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Abstract

Interpersonal distress is a common feature in gambling disorder and adding a concerned significant other (CSO) to the recovery process could be an effective tool for improving treatment outcome. However, little empirical evidence is available regarding the effectiveness of including a CSO to interventions. We aimed to compare treatment outcomes (i.e. compliance with therapy guidelines, dropout from treatment, and relapse during treatment) in a CBT program involving a CSO to CBT treatment as usual (TAU) without a CSO. The sample comprised male gambling disorder patients (N=675). The manualized CBT intervention consisted of 16 weekly outpatient group sessions and a 3-month follow-up period. Patient CSOs attended a predetermined number of sessions with the patient and were provided with resources to acquire a better understanding of the disorder, to manage risk situations, and to aid patients in adhering to treatment guidelines. Patients with a CSO had significant higher treatment attendance and reduced dropout compared to patients receiving TAU. Moreover, patients whose spouse was involved in the treatment program were less likely to relapse and adhered to the treatment guidelines more than those with a non-spousal CSO. Our results suggest that incorporating interpersonal support to gambling disorder interventions could potentially improve treatment outcomes.

Keywords: Gambling disorder · cognitive-behavioral therapy · concerned significant others · outcome predictors

Introduction

Gambling disorder (GD) is characterized by a maladaptive pattern of gambling behavior that persists despite negative consequences in major areas of life functioning. In the Diagnostic and Statistical Manual of Mental Health Disorders (DSM-5), it is classified as a non-substance-related addiction (APA, 2013). This activity is more frequent in men than in women (Granero et al., 2009) and the prevalence of lifetime GD has been found to vary, ranging from 0.4%–2.0% in the general population (Kessler et al., 2008; Petry, Stinson, & Grant, 2005; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2001). GD patients are often characterized by impulsive behavior (Alvarez-Moya et al., 2010; Slutske, Caspi, Moffitt, & Poulton, 2005), cognitive distortions, such as illusions of control (Gaissmaier, Wilke, Scheibehenne, McCanney, & Barrett, 2015), and specific personality traits (e.g. high novelty seeking) (Fortune & Goodie, 2010; Janiri, Martinotti, Dario, Schifano, & Bria, 2007; Jiménez-Murcia, Fernández-Aranda, Granero, & Menchón, 2014).

Cognitive-behavioral therapy (CBT) has become the intervention of choice in treating GD and has been shown to be effective in reducing gambling behavior (Cowlishaw et al., 2012). Cognitive aspects of CBT include correcting erroneous beliefs about gambling, as well as biased information processing. Inaccurate beliefs about luck and random chance are core cognitive distortions in GD (Toneatto & Nguyen, 2007). In contrast, behavioral aspects of CBT cover areas such as stimulus control and systematic desensitization (Dowling, 2008). Nonetheless, currently available GD treatment options have considerable limitations defined by high dropout rates, relapse, and low compliance to treatment guidelines by patients (Gooding & Tarrier, 2009).

Several studies have identified a set of risk factors for relapse. The employment of poor coping styles characterized by avoidance and impulsivity when dealing with stressful situations (e.g. marital or employment problems) (Ledgerwood & Petry, 2006; Raylu, Oei, Loo, & Tsai, 2015) as well as high levels of impulsivity (Leblond, Ladouceur, & Blaszczynski, 2003), harm avoidance (following the temperament dimension defined by Cloninger (1998)) (Aragay et al., 2015; Echeburúa, Fernández-Montalvo, & Báez, 2001) and other traits like novelty seeking (Aragay et al., 2015) have been associated with poor response to treatment. Moreover, the combination of gambling opportunities, and physiological, affective and cognitive changes that appear due to these environmental cues may be a trigger for relapse in GD (Oei & Gordon, 2008). Likewise, a positive family attitude towards gambling behavior and patients' relatives engaging in gambling activities (Ledgerwood & Petry, 2006) and a lack of social support (Petry & Weiss 2009; Gomes & Pascual-Leone 2015) are also associated with a higher risk of relapse.

Both relatives and friends of patients with GD suffer from the devastating effects of this disorder, with the patient's spouse often being the individual who is most affected (Bertrand, Dufour, Wright, & Lasnier, 2008; Hodgins, Shead, & Makarchuk, 2007). Numerous studies have observed an association between marital problems, depression and gambling habits in GD patients (Hodgins, Toneatto, Makarchuk, Skinner, & Vincent, 2007; Poirier-Arbour, Trudel, Boyer,

Harvey, & Goldfarb, 2014). On the other hand, a supportive network has also been identified as the main predictor for treatment continuation (Grant, Kim, & Kuskowski, 2004). This has led to the inclusion of a concerned significant other (CSO) in certain treatment interventions (CSO's are commonly the patient's spouse or partner, but also include parents, siblings or loved ones) (McComb, Lee, & Sprenkle, 2009). Other studies have proposed specialized couple's therapy treatment, though there is a lack of empirical evidence using large samples to determine whether these interventions are more effective than standard CBT treatment (Bertrand et al., 2008; Tremblay, Savard, Blanchette-Martin, Dufour, Bertrand, Ferland, Côté & Saint-Jacques, 2015). The few studies investigating the influence of CSOs on treatment outcomes have thus far provided promising results. For instance, Ingle et al. (2008) found that CSO involvement was associated with successful treatment outcome and longer treatment length, and research by Hodgins et al. (2007) showed that gamblers' CSOs receiving self-help workbooks and telephone support, or informational packets on gambling experienced considerable improvement in personal and relationship functioning. In this same vein, Grant et al. (2004) found that one predictor of treatment retention was whether GD patients had someone in their lives who they considered to be supportive of them receiving treatment and giving up gambling. Treatment retention is of clinical pertinence because of its strong association with ultimately reducing overall gambling behavior (de Castro, Fuentes, & Tavares, 2005; Petry, 2003).

As such, the inclusion of a CSO in the treatment could provide relief both in terms of personal and interpersonal distress for the patient and the CSO. Moreover, they could also foster positive change by reducing a patient's illusory cognitions and exposure to cues (Bertrand, Dufour, Wright, & Lasnier, 2008).

The aims of the study were threefold: a) to compare treatment outcomes (i.e. compliance with therapy guidelines, dropout from treatment, and relapse during treatment and at follow-up) in group CBT involving a CSO to treatment as usual (TAU), without a CSO; b) to explore the relationship between treatment outcomes and the type of CSO involved (spouse/partner versus others) and c) to compare sociodemographic, clinical and personality variables between patients in the CSO group and TAU group.

Based on the reviewed evidence, we hypothesized that the presence of a CSO would improve CBT outcomes by reducing dropout and relapse rates. We also expected that having a patient's partner involved in the CBT program would provide better results than the involvement of other types of CSOs.

Methods

Participants

The sample consisted of 675 men with a diagnosis of GD who were being treated at the Gambling Disorder at our University Hospital. The hospital is a public hospital certified as a tertiary care center for the treatment of GD and it oversees the treatment of highly complex cases. All the patients were consecutive referrals for assessment and treatment

from December 2004 to January 2015. They were derived to the Unit through general practitioners or via another healthcare professional; some patients were derived from prison health services, though their treatment was not compulsory. Exclusion criteria were: the presence of an organic mental disorder, intellectual disability, a neurodegenerative condition such as Parkinson's disease or an active psychotic disorder.

Measures

Temperament and Character Inventory-Revised (TCI-R; Cloninger, 1999)

This questionnaire consists of 240 items that assesses personality traits according to 7 personality factors. They are divided into four temperamental traits and three character traits. The temperamental traits are novelty seeking, harm avoidance, reward dependence and persistence, and the character traits are self-directedness, cooperation and self-transcendence. These different personality dimensions have demonstrated adequate reliability-validity in the Spanish population with Cronbach's alphas between .77 and .84 (Gutiérrez-Zotes et al., 2004). Consistency in the study sample was between moderate (for novelty seeking scale) and excellent (for persistence scale) (Table A.1 includes internal consistency for all the scales).

Symptom Checklist-Revised (SCL-90-R;Derogatis, 1990)

The SCL-90-R evaluates a broad range of psychological problems and psychopathological symptoms. This questionnaire contains 90 items and measures nine primary symptom dimensions: somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. It also includes three global indices: 1) a global severity index (GSI), designed to measure overall psychological distress; 2) a positive symptom distress index (PSDI), to measure the symptom intensity; and 3) a positive symptom total (PST), which reflects self-reported symptoms. This scale has been validated in a Spanish population, with a mean internal consistency of 0.75 (Cronbach's alpha) (Derogatis, 2002). Consistency in the study sample was between good (α=.74 for phobic anxiety) and excellent (α=.98 for global indexes) (Table A.1 includes internal consistency for all the scales).

DSM-IV-TR (APA, 2000)

Patients were diagnosed with pathological gambling if they met DSM-IV-TR criteria (APA, 2000) which was assessed by means of a questionnaire. It should be noted that with the release of the DSM-5 (American Psychiatric Association, 2013), the term pathological gambling has been replaced with GD. Consistency in the sample was good (α=.75).

South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987)

This diagnostic questionnaire uses 20 items to ascertain gambling disorder severity. The Spanish validation of this questionnaire shows high reliability and validity (Echeburúa, Báez, Fernández, & Páez, 1994). Its test-retest reliability is 0.98 ($p < 0.001$) and its internal consistency is 0.94 (Cronbach's alpha). Consistency in the sample was good (α=.73).

Other socio-demographic and clinical variables

Additional demographic, clinical, and social/family variables related to gambling were measured using a semi-structured face-to-face clinical interview described elsewhere (Jiménez-Murcia, Aymamí-Sanromà, Gómez-Peña, Álvarez-Moya, & Vallejo, 2006). The gambling behavior variables covered included the number of previous treatment attempts, the type of problem gambling, the age of onset of gambling behavior and of gambling-related problems, the average monetary investment in a single gambling episode, the maximum amount bet in a single episode, and the total amount of accumulated debts. In addition, the interview explored some maintaining factors such as gambling to chase one's losses or to avoid negative emotional states, magical thinking and illusions of control, ritualistic behavior, the characteristics of the patient's last gambling episode prior to visiting the unit, and the interpersonal/family consequences of gambling behavior.

Throughout treatment, patient attendance, control of spending and gambling behavior, compliance with the treatment guidelines (subjectively rated by the therapist as good, fair or poor) and the occurrence of relapses were recorded on an observation sheet. Patients were also instructed to carry out tasks as homework in preparation for the following session. At the end of the session, records were compared in order to judge the level of inter-rater agreement.

Procedure

Experienced psychologists and psychiatrists conducted the first two face-to-face clinical interviews. In addition to a comprehensive clinical and psychological evaluation, which included the use of the instruments mentioned above, demographic data were also obtained at the beginning of therapy. If patients were unable to complete the evaluation on their own (e.g. due to being illiterate), these instruments were administered by a clinician at the Unit. All questionnaires (except for the TCI-R) were given to participants at follow-up. The same therapist who provided treatment also evaluated patients at their last therapy appointment (session 16), and at the 1- and 3-month follow-up visits. Signed informed consent was obtained from all participants.

Treatment

The CBT group therapy intervention consisted of 16 weekly outpatient sessions lasting 90 minutes each and a follow-up period. The current study assesses data from the first three months of follow-up. Following the first face-to-face interview, patients were informed of the possibility of having a CSO involved in their treatment program and attending treatment sessions. Seven sessions were specifically orientated to be attended by patients and their respective CSOs. Patients whose CSO attended these sessions were placed in the CSO group. Patients who did not have a CSO at their disposition (e.g. because of lack of social support, practical reasons, etc.) to attend these sessions were placed in the TAU group and received the same manualized CBT group therapy intervention as the CSO group. To ensure treatment fidelity, therapists were instructed to adhere closely to the treatment manual.

CBT groups were led by an experienced clinical psychologist as well as a clinically-trained co-therapist. The goal of the treatment was to train patients to implement CBT strategies in order to minimize all types of gambling behavior and to eventually arrive at full abstinence. The general topics addressed in the therapies included: psychoeducation regarding the disorder (its course, vulnerability factors, diagnostic criteria, bio-psychosocial models of GD, phases, etc.), stimulus control (money management, avoidance of potential triggers, self-exclusion programs, etc.), response prevention (alternative and compensatory behaviors), cognitive restructuring focused on illusions of control over gambling, and magical thinking, reinforcement and self-reinforcement, skills training, and relapse prevention techniques. This treatment program has already been described elsewhere (Jiménez-Murcia et al., 2006) and its short and medium-term effectiveness has been reported (Jimenez-Murcia et al., 2012; Jiménez-Murcia et al., 2007).

The role of the CSO was to acquire a better understanding of the disorder, to manage situations of risk, and to aid patients in adhering to treatment guidelines. Furthermore, CSOs who attended group therapy directly collaborated in some aspects of treatment such as stimulus control (initial control of spending) and in helping patients to find alternative activities to gambling, such as new hobbies and healthy distractions. These same areas were covered in the TAU group though without the aid of a CSO.

Data analysis

Statistical analysis was carried out with Stata13 for Windows. Comparisons of sociodemographic, clinical and personality measures between patients in the CSO group and the TAU group were made with chi-square tests (for categorical variables), t-tests (for quantitative variables) and negative binomial models (implemented in generalized linear models, for count variables). Effect sizes were estimated through 95% confidence interval for B-parameters and Cohens'-*d* coefficient ($|d|>0.50$ was considered moderate effect size and $|d|>0.80$, large size).

Survival analysis techniques modeled the relapse and dropout rate during the CBT program. The Kaplan-Meier method estimated the cumulated survival functions and the comparison between patients in the two study groups was carried out with the log-rang (Mantel-Cox) test, the Breslow (Generalized Wilcoxon) test and Tarone-Ware test.

Incremental predictive capacity of the CSO, adjusted by the main variables of the study [patients' chronological age, duration of the gambling behavior, severity of the gambling behavior (total DSM-IV criteria for gambling disorder) and general psychopathological state (SCL-90R GSI)] was estimated through logistic regression models. The change in the Nagelkerke's pseudo-R^2 comparing the first block (entering only the covariates) and the second block (adding the presence-absence of a CSO) of the logistics was used as measure of incremental predictive capacity.

Due to multiple statistical comparisons, increase in Type-I error was controlled for via Bonferroni-Finner's correction method (Finner, 1993), a Familywise error rate stepwise procedure which offers more a powerful test than classical Bonferroni correction.

Results

Sample characteristics

537 patients (79.6%) had a CSO join them in the CBT program. In this sub-sample (*n*=537), the distribution of the CSO type was: 311 (57.9%) spouse or partner, 121 (22.5%) parent, 20 (3.7%) son or daughter, 68 (12.7%) other family members and 17 (3.2%) a friend.

Table 1 includes a description of the participants at intake (baseline-values) for the total sample and stratified for patients in the CSO group and in TAU. Most of the participants had a primary (54.7%) or secondary (39.0%) school level of education, were married or lived with their partner (56.7%) and were employed (61.8%). The mean age of participants was 43.0 years-old (SD=12.7) and mean duration of the disorder was 4.8 years (SD=5.3). No baseline statistical differences were found in the sociodemographic, clinical and personality variables between patients in the CSO group and the TAU group.

- Insert Table 1–

Post-treatment results for patients with and without a CSO

Table 2 compares changes after the completion of the CBT sessions (changes were defined as differences in pre-post scores) between patients in the CSO group and the TAU group. Only PST on the SCL-90-R index scores were significantly different: patients in the CSO group showed significantly less positive symptoms after the completion of CBT therapy than those in the TAU group. Effect size for obtained through Cohen's-*d* coefficient was, however, in the poor range, *d*=0.22).

- Insert Table 2–

CBT outcomes: treatment adherence, relapses and dropout

The first rows of Table 3 contain a comparison of failure to adhere to treatment guidelines, missing at least 3 group sessions, relapse and dropout from therapy. Two of these outcomes reached significance when comparing patients in the CSO group and in the TAU group: patients in the TAU group were at higher risk of failing to attend group sessions and of dropout.

The last three rows of Table 3 contain a comparison of these outcomes measured as count variables: the number of sessions in which treatment guidelines were recorded as not being adhered to, the number of sessions that patients failed to attend and number of sessions in which relapses were registered. Statistical differences emerged for the number of non-attended sessions with a higher lack of attendance being found in patients in the TAU group (effect size was in the moderate range).

- Insert Table 3 –

Figure 1 shows the cumulative survival functions estimated through the Kaplan-Meier procedure for the rate of the first relapses and dropout during CBT. No statistical differences between survival curves for relapses were found comparing patients in the CSO and TAU groups (Log Rank: χ^2=0.14, p=.711; Breslow: χ^2=0.29, p=.590; Tarone-Ware: χ^2=0.21, p=.649). However, survival function for dropout was statistically different depending upon the group (Log Rank: χ^2=18.6, p<.001; Breslow: χ^2=19.7, p<.001; Tarone-Ware: χ^2=19.2, p<.001), with the rate of dropout being higher for patients in the TAU group.

- Insert Fig. 1 –

Table 4 includes the results of the second block of the logistic regressions assessing the incremental predictive capacity of the CSO into the CBT program, after adjusting by the covariates patients' age, evolution of the gambling, the gambling severity (total DSM-IV criteria) and the general psychopathological state (SCL-90R GSI index). The presence of a CSO remained statistical significant contribution decreasing the risk of failing to attend group sessions and dropout, with a predictive contribution of 1.9% and 3.1%.

CBT outcomes based on CSO type

Table 5 contains the comparison between patients who had their spouse/partner as a CSO and those who had another individual. Results for these comparisons show that the inclusion of the spouse/partner as a CSO (compared to other individuals acting as a CSO) increased compliance with the CBT program treatment guidelines and reduced the risk of relapse.

- Insert Table 5–

Discussion

The main objective of this study was to examine the short-term effectiveness of including a CSO in a CBT intervention for gambling disorder. It also sought to examine the association between CSO type and response to treatment, taking treatment compliance, relapse and dropout rates into account. Our findings support that, akin to in substance use disorders (Hunter-Reel, Witkiewitz, & Zweben, 2012), having CSOs play an active role in GD treatment has a positive influence on therapy outcome, at least in the short term. This study found that CSO participation in treatment was associated with significant clinical improvements, increased treatment attendance, and reduced dropout from the group CBT intervention compared to patients who received TAU.

At baseline, the GD patients in our study presented significant psychological problems and psychopathological symptoms (according to the SCL-90-R), which is consistent with previous studies finding a strong link between GD and emotional impairment (Aragay et al., 2012; Jiménez-Murcia et al., 2015; Walther, Morgenstern, & Hanewinkel, 2012). Gambling-related dysfunctional behavior often leads to a series of physical, emotional and interpersonal difficulties for

the subject (Lynch, Maciejewski, & Potenza, 2004; Vitaro, Arseneault, & Tremblay, 1997). Our study found that those patients who had a CSO involved in their CBT treatment reduced overall positive psychopathology symptom levels compared to patients receiving TAU. This finding suggests that the presence of a CSO in the GD recovery process might provide additional benefits in helping to reduce the emotional disturbances associated with the disorder.

Treatment outcome also seemed to be greatly influenced by the integration of a CSO. Patients who had a CSO involved in their treatment, regardless of whether that person was the patient's partner, were more likely to attend therapy sessions and were less at risk of dropping out of treatment. This is consistent with other studies; for instance, research in alcohol use disorders that have found that involving a CSO in treatment is associated with improved treatment retention (Hunter-Reel, Witkiewitz, & Zweben, 2012). It is important to note that our disorder-specific interventions did not assume that there were overt interpersonal difficulties between patients and CSOs that required attention, but rather focused on the specific ways in which CSOs interact or manage situations related to GD that might contribute to its maintenance and thwart treatment gains (Baucom, Shoham, Mueser, Daiuto, & Stickle, 1998). Relatedly, other studies have described that allowing CSOs to be involved in the treatment process aids them in being better equipped to recognize and cope more productively with the consequences of their loved one's gambling behavior (Hodgins, Shead, et al., 2007). In addition, doing so can also lead to improvements in relationship functioning between the CSO and the patient, and further engage the problem gambler. Being that a vast majority of people with problem gambling do not seek treatment (National Research Council, 1999; Slutske, Moffitt, Poulton, & Caspi, 2012), a CSO could provide the necessary impetus for a GD patient to begin treatment. More importantly, this same person could also provide the support needed for the patient to continue attending treatment sessions and adhere to treatment guidelines.

This study also found that patients whose partner/spouse was involved in treatment, as opposed to another significant other, were less likely to relapse and more likely to follow treatment guidelines. This may be due to the fact that a patient's partner is likely to spend long periods of time with the patient and might be better enabled to take control of issues such as developing environmental supervision (i.e., limiting access to money), working together toward financial recovery, addressing legal issues, and providing a context of support for the partner. These points have been described in other couples-based therapy programs (Ciarrocchi, 2002; Lee & Awosoga, 2015), though empirical data on the effectiveness of such interventions in large samples is scarce. Given that GD patients often report having trouble coping with negative emotions, and tend to suffer from an unstructured daily schedule and boredom when in recovery (Ledgerwood & Petry, 2006), the implication of a CSO in group treatments allows for coordinated efforts to address these needs. Likewise, if a patient is under the impression that their loved ones are non-supportive because of commonly reported feelings of resentment and distrust, they might be less willing to stay in treatment when interpersonal arguments arise (Bertrand et al., 2008). Indeed, numerous studies have found that such quarrels often serve as triggers for relapse (Poirier-Arbour et al., 2014), and it is known that families with problem gamblers are often

dysfunctional (Bertrand et al., 2008). Given these circumstances, we believe that working to minimize such personal and social complications (Hodgins, Toneatto, et al., 2007) should become a key aspect of GD interventions.

Limitations

This study has several limitations that may reduce its generalizability:

1) The non-randomized design of this study is a major limitation and future studies should employ a stricter, randomized controlled trial design to determine the validity of our results.
2) Even though no baseline differences between the CSO and TAU groups were found, it is feasible that patients who are unable to find a CSO to participate in their treatment are more resistant to treatment for other reasons. Likewise, the possibility exists that patients in the TAU group received support from a loved one or partner but that this person was unable to attend treatment sessions for a variety of reasons. Future studies should empirically determine whether the presence of interpersonal support for such patients has a similar positive effect to including a CSO and aim to collect more detailed information on CSOs themselves.
3) Our sample comprised only male patients and future studies would benefit from including women with GD.
4) Our primary outcome variables are subject to self-report bias. The use of therapists to obtain outcome data based upon clinical interviews presents a potential confound, and safeguards against the effects of hypothesis guessing should be utilized in future studies.

Conclusions

To conclude, our results suggest the utility of identifying a patient's support network at the start of GD treatment, and encouraging the involvement of this network in the patient's care. We found that CSO involvement was associated with an improvement in greater treatment attendance and reduced dropout from the treatment program. Furthermore, those who had their spouse involved in the CBT intervention were more likely to comply with the treatment guidelines and be at less risk of relapse than those patients who had another person serve as a CSO in their treatment. This upholds the notion that including a CSO in gambling inventions may provide added motivational and social support for both CSOs and GD patients. While there is some research examining the effectiveness of couple's therapy in GD, these studies often have small sample sizes and vary in their approach to GD treatment (Petry et al., 2005; Toneatto & Ladoceur, 2003). Future research should focus on the development of new treatment models including CSOs and collect empirical data from both patients and CSOs themselves. Including a CSO to group CBT treatment programs is not only cost-effective; it could also have a positive impact on GD treatment success and prove to be beneficial for both patients and for CSOs coping with the destructive effects of gambling behavior.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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Table 1. Sample description at baseline.

			Total (*n*=675)		TAU (*n*=138)		CSO (*n*=537)		*p*
Education level; *n-%*	*Primary*		369	54.7%	81	58.7%	288	53.6%	.149
	Secondary		263	39.0%	53	38.4%	210	39.1%	
	University		43	6.4%	4	2.9%	39	7.3%	
Civil status; *n-%*	*Single*		212	31.4%	54	39.1%	158	29.4%	.068
	Married - in couple		383	56.7%	72	52.2%	311	57.9%	
	Divorced - separated		80	11.9%	12	8.7%	68	12.7%	
Employment status; *n-%*	*Employed*		417	61.8	89	64.5	328	61.1	.462
Smoker (yes); *n-%*			439	65.0%	86	62.3%	353	65.7%	.453
Alcohol abuse (yes); *n-%*			100	14.8%	18	13.0%	82	15.3%	.511
Other drugs abuse (yes); *n-%*			58	8.6%	12	8.7%	46	8.6%	.961
Age (years); *mean-SD*			43.04	12.67	42.83	12.99	43.09	12.60	.825
Age of onset of GD (years); *mean-SD*			38.35	13.02	38.22	14.04	38.38	12.76	.898
Duration of GD (years); *mean-SD*			4.77	5.35	4.67	5.50	4.80	5.31	.806
Maximum bets per episode (euros); *mean-SD*			1102.1	11597.1	638.1	1499.5	1221.3	12979.8	.599
Mean bets per episode (euros); *mean-SD*			98.5	246.5	91.1	272.8	100.4	239.5	.693
Cumulate debts (euros); *mean-SD*			9071	29407	7103	22264	9576	30976	.379
DSM-IV-R: total criteria; *mean-SD*		α=.75	7.10	1.89	6.85	1.92	7.16	1.88	.080
SOGS: total score; *mean-SD*		α=.73	10.34	2.88	10.03	2.95	10.42	2.87	.151
SCL-90-R: Somatization; *mean-SD*		α=.90	0.84	0.76	0.84	0.76	0.84	0.76	.913
SCL-90-R: Obsessive/compulsive; *mean-SD*		α=.86	1.01	0.74	1.00	0.76	1.01	0.73	.953
SCL-90-R: Interper. sensitivity; *mean-SD*		α=.85	0.89	0.74	0.89	0.77	0.89	0.73	.958
SCL-90-R: Depressive; *mean-SD*		α=.90	1.38	0.85	1.30	0.85	1.40	0.84	.255
SCL-90-R: Anxiety; *mean-SD*		α=.88	0.88	0.72	0.84	0.71	0.89	0.73	.425
SCL-90-R: Hostility; *mean-SD*		α=.82	0.81	0.75	0.79	0.72	0.82	0.76	.738
SCL-90-R: Phobic anxiety; *mean-SD*		α=.74	0.37	0.52	0.35	0.49	0.37	0.53	.659
SCL-90-R: Paranoid Ideation; *mean-SD*		α=.76	0.77	0.70	0.76	0.69	0.78	0.71	.844
SCL-90-R: Psychotic; *mean-SD*		α=.83	0.81	0.68	0.75	0.63	0.82	0.69	.299
SCL-90-R: GSI score; *mean-SD*		α=.98	0.94	0.63	0.91	0.64	0.94	0.62	.526
SCL-90-R: PST score; *mean-SD*		α=.98	43.42	20.70	42.55	21.46	43.64	20.51	.580
SCL-90-R: PSDI score; *mean-SD*		α=.98	1.81	0.55	1.77	0.54	1.82	0.55	.297
TCI-R: Novelty seeking; *mean-SD*		α=.66	109.42	13.31	109.05	12.30	109.52	13.57	.720
TCI-R: Harm avoidance; *mean-SD*		α=.79	99.46	16.11	98.21	16.67	99.77	15.97	.320
TCI-R: Reward dependence; *mean-SD*		α=.78	100.33	15.36	101.06	14.71	100.14	15.53	.539
TCI-R: Persistence; *mean-SD*		α=.87	109.88	21.22	110.84	20.89	109.64	21.32	.562
TCI-R: Self-directedness; *mean-SD*		α=.84	130.85	20.49	130.23	21.05	131.01	20.37	.700
TCI-R: Cooperativeness; *mean-SD*		α=.78	134.29	16.35	133.72	16.14	134.43	16.41	.656
TCI-R: Self-Transcendence; *mean-SD*		α=.82	63.14	14.54	64.43	15.25	62.82	14.35	.254

Note. SD: standard deviation. CSO: concerned significant other. TAU: treatment as usual

Table 2. Pre-post CBT treatment differences for patients in the CSO and TAU groups

	TAU (*n*=138)		CSO (*n*=537)		T-TEST for mean comparison					
	Mean	SD	Mean	SD	$t_{(df=673)}$	*p*	MD	95% MD		Cohens'-|*d*|
SOGS: total score	4.37	4.45	5.13	5.02	1.62	.106	0.76	-0.16	1.68	0.16
SCL-90-R: Somatization	0.33	0.58	0.36	0.55	0.47	.681	0.03	-0.08	0.13	0.05
SCL-90-R: Obsessive/compulsive	0.36	0.57	0.43	0.59	1.25	.303	0.07	-0.04	0.18	0.12
SCL-90-R: Interpersonal sensitivity	0.36	0.58	0.41	0.59	0.87	.465	0.05	-0.06	0.16	0.09
SCL-90-R: Depressive	0.48	0.71	0.64	0.77	2.26	.196	0.16	0.02	0.30	0.22
SCL-90-R: Anxiety	0.33	0.55	0.43	0.59	1.77	.240	0.10	-0.01	0.21	0.18
SCL-90-R: Hostility	0.31	0.54	0.40	0.60	1.47	.301	0.08	-0.03	0.19	0.16
SCL-90-R: Phobic anxiety	0.13	0.28	0.18	0.37	1.38	.303	0.05	-0.02	0.11	0.15
SCL-90-R: Paranoid Ideation	0.33	0.54	0.34	0.54	0.36	.717	0.02	-0.08	0.12	0.02
SCL-90-R: Psychotic	0.30	0.51	0.40	0.57	1.75	.303	0.09	-0.01	0.20	0.18
SCL-90-R: GSI score	0.33	0.50	0.41	0.52	1.57	.117	0.08	-0.02	0.17	0.16
SCL-90-R: PST score	12.69	18.01	16.46	19.40	2.07	**.039**	3.77	0.19	7.36	0.20
SCL-90-R: PSDI score	0.29	0.44	0.33	0.44	0.98	.326	0.04	-0.04	0.12	0.09

Note. SD: standard deviation. MD: mean difference. Bold: significant comparison (.05 level, including Bonferroni-Finner's correction for multiple comparisons). CSO: concerned significant other. TAU: treatment as usual.

Table 3. Comparison of therapy outcomes between groups.

	Group				
	TAU (*n*=138)	CSO (*n*=537)	χ^2 (df=1)	*p*	Cohens'-|*d*|
[1]Non-compliance of therapy guidelines	28.3%	36.1%	3.00	.190	0.17
[1]≥ 3 missed sessions throughout treatment	65.2%	50.7%	**9.37**	**.004**	0.30
[1]Presence of relapses	24.6%	24.0%	0.02	.880	0.01
[1]Drop-out from therapy	38.4%	22.9%	**13.70**	**<.001**	0.34
[2]# sessions non-compliance of rules*; mean (SD)*	0.68 (1.44)	0.74 (1.41)	0.28	.598	0.04
[2]# sessions unattended*; mean (SD)*	6.36 (5.28)	4.31 (4.47)	**10.99**	**.003**	0.53
[2]# sessions with report of relapses*; mean (SD)*	0.33 (0.65)	2.06 (2.03)	2.03	.222	1.13

Note. [1]Chi-square test. [2]Generalized linear model (binomial regression). Bold: significant comparison (.05 level, including Bonferroni-Finner's correction for multiple comparisons). CSO: concerned significant other. TAU: treatment as usual.

Table 4. Logistic regressions valuing the incremental predictive capacity for a CBT treatment with a CSO.

Dependent variable	ΔR^2	B	SE	Wald	p	OR	95% CI (OR)	
[1]Non-compliance of therapy guidelines	.005	.335	.211	2.51	.113	1.40	0.92	2.11
[1]≥ 3 missed sessions throughout treatment	.019	-.623	.202	9.48	**.002**	0.54	0.36	0.80
[1]Presence of relapses	.001	-.054	.224	0.06	.808	0.95	0.61	1.47
[1]Drop-out from therapy	.031	-.800	.207	14.94	**<.001**	0.45	0.30	0.67

Note. Results adjusted by the patients' age, gambling severity (gambling duration and total DSM-IV criteria) and psychopathology global state (SCL-90R GSI).

ΔR^2: Increased in the Nagelkerke's pseudo-R^2 for the second block (adding the CSO presence) compared to the first block (including the covariates).

Bold: significant parameter (.05 level, including Bonferroni-Finner's correction for multiple comparisons).

Table 5. Comparison of therapy outcomes between groups based on the CSO type (sub-sample of patients with a spouse/partner).

	CSO				
Sample: patients with CSO; n=537	Spouse/partner (*n*=311)	Other (*n*=226)	χ^2 df=1	*p*	Cohens'-|*d*|
[1]Non-compliance of treatment guidelines	31.8%	42.0%	**5.90**	**.049**	0.21
[1]≥3 sessions unattended	50.2%	51.3%	0.07	.874	0.02
[1]Presence of relapses	21.5%	27.4%	2.49	.217	0.14
[1]Dropout from therapy	22.8%	23.0%	0.00	.961	0.00
[2]# sessions non-compliance of rules*; mean (SD)*	0.54 (1.1)	1.01 (1.7)	**19.19**	**<.001**	0.33
[2]# sessions unattended*; mean (SD)*	4.36 (4.53)	4.25 (4.39)	0.06	.802	0.02
[2]# sessions with report of relapses*; mean (SD)*	0.31 (0.7)	0.57 (1.3)	**13.05**	**<.001**	0.25

Note. [1]Chi-square test. [2]Generalized linear model (binomial regression). Bold: significant comparison (.05 level, including Bonferroni-Finner's correction for multiple comparisons). CSO: concerned significant other.

Fig. 1. Cumulate survival functions from the time to first relapse and dropout during the CBT program for patients in the TAU and CSO groups.