors did not state how many reviewers performed the study selection.

Assessment of study quality
Validity was assessed using Clinical Trials Assessment Measure (CTAM), which evaluated: sample size and recruitment method; allocation to treatment; assessment of outcome; control groups; description of treatments; and analysis. Maximum possible score was 100 points and 65 or more points indicated adequate methodological rigour of studies.

Validity was assessed by one reviewer.

Data extraction
Data on outcomes from each study were extracted and used to calculate effect size (ES) and 95% confidence intervals (CIs). Where data were missing, no attempts were made to contact authors.
The authors did not state how many reviewers performed data extraction.

**Methods of synthesis**

Pooled effect sizes and corresponding 95% CIs were calculated using Hedge's g method and a random-effects model. Subgroup analyses were conducted to explore sources of variability in outcome measures. Meta-regression analyses were used to assess associations between effect sizes and quality, session number and hours, attrition rates and percentage of men in the sample. Sensitivity analyses were performed to remove studies that provided follow-up data only. It appeared that publication bias was assessed using methods by Rosenthal.

**Results of the review**

Twenty-five studies were included in the analyses (total number of participants unknown): 16 studies had a comparison group; the other nine studies assessed a single group before and after treatment only. Only four studies were deemed to be of adequate methodological rigour. Mean attrition rate over the study period was 14% (range 0% to 45.7%).

CBT was significantly effective at reducing overall gambling behaviour at three months (ES -0.72, 95% CI -0.96 to -0.49, p<0.0001; 20 studies), six months (ES -0.58, 95% CI -0.84 to -0.32, p<0.0001; 13 studies), 12 months (ES -0.40, 95% CI -0.7 to -0.08, p<0.02; six studies) and 24 months or beyond (ES -0.81, 95% CI 1.16 to 0.47, p<0.0001; three studies).

CBT was significantly more effective than control groups for reducing gambling behaviours when compared to no control group (ES -0.57, 95% CI -0.88 to -0.26, p<0.0001; six studies), waiting list (ES -1.06, 95% CI -1.47 to -0.65, p<0.0001; five studies) and either another treatment as control or group delivery of treatment as control (ES -0.41, 95% CI -0.69 to -0.13, p<0.01; 10 studies).

Subgroup analyses indicated statistically significant effect sizes for most outcome measures; exceptions were duration of gambling bout and SOGS (South Oaks Gambling Screen) and the gambling type of scratch/lottery cards (results were reported in the review). There were significant results for comparison of one version of CBT with another (ES -0.27, 95% CI -0.45 to -0.09; seven studies).

Meta-regression analyses reported that poorer quality studies and those with a greater percentage of men in the sample had a greater effect size. Sensitivity analyses did not significantly alter the results at six months (analyses were not possible at 12 months or 24 months and beyond). There was no evidence of publication bias.

Other results were reported in the review.

**Authors' conclusions**

Findings showed that CBT in various forms was effective in reducing gambling behaviours. However, caution was warranted because of poor-quality study designs and heterogeneity of included studies.

**CRD commentary**

The review question was clear with appropriate inclusion criteria. Outcome measures were only broadly defined. Only one electronic database was searched and the search was restricted to published studies in English, so there was potential for language and publication biases. However, formal assessment of publication bias was conducted and no evidence was found. Validity was assessed and effects of quality on effect size were explored. It was unclear whether appropriate steps were taken to reduce reviewer error and bias in the review process. Studies were combined in a meta-analysis. It was unclear whether any tests for statistical heterogeneity were conducted. However, the authors explored differences in studies in terms of mode and treatment of delivery, outcomes and study designs using subgroup analysis. The number of studies for analysis at 12 or more months were small. The authors' cautious conclusions appeared to reflect the evidence provided, but due to potential limitations in the review methodology their reliability is unclear.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that further large-scale well-controlled trials with long-term follow-up were needed.
problem that most of those with gambling-related problems do not seek help needed to be addressed. Further research should not only include comparison of CBT with other types of therapy but also compare aspects of tailor-made CBT to combat gambling with more standard/generic CBT programmes.

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