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Effectiveness of problem gambling brief telephone interventions: An uncontrolled outcome study

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Background

Problem gambling and other gambling-related harms have substantial health, social and financial impacts. They present a significant challenge to governments, communities, families and individuals. They follow and deepen existing lines of social disadvantage and health disparity. Various policies and services have been developed with the object of preventing and reducing problem gambling and associated harms. In New Zealand, as in a number of other jurisdictions, this includes a national gambling helpline and face-to-face counselling services. Little is known about how well these services perform, in New Zealand and elsewhere. Given that services are now increasingly available in many parts of the world, and were first established in New Zealand 20 years ago, it is surprising that the evidence base is weak. Internationally there have been relatively few studies of even moderate quality where people recruited from the community or seeking help from counselling services are randomly allocated to receive defined interventions to assess their relative efficacy or effectiveness. It is more surprising that there are not substantially more outcome studies where people who seek help from, and engage in, a particular service are systematically tracked afterwards to assess the extent and durability of change over time and obtain more information about factors that precipitate relapse and sustain recovery. The former type of investigation, randomised controlled trials (RCTs), is expensive to do well and is difficult to conduct in real-life clinical settings. While not without challenges, outcome studies are generally less expensive and somewhat easier to undertake.

The Gambling and Addictions Research Centre at Auckland University of Technology was commissioned by the Ministry of Health to conduct a RCT of four different, defined, interventions to be delivered by the national Gambling Helpline. These interventions included: (1) Helpline standard care (TAU, Treatment as usual), (2) single motivational interview (MI), (3) single motivational interview plus cognitive-behavioural self-help workbook (MI+W), and (4) single motivational interview plus workbook plus four follow-up motivational telephone interviews (MI+W+B). Four hundred and sixty-two Helpline callers who met the eligibility criteria were randomly assigned to the four groups. Inclusion criteria were minimum age of 18 years; perception of having a gambling problem; and willingness to read a short workbook (to ensure reading ability), have calls recorded, provide follow-up data on gambling, and provide the name of collaterals. Past or present involvement in treatment or mutual help groups for gambling or other mental health problems was documented and did not preclude participation. Callers were excluded if they were considered to be actively psychotic or required immediate crisis or police intervention because they posed a serious risk to themselves or others. It was found that participants in all four groups improved significantly, both statistically and clinically, and that these improvements were sustained at 12 months. A 36-month follow-up has recently commenced. While there were no overall primary outcome differences between the four treatments, some client subgroups did better in one or more treatments than in others. These findings have implications for potential matching of clients to interventions to further enhance treatment outcome.

The outcome study reported here is not part of the RCT. That is reported separately. It does, however, include one of the four intervention groups of the trial participants who received Helpline standard care. This group was supplemented by additional clients recruited after trial recruitment had ceased. Recruitment was extended to increase participant numbers and provide the basis for a stand-alone outcome study. The main purpose of this study was to ascertain whether there are differences in outcome between those who only access telephone care and those who also access professional counselling or therapy services additional to the

initial telephone intervention, and also to identify client characteristics associated with treatment outcome.

Methodology

The study was designed as an uncontrolled outcome study. This is a type of prospective cohort study.   All callers initially received brief non-directive counselling to identify presenting concerns and establish rapport. If the caller met eligibility criteria he or she was invited to participate. The inclusion criteria were the same as those used in the RCT and outlined above. In addition to the 116 participants from the RCT, 34 participants were recruited making a total of 150 callers recruited and followed for 12 months. After consent was given, participants received a baseline assessment and then received a manualised version of the Helpline's standard care. This included brief screening, reflective listening to clients' concerns and, in the case of first-time callers or regular callers who were experiencing persistent difficulties, referral to face-to-face problem gambling counselling services and/or suggestions for self-care. Prior to the commencement of the study Helpline counsellors received extensive training in delivering manualised standard care and their performance before and during the study was assessed for compliance and consistency. Both were high. In contrast, there is considerable variability in the approach that face-to-face counsellors take within and across agencies in New Zealand. This variability is not assessed in this report.

Study participants could choose their own treatment goal (quit some or all forms of gambling, or control their gambling). Outcome measures were self-reports of days gambled, money lost gambling and treatment goal success. Other outcome measures included problem gambling severity, control over gambling, gambling impacts, psychiatric comorbidity, general psychological distress and quality of life. Although some baseline information was obtained by counsellors pre-intervention, additional information was obtained by a research team member within seven days post-intervention.

Results

Of the 150 callers who received Helpline treatment, 86% were assessed at three months, 79% at six months and 66% at 12 months. There were slightly more female participants (57%) than males. Fourteen percent were aged 18 to 24 years, 25% were aged 25 to 34 years, 27% were aged 34 to 44 years, 20% were aged 45 to 54 years and 14% were aged 55 years and older.   The majority of participants identified their primary ethnicity as either Maori (43%) or European (42%) with 10% primarily Pacific and five percent Asian or other. Approximately half (49%) were partnered.   Twenty-seven percent had no educational qualification, 32% a secondary school qualification, 18% a trade or technical qualification and 23% a tertiary or professional qualification. Forty-four percent were in full-time employment and 13% had part-time employment. There is no evidence of major differential attrition with respect to socio-demographic variables. Most participants reported electronic gaming machines as their primary mode of problem gambling (89%) with 76% citing machines in pubs, nine percent machines in clubs and three percent citing machines in casinos.

With respect to gambling outcome measures there were substantial improvements from baseline to three months, with these improvements being maintained at six and 12 months. This included problem gambling severity as measured by the PGSI-3 (past three-month time frame) and PGSI-12 (past 12 month time frame). The median score reduced from 17 to 9. At baseline 96.6% met the PGSI criteria for problem gambling and 3.5% for moderate risk

gambling. At 12 months 57.5% were assessed as problem gamblers, 25.5% as moderate risk and 17% as non-problem or low risk. The percentage of problem gamblers at the baseline and 12-month assessments was similar to that noted for this group (without the additional 34 participants) in the RCT (97.2% and 60.8% respectively).

Treatment goals changed somewhat during the 12-month follow-up period, with proportionately more over time seeking to maintain abstinence and fewer seeking to quit all gambling. There was a slight increase in people wanting to gamble in a controlled manner.

Participants reported substantial reductions in the adverse impacts of gambling on work, social life, family/home and physical health. Again most improvement occurred between baseline and three months with little change subsequently. A similar pattern was found with respect to psychological distress as measured by the Kessler-10. At baseline, 56% were in the clinically significant high distress category. This reduced to 12.5% at three months and remained slightly below this percentage at six and 12 months. At baseline only 2.8% were in the low distress category. This increased to 62.6% at 12 months. Notable changes were also apparent with respect to mood disorders. At baseline, 57.7% of participants, as assessed by the PRIME-MD, were deemed likely to have a major depressive disorder and 12.4% a minor depressive disorder. At 12 months the corresponding percentages were 18.2% and four percent. Less substantial changes were apparent for dysthymia. There were slight reductions in smoking across the four assessment points (60% at baseline; 50% at 12 months) and alcohol abuse/dependence from baseline to six months (62.4%; 50%); however, at 12 months the percentage was 59.6%. While most participants did not report other drug misuse problems, those indicating moderate or serious problems reduced from 12.3% at baseline to two percent at 12 months.

During the first three months of the follow-up period, 31% of participants reported receiving assistance for their gambling problem from a professional treatment service and somewhat more (39%) reported obtaining informal support. Both professional and informal assistance reduced at each subsequent assessment point. At 12 months, the corresponding figures were 19% and 25%. There did not appear to be a clear preference for treatment provider and some sought help from more than one source.

From multivariate analyses it was found that males were significantly more likely than females to take up formal treatment during the first three months post-intervention (41.5% versus 22.1%) with an odds ratio of 2.85. In the case of males, this applied irrespective of whether they had, or had not, previously received treatment for a mental health problem (50% versus 40%). However, it was only females who had previously received treatment who were more likely to seek professional gambling treatment (43.8%) with an odds ratio of 4.41 compared with females who had not previously sought treatment (15.4%). None of the other socio-demographic variables including area of residence predicted receiving formal treatment. Participants who had received treatment for a gambling problem and those who had received treatment for another mental health problem during the past 12 months were also more likely to engage in counselling or therapy during this period.

A large number of factors were found not to be associated with receiving formal treatment including primary problem gambling mode (EGMs versus other); various indicators of problem gambling severity, impact and duration; motivation to overcome gambling problem; treatment goal; level of belief in treatment success; and perceived difficulty in overcoming problems. Similarly, the various measures of psychological distress, mental health disorder, substance use/misuse, suicidal ideation, quality of life, and prior treatment for an alcohol or drug problem in the past 12 months did not predict treatment engagement.

With respect to improvements on the PGSI-12 from baseline to 12 months (i.e. reductions in problem gambling severity) there was no significant difference between those who did and did not access formal gambling treatment services during the first three months post-intervention. Some groups of people outside the paid workforce (disabled, had an illness, on sick leave) improved less on this measure. This was also the case for people residing in more deprived areas. When confounding factors were accounted for, participants who gambled on pub EGMs showed substantially less improvement than participants who gambled on casino EGMs and casino table games (p=0.01). Those who were classified as having minor depressive disorder improved more (p=0.003). The wide range of other measures referred to with respect to the analyses of formal gambling treatment involvement were not found to be associated with reduced problem gambling severity.

Participants who accessed formal gambling treatment services were somewhat more likely to report a reduction in time-averaged mean number of days gambled per month over the follow-up assessment period. Widowed participants evidenced less change than those in other relationship categories. None of the other large number of variables examined was associated with change on this outcome measure.

In contrast to number of days gambled, no association was found between the uptake of formal gambling treatment services and time-averaged mean change in money lost gambling per month. In the multivariate analyses, baseline problem gambling severity (PGSI-12) was the only statistically significant predictor of change on this outcome measure (p=0.02). Participants with high scores (more serious gambling problems) improved less.

Participants who had higher belief in treatment success at baseline were more likely to have somewhat larger improvement in time-averaged self-assessment of control over gambling (p=0.022). On the other hand, those who perceived a high level of difficulty in overcoming their gambling problem had somewhat less improvement on this outcome measure (p=0.032). Participants who scored as having a low quality of life at baseline also improved less, as did those who had received treatment for a mental health problem in the past year.

None of the various factors examined in relation to time-averaged, self-assessed treatment success (gambling-quit or improved) reached statistical significance in univariate and multivariate analyses.

Discussion

Perhaps the most notable study finding is that clients improved substantially, both in statistical and clinical terms, with respect to problem gambling and some associated mental health problems. In many instances improvement occurred in the first three months and was sustained at the 12-month assessment. The durability of these changes will be further assessed at 36 months. They were achieved even though most callers received only one Helpline call and did not access other, more intensive, gambling counselling or therapy. Less change was evident for tobacco use and alcohol misuse. Given that substantial numbers of clients smoked and experienced alcohol problems, these findings raise questions about how they could be addressed, either by extending Helpline services or further encouraging referral to specialist services. There were some client characteristics that were associated with better or worse outcomes on some measures. There are a number of potential implications for future research and professional practice. However, the most striking finding was that, for the most part, clients showed fairly similar overall gains, irrespective of socio-demographic and other background differences.

The other major finding is that engagement in additional gambling treatment was not associated with better treatment outcome. This does not mean that these services are not of value. It might be that most clients who do not perceive a need for additional professional assistance do not require it, and that those who do perceive a need, obtain it and benefit. This could explain why there are generally no differences between those who do and do not receive additional therapy. However, if this is the case, it is surprising that those who obtained additional treatment did not have more serious gambling problems, psychopathology and less confidence in achieving treatment goals. Further research is required to assist in the matching of clients to services. Little is known about the nature of face-to-face gambling services in New Zealand and their outcomes.

It is not possible to conclude from an outcome study that client improvements are attributable to the intervention provided. However, some of the interventions that were included in the RCT from which most of the outcome study participants were sourced had been evaluated previously relative to wait-list control groups in previous trials. Given that Helpline standard care and these interventions achieved comparable outcomes, it is highly likely Helpline standard care per se contributes to the outcomes observed.

1	BACKGROUND

In December 2008, the Gambling and Addictions Research Centre at Auckland University of Technology was commissioned by the Ministry of Health to conduct the research project *National problem gambling intervention effectiveness* which is reported separately[1] and which should be read in conjunction with the current report.

The above-mentioned project was a single-site randomised controlled trial of brief telephone interventions for problem gambling involving four groups with repeated measures (pre-treatment, three months, six months and 12 months) enabling investigation of independent, and some interaction, effects of the different interventions. Participants were recruited from gambler callers to the national gambling helpline.

The four groups were:
- Group 1: Helpline standard care (control group)
- Group 2: Single brief motivational interview
- Group 3: Single brief motivational interview plus self-help workbook
- Group 4: Single brief motivational interview plus self-help workbook plus four follow-up motivational booster sessions.

Current study

The current study is an uncontrolled outcome study. An outcome study involves the prospective tracking and assessment of a cohort of participants. Participants comprised the Group 1 participants from the aforementioned randomised controlled trial together with additional participants recruited to Group 1. All participants received the same treatment.

The main aims of the current study are to:
- Ascertain if there are any differences in participant outcomes between those who only access telephone assistance for gambling problems in comparison with those who also access professional counselling services additional to the initial telephone intervention.
- Identify client characteristics associated with treatment outcome.

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[1] Abbott, M., Bellringer, M., Vandal, A., Hodgins, D., Palmer Du Preez, K., Landon, J., Sullivan, S., & Feigin, V. (2012). *Effectiveness of problem gambling brief telephone interventions: A randomised controlled trial*. Auckland: Gambling and Addictions Research Centre, Auckland University of Technology.

Background

Gambling is a popular recreational activity in New Zealand, with between 80% and 90% of the population reporting participating in the past six- or 12-months (Abbott & Volberg, 1996, 2000; Amey, 2001; Christoffel, 1992; Department of Internal Affairs, 2008; Health Sponsorship Council, 2007; Reid & Searle, 1996; Wither, 1987). The Department of Internal Affairs' five-yearly national surveys on people's participation in, and attitudes to, gambling from 1985 to 2005 showed that rates of participation in gambling have dropped slightly over time despite the number of gambling opportunities increasing (Department of Internal Affairs, 2008). In 2000, 10% of the population reported not participating in any forms of gambling in the past year. This doubled to 20% when the survey was repeated in 2005 using the same methodology. Lower reported participation rates of 63% to 65% have been reported in other studies (SHORE & Whariki, 2008; Ministry of Health, 2006; 2009) but these differences in gambling participation from previous estimates may be due to methodological differences in the conduct of the surveys (Williams & Volberg, 2010).

A wide variety of modes of gambling are approved by the Department of Internal Affairs under the Gambling Act 2003. These include:
- Housie
- Keno
- Lotteries Commission products, e.g. Lotto, Bullseye, Big Wednesday
- Scratch tickets
- Electronic gaming machines in pubs, clubs and casinos
- Casino table games
- Track betting with the TAB
- Sports betting with the TAB
- Card games, e.g. poker
- Raffles
- Casino/gaming evenings

These various legalised modes of gambling attract large amounts of spending each year. Over $1,900 million was spent on gambling in 2011 (Department of Internal Affairs website, 2012), with non-casino electronic gaming machines accounting for $856 million of that expenditure. Table A shows the breakdown of gambling expenditure over the most dominant modes in 2011.

Table A: Gambling expenditure in 2011

Gambling sector	Expenditure in 2011
TAB racing and sports betting	$273 million
NZ Lotteries products	$404 million
Non-casino electronic gaming machines	$856 million
Casino gambling (electronic gaming machines and table games)	$434 million
Total	*$1967 million*

(Department of Internal Affairs website, 2012)

Although most people are able to gamble without ever experiencing any harm, it is estimated that one percent to two percent of the adult population meet the criteria for problem gambling and experience significant harm as a result of their gambling. A national survey of

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4,053 adults over the age of 18 years, estimated that the prevalence rate for current problem and probable pathological gambling was 2.1% (±0.4) and 1.2% (±0.3) respectively (Abbott & Volberg, 1996; 2000). Another face-to-face national survey of a random sample of 12,488 New Zealanders over 15 years of age was conducted in 2006/07 (the New Zealand Health Survey). That survey found that 0.6% of past-year gamblers could be classified as problem gamblers, with an additional two percent being classified as moderate-risk gamblers (Ministry of Health, 2009).

In addition to the harm experienced by problem gamblers, affected others (i.e. people close to a problem gambler, such as nuclear family, whanau, and work colleagues) also experience harm due to someone else's gambling. Analysis of data from the 2006/07 New Zealand Health Survey indicated that 2.8% of New Zealanders over the age of 15 years had experienced problems due to someone else's gambling in the past 12 months (Ministry of Health, 2009).

Treatment in New Zealand

There is a wide range of problem gambling treatment providers located throughout New Zealand both in urban and rural localities, all of which provide services free of charge. The gambling helpline is the primary telephone counselling provider and is staffed 24 hours a day, 365 days per year by trained counsellors. In 2011, the gambling helpline received calls from 1,242 new problem gamblers and 600 new affected others (Gambling Helpline, 2012). Face-to-face counselling services assisted 12,090 people seeking help for gambling-related issues over a similar period (July 2010 to June 2011) (Ministry of Health, 2012).

The Problem Gambling Foundation (PGF) is the largest nationwide provider of gambling intervention services. PGF offers counselling in a range of languages including, but not limited to, Maori, Pasifika, Mandarin and Cantonese. As well as face-to-face counselling, PGF also has gambling 'hotlines' for telephone counselling for the general public, and for Asian and Pasifika help seekers (PGF website). PGF face-to-face counselling varies in counselling technique based on the preferred modality of individual counsellors. Thus, different clients may receive different types of intervention (e.g. motivational interviewing or cognitive behavioural therapy). This is most likely the case for many of the face-to-face counselling services as there is no requirement for standardised care at present. This presents a difficulty when making recommendations based on treatment outcomes reported by service providers.

The National Oasis Centres, a branch of the Salvation Army, also offer nationwide face-to-face counselling for problem gamblers and affected others. Oasis also makes referrals to self-help groups such as Gamblers Anonymous (Oasis website).

Gamblers Anonymous (GA) is a member-run self-help organisation that is founded on the 12-step programme instituted by Alcoholics Anonymous. GA promotes abstinence from gambling through peer support and has groups throughout New Zealand (Gamblers Anonymous website).

Hapai Te Hauora Tapui is a Maori public health provider that uses a Maori framework as a base for providing information, development and guidance for problem gambling services and the general public at a local (Auckland) and national level (Hapai Te Hauora Tapui website).

There is also a range of regional Maori, Pacific and Asian treatment providers that work with local communities. For example, Te Piringa Tupono and South Seas Healthcare Trust both

provide problem gambling treatment services for the people of Manukau in Auckland, the former assisting Maori and the later, Pasifika.

Problem gamblers accessing treatment

In terms of the number of people assisted by face-to-face problem gambling treatment services each year, Table B shows the total clients (excluding brief interventions) over the last seven years (Ministry of Health website). It should be noted that the way data were collected changed over time so the numbers are not directly comparable. However, it can probably be concluded that the number of people seeking help for gambling has risen overall between 2004 and 2011. There were large increases occurring in the years 2006/07 and 2008/09 and a small decrease in help-seekers in 2010/11 but it is yet to be seen whether this decrease will continue into 2012.

Table B: Total clients recorded by face-to-face problem gambling treatment services (excluding brief interventions)

Contact	Jul 04 - Jun 05	Jul 05 - Jun 06	Jul 06 - Jun 07	Jul 07 - Jun 08	Jul 08 - Jun 09	Jul 09 - Jun 10	Jul 10 - Jun 11
Total clients	3237	3329	4271	4441	6015	6367	6133
New clients	2293	2194	2786	2834	3854	3637	3180
Existing clients	944	1135	1485	1607	2161	2730	2953
↑ from prev. year	-	92	942	170	1574	352	-234
% ↑ from prev. year	-	2.8%	28.3%	4.0%	35.4%	5.9%	-3.7%

(Ministry of Health website)

The gambling helpline has a reduction in numbers of clients seeking help over the past seven years especially in the case of existing clients (Table C) (Gambling Helpline, 2012). This reduction in existing clients may be due to the gambling helpline referring clients to face-to-face services, such as PGF. This may have resulted in a skew of the total number of existing clients due to the fact that the gambling helpline mainly offers brief interventions over the telephone, rather than more structured long-term counselling.

Table C: Total clients recorded by the gambling helpline

Contact	Jan - Dec 05	Jan - Dec 06	Jan - Dec 07	Jan - Dec 08	Jan - Dec 09	Jan -Dec 10	Jan -Dec 11
Total clients	6534	5631	5747	4653	4118	4060	3600
New clients	2861	2641	2877	2268	2133	2444	2122
Existing clients	3673	2972	2870	2385	1985	1616	1478
↑ from prev. year	-1993	-903	116	-1094	-535	-58	-460
% ↑ from prev. year	-23	-13.8	2	-19	-11.4	-1.4	-11.3

(Gambling Helpline, 2012)

Treatment modalities

The following sections of this literature review focus on the major different modalities of treatment available to people who are experiencing harm from gambling and for which outcome study data are available. We acknowledge that other treatment modalities exist. The

fact that the various treatment modalities are generally not standardised make effectiveness difficult to assess. This review examines the evidence presented by various outcome studies and does not attempt to differentiate between the techniques used, aside from those differences mentioned in the methodologies of these studies. Whilst randomised controlled studies provide more robust data than outcome studies regarding the efficacy and effectiveness of the treatment modalities, they have been discussed in the literature review within the main report for the effectiveness study of brief interventions. The current report is a companion report focusing on outcomes of helpline standard care participants from the main study who did, or did not, access professional counselling services additional to the initial telephone intervention.

Gamblers Anonymous

Gamblers Anonymous, founded in 1957, is based on the Alcoholics Anonymous 12-step model of self-help treatment. Members attend meetings with other recovering problem gamblers and share stories about their experiences with gambling (Gambler's Anonymous website). This treatment programme promotes abstinence as the only acceptable form of recovery.

Multiple studies have reported GA as being ineffective at treating problem gambling (Petry & Armentano, 1999). Retrospective studies show that less than 10% of those who attend GA become active members (and are thus abstinent) (Stewart & Brown, 1988) and of those who attend meetings, only a small percentage achieve a year of continued abstinence from gambling (Brown, 1985). In a study of 232 GA attendees conducted by Brown (1985), it was found that 7.5% were abstinent after one year of attending GA meetings and 7.3% were abstinent after two years. Brown argued that this shows that GA has some benefit in achieving long-term behaviour change, but only to a minority of attendees.

When GA is combined with other treatment types, it may be more effective than when it is used as the sole treatment. However, due to outcome studies not having control groups and the treatment not being strictly monitored in many studies, especially post-treatment, the role that GA plays in any success cannot be concluded (Russo, Taber, McCormick, & Ramirez, 1984; Petry, 2003; Taber et al., 1987).

Behavioural therapy

Behavioural therapy is based on the theory that behaviour is learned through negative and positive reinforcement. There are different forms of behavioural therapy including aversion therapy, exposure therapy (urge reduction or extinction), and techniques to assist in avoidance of behavioural triggers. In the case of gambling, it is argued that arousal experienced by gamblers when in the gambling environment and winning (and associated random reinforcement schedule[2]) act to reinforce pathological behaviour (Anderson & Brown, 1984). McConaghy, Armstrong, Blaszczynski and Allcock (1988) argue that the behaviour becomes so habituated that if one does not perform the behaviour when stimulated, the experience is so negative that one is compelled to participate in the behaviour in order to relieve these feelings.

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[2] A random reinforcement schedule refers to a 'reward' of some kind being offered in response to a specific act, in this case, at random intervals. In the context of gambling, wagering money is the act and the reward is winning money or, in the case of electronic gaming machines, winning 'free spins'.

Early behavioural treatment for problem gambling included aversion treatment, the most common of which involved electric shocks and inducing vomiting through medications (Lester, 1980). These techniques resulted in short-term abstinence from gambling but did not produce long-term behaviour change. Walker (1993) illustrated this in a review of seven studies that used aversion treatment with a combined total of 53 participants. When participants were followed up between six months and three years after termination of treatment, only 12 participants were abstinent and nine considered themselves improved.

Two case studies conducted in the late 1970s added the use of other behavioural techniques to aversion therapy: contingency management (strategies the individual can draw on to reduce the chances of relapsing) and controlled gambling (Dickerson & Weeks, 1979; Rankin, 1982). These case studies found that the addition of these other behavioural aspects to therapy resulted in both patients achieving their stated goals of reduced gambling over the course of treatment.

Many behavioural treatments for problem gambling are based on the treatment developed for obsessive compulsive disorder (OCD), in which a participant is repeatedly exposed to stimuli, including imaginary scenarios (imaginal desensitisation), that cause them to experience problematic urges until they no longer feel the urge (Marks, 1987). In the problem gambling area, these stimuli are often those relating to the mode of gambling in which the participant is experiencing problems. In a study comparing two groups of ten problem gamblers, McConaghy, Armstrong, Blaszczynski, and Allcock (1983) found imaginal desensitisation more effective in decreasing gambling urges, gambling frequency and anxiety than aversion therapy.

McConaghy, Blaszczynski and Frankover (1991) conducted a study comparing the outcomes of 120 problem gamblers who underwent a five-day inpatient treatment programme. Participants were consecutively allocated to one of four different behavioural therapy programmes and followed-up two to nine years later. Sixty participants were allocated to receive imaginal desensitisation (ID), whereby the participant visualised scenarios in detail in which they experienced the urge to gamble but did not act on that urge. Twenty participants were allocated to aversion therapy, where they were exposed to mild electric shocks to their fingers when they read aloud phrases that described their past gambling behaviour. In each session, the last phrase read described them avoiding a gambling situation and that did not result in a shock. Twenty participants were allocated to imaginal relaxation, where they were taught to relax by visualising scenes that they found soothing. A typical scene reported by the authors was of the participant lying in a hammock with a drink. Once the participant had achieved a state of relaxation, they signalled to the therapist and then moved on to imagining the next relaxing scenario. Lastly, ten participants were allocated to brief in-vivo exposure and ten were allocated to prolonged in-vivo exposure. In-vivo exposure consisted of participants being exposed to gambling stimuli but not acting on their urges to gamble. In this case, participants accompanied the therapist to a gambling venue, with those in the brief exposure condition staying at the venue for 20 minutes each day and those in the prolonged exposure condition staying at the venue for 60 minutes each day. Sixty-three participants completed follow-up measures (52% of the sample).

At follow-up, 18 participants reported that they had ceased gambling, 25 reported having continued gambling in a controlled manner, and 20 reported continuing gambling in an uncontrolled manner. Of the 33 participants in the ID group who completed follow-up measures, 26 (79%) had ceased gambling or gambled in a controlled manner. This is significantly different from those followed-up who were allocated to the other behavioural procedures, 16 (53%) of whom had ceased gambling or gambled in a controlled manner. Differences in gambling behaviour at follow-up between participants allocated to the three

alternative behavioural therapies were not significant. Due to the lack of control group, small sample size and the low retention of participants for follow-up, conclusions from this study need to be interpreted with caution.

Another study examining the effectiveness of a behavioural intervention, in this case exposure therapy, was conducted by Symes and Nicki (1997). Using progressively more intense stimuli, two participants were exposed to gambling situations without the financial reward being present. Both participants experienced a decrease in their urges to gamble and were abstinent at the end of treatment (80 days consisting of 11 days of baseline measures being taken and 69 days of therapy).

In a case study reported by Oakes, Battersby, Pols and Cromarty (2008), a 31 year old woman who fit the criteria for pathological gambling was treated with an exposure therapy and relapse prevention programme. The exposure hierarchy used for this therapy commenced with several stepped stages progressing gradually from imaginal exposure of gambling cues, through to pictures of favourite gaming machines, with the final stage being to sit at a machine and put money into the machine without playing, then cashing out the money when the urge to gamble had dissipated. Following treatment completion, the participant completed measures, including the South Oaks Gambling Screen (SOGS), the Beck Depression and Anxiety Index, and goal evaluations every three months for one year. Following that, measures were completed yearly up to four years post-treatment. Immediately post-treatment, the participant was no longer classified as a pathological gambler. These treatment gains remained stable at the four year follow-up. Gains were also made on the Work and Social Adjustment Scale and the Beck Depression and Anxiety Index, moving from the clinical range to normal post-treatment, and remaining stable at four years.

A larger study examining exposure therapy was undertaken by Smith and colleagues (2010), using 127 clients of the Statewide Gambling Therapy Service in South Australia. Participants were treated with exposure therapy and followed-up one, three, six and twelve months post-treatment. Results showed that exposure therapy was effective at improving measures of problem gambling severity, psychological distress and impaired functioning at short- and mid-term follow-up. However, these gains were not held long-term. Additionally, retention was relatively low with 91 (71.7%) participants completing measures at three months and 80 (63%) at six months.

Other studies of exposure therapy have included cognitive therapy as an adjunct or supplement. Battersby, Oakes, Tolchard, Forbes and Pols (2008) assessed outcomes following treatment at the Flinders Therapy Service for 123 problem gamblers who completed treatment. Flinders Therapy Service is a treatment facility in South Australia for problem gamblers referred by state-funded agencies. Treatment was administered via a variety of modes, including face-to-face, telephone, videoconferencing and group sessions. Of the 123 participants who completed treatment, 54 (44%) completed follow-up measures at six months. Of these 54, only three participants (2%) reported having lapsed into problem gambling. The majority of participants also showed improvements in their depression and anxiety levels.

The authors acknowledged that a weakness of the study was the lack of resources that could be dedicated to re-contacting participants. Participants were encouraged to return to the Service to complete follow-up measures but were not actively pursued by staff. No differential analysis was performed on the non-completers (Battersby et al., 2008).

The Flinders Therapy Service has also published a case study of a woman treated for problem gambling using the exposure therapy with cognitive therapy model (Battersby et al., 2008).

"Melissa" attended eight weekly sessions and was followed up over two years. At the beginning of her treatment, Melissa scored 14 on the SOGS, indicating a severe gambling problem. Mid-treatment, immediately post-treatment, and at six-, 12-, and 24-months, Melissa scored zero on the SOGS and had also significantly reduced her depression and anxiety to nonclinical levels.

In another study using the Flinders Therapy Service's model of exposure therapy plus cognitive therapy, the effectiveness of group therapy in a rural setting was examined (Oakes, Gardiner, McLaughlin & Battersby, 2012). Seven problem gamblers completed pre-screening for gambling problem severity and comorbid problems and all were recommended to attend an inpatient programme at Flinders Medical Centre. However, all chose to participate in an intensive outpatient programme in the rural community where they lived. This programme consisted of two five-day blocks over a three-week period, as opposed to the usual outpatient programme of 12 once-weekly sessions.

Of the initial seven problem gamblers recruited for the rural Flinders study, six completed the treatment (including homework tasks) and the follow-up measures. At the initial assessment, the median score on the SOGS was greater than five indicating probable pathological gambling. At all five post-treatment points (immediately post-treatment, three-, five-, six- and 12-months following treatment), the median SOGS score was below three, indicating that the participants no longer fit the criteria for probable pathological gambler. Participant statements at 12-months also showed that all six no longer considered themselves problem gamblers. Five of the six participants reported being able to enter a gambling venue without feeling any urge to gamble (one of the six had relapsed). The authors reported that the above gains from a three-week intensive outpatient programme show the effectiveness of this treatment, even over short time periods of treatment (Oakes et al., 2012).

Cognitive therapy

Cognitive treatment is based on the theory that problem gambling stems from gamblers' erroneous beliefs in the randomness of gambling. Gamblers often report cognitions of having some control over the outcome, of having strategies that influence the game, or of being able to predict when a win will occur (often thinking that losing is necessary in order to have a big win later, or that winning predicts more wins to follow) (Ladouceur & Walker, 1996, Gaboury & Ladouceur, 1989). Cognitive treatments aim to challenge these erroneous beliefs, leading to a change in behaviour in the problem gambler.

In a case study conducted by Toneatto and Sobell (1990) it was found that cognitive treatment resulted in a reduction of gambling frequency from seven times per month to once a month immediately post-treatment. The frequency of gambling dropped further to once every two months, six months following treatment.

In a small study conducted by Ladouceur, Sylvain, Letarte, Giroux and Jacques (1998), cognitive therapy was used to treat five participants diagnosed as pathological gamblers by a clinician using the DSM-IV. A psychologist delivered the cognitive therapy to participants once or twice a week for 60 to 90 minutes, with a maximum of 20 hours of treatment per person. At the end of treatment, four participants no longer met the criteria for pathological gambling. These treatment gains were maintained at six months post-treatment.

Similar to many behavioural treatment studies, cognitive treatment studies suffer from small sample size and lack of control group. There is also a lack of studies for techniques that focus

on the use of cognitive or behavioural treatments only, rather than in combination (Petry & Armentano, 1999; Emshoff et al., 2007).

Cognitive behavioural therapy

Cognitive Behavioural Therapy (CBT) is a broad term encompassing behavioural and cognitive interventions. It was described in 1996 as involving "a highly diverse set of terms and procedures" (Brewin, 1996, p31) and more recently as the "generic term referring to therapies that incorporate both behavioural interventions (direct attempts to reduce dysfunctional emotions and behaviour by altering behaviour) and cognitive interventions (attempts to reduce dysfunctional emotions and behaviour by altering individual appraisals and thinking patterns)" (Problem Gambling Research and Treatment Centre (PGRTC), 2011, p66).

Studies have indicated that CBT is associated with positive outcomes though these have not necessarily used CBT alone and the CBT is not necessarily more efficacious than other treatments for problem gambling. For example, one small study assessed the outcome of problem gamblers treated with a combination of motivational enhancement therapy (MET) (one to three sessions), CBT (ten to fifteen sessions) and, finally, relapse prevention (two sessions), all administered individually and in a face-to-face setting. The nine problem gamblers assessed all showed a decrease in SOGS scores following the completion of treatment (Freidenberg, Blanchard, Wulfert, and Malta, 2002).

The authors acknowledged that their study was limited by the small number of participants and the lack of control group. In addition, follow-up was limited to immediately post-treatment which does not allow any investigation into how long the treatment gains lasted. Furthermore, there was no attempt to separate the three treatments in any way in order to assess if any one treatment was more effective than the other, or whether they were most effective in combination.

Another study with a larger sample size was conducted with 99 problem gamblers randomly assigned to one of four treatment groups:
- Cognitive therapy (six individual treatment sessions over 8 to 10 weeks)
- Behavioural therapy (as above)
- Motivational enhancement therapy (as above)
- Minimal intervention (one 90 minute feedback session consisting of practical advice for stopping gambling, including a booklet of practical strategies plus the feeding back of findings from baseline assessment).
(Toneatto & Gunaratne, 2009)

Over 90% (n=92) of the participants were followed-up immediately post-treatment and 74% (n=73) at 12 months. Toneatto and Gunaratne (2009) found that there were no significant differences in the effectiveness of all four treatments. All participants were found to have a lower number of symptoms of the DSM-IV pathological gambling criteria and gambled less frequently, though the changes were mild to moderate. There were no differences in the socio-demographics between groups.

In a more recent outcome study of 502 problem electronic gaming machine gamblers, participants were assigned (not randomly) to CBT-only (n=313) and CBT plus exposure and response prevention (ERT) treatment groups (n=189) (Jimenez-Murcia, et al., 2012). ERT is a form of in-vivo exposure therapy. Participants were exposed to stimuli that elicited the urge to gamble, for example, a gaming machine. Participants remained with the stimuli until the

urge to gamble dissipated. The intensity of the stimuli was gradually increased to reflect real-life scenarios, for example, being in a gambling venue with accessible cash. The treatment for each of the two groups consisted of 16 weekly group therapy sessions. It was found that CBT was an effective treatment for problem gambling, with positive results evident immediately post-treatment and at the six-month follow-up. However, due to the high attrition rates seen in the CBT + ERT group (53.4%) compared with the CBT group (29.7%), this treatment was concluded not to be effective (Jimenez-Murcia et al., 2012).

The authors commented that the high attrition rates may be due to the extra demands made on those in the latter group, for example, the CBT + ERT group had significantly more homework than the CBT-only group. They suggested that making the treatment less complex may result in lower attrition, as seen in the CBT-only group. Conversely, the authors also stated that this assumed that participant drop-out was a negative result, indicating relapse. This may not be the case as drop-out may also indicate that the participant felt that they no longer needed treatment as their problem had been resolved. Due to the lack of randomisation, lack of control group and limitations in following-up participants, the authors recommended that more research was required to support these results.

In a study comparing treatment outcomes of 126 problem gamblers 12-months following either a CBT or modified Gamblers Anonymous (GA) intervention, Toneatto & Dragonetti (2008) found there to be no difference between either group. Both treatments resulted in significantly reduced gambling frequency and expenditure 12 months post-treatment. Of those who completed follow-up at 12 months, approximately half reported being abstinent from gambling. At the 12-month follow-up, of those who continued to gamble, approximately one quarter still met the criteria for pathological gambling, according to the DSM-IV criteria. Less than half of the initial sample completed 12-month follow-up measures (n=81), presenting a limitation in this study.

Motivational interviewing

Motivational interviewing is a form of brief treatment that typically includes limited interaction time between the therapist and the participant and the use of self-help tools such as workbooks. Motivational interviewing focuses on building the desire of the participant to change by using five therapeutic guidelines: expressing empathy, highlighting inconsistencies between a participant's behaviour and their goals, avoiding arguing or confronting the participant, reinforcing accurate and correcting inaccurate perceptions whilst going along with any resistance, and endorsing self-efficacy (Miller & Rollnick, 2002; Miller, Zweben, DiClemente & Rychtarik, 1992). It is used for treating problem gambling due to the fact that the majority of problem gamblers never seek treatment and that those who do often drop out of treatment early (Slutske, 2006). These features of motivational interviewing also make this kind of intervention more suitable for telephone helplines and for assisting people in rural communities where formal treatment is lacking (Hodgins, Currie, Currie & Fick, 2009).

In relation to outcome studies of motivational interviewing interventions, one case study examined the combination of motivational interviewing with pharmacotherapy (fluoxetine) and found that this combination of treatment was successful in reducing gambling symptoms immediately post-treatment and at three-month follow-up (Kuentzel et al., 2003).

Many of the studies that have been conducted assessing the effectiveness of motivational interviewing have been randomised controlled trials, which are beyond the scope of this literature review. They are, however, discussed in detail in the previously mentioned literature review within the main report for the effectiveness study of brief interventions.

Multimodal treatment

Many general addiction treatment facilities offer multimodal treatment for problem gambling. Multimodal treatment is where multiple modalities of therapy are used to treat a patient's issues. These can include individual face-to-face therapy, group therapy, family group therapy, education, financial counselling, relationship counselling, and GA (twelve-step) therapy (Stinchfield & Winters, 2001). Commonly, not only is a patient's urge to gamble addressed but also other areas of life that may have been affected by their gambling. Multimodal treatment is premised on the complex nature of problem gambling and the impact that it can have on multiple areas of one's life including physical health, mental health, family relationships, and one's financial situation.

Korn and Shaffer (2004) support the view that problem gambling requires a multimodal approach, arguing that pathological gambling is best viewed as a syndrome, as it often presents with multiple symptoms including depression, anxiety, and alcohol and substance abuse. However, treatment programmes which involve interventions over multiple problem areas are typically not run in specialised gambling centres and vary in terms of quality and implementation of best practice principles (Griffiths & MacDonald, 1999).

Outcome studies on multimodal treatment have reported positive findings. Blackman, Simone and Thoms (1989) studied 155 participants admitted to multimodal treatment at an American multimodal treatment centre between 1982 and 1985. Treatment length was on average 5.5 months. Pre- and immediately post-treatment measures were available for 88 participants. When presenting for treatment, 79% of the 88 participants followed up were gambling daily and 67% rated their gambling problem as severe or very severe. At the completion of treatment, six percent were gambling on a daily basis and 29% rated their gambling problem as severe or very severe. In addition, 43% of participants described themselves as pre-occupied with gambling when beginning treatment, compared to 25% at treatment termination.

Russo, Taber, McCormick and Ramirez (1984) also reported positive findings from a follow-up of 60 former inpatients of a multimodal treatment facility. They found that 55% of participants reported being abstinent from gambling one year post-treatment. However, the 60 participants who responded to requests for follow-up represented only 48% of the sample that Russo and colleagues were investigating. This low response rate increases the possibility of the sample being skewed.

A large-scale outcome study assessing the effectiveness of Minnesota's (USA) gambling treatment programmes was published in 2001 and, due to the large sample size of 568 patients and the inclusion of standardised pre-, post-, and follow-up measures, represents a high quality source of information on gambling treatment outcomes (Stinchfield & Winters, 2001). The Minnesota study included four state-supported out-patient gambling programmes offering multimodal treatment aimed at cultivating gambling abstinence. Despite the programmes having a GA grounding, they all offered individual counselling, group therapy, lectures, discussion groups, financial counselling, and various other forms of therapy. Data were collected between January 1992 and January 1995, with the number of patients from each facility being as follows: 171, 187, 138 and 96. The sample comprised 348 males and 220 females, the majority of whom were white and employed, with an average age of 39 years but ranging from 18 to 74 years. The treatment goals were gambling abstinence and to learn how to live without gambling.

One of the strengths of the Minnesota study is that assessment batteries were administered pre-treatment, post-treatment, six-months following and 12-months following treatment.

Questions included gambling frequency, legal problems, recovery attitude, and substance use issues, amongst others. In addition, the patient's nominated 'significant other' completed a questionnaire about the patient's behaviours at the same time points. The SOGS was included in all assessment batteries in order to measure problem gambling severity. The majority of patients reported experiencing problems with electronic gaming machines and casino card games and reported gambling either daily or weekly. All patients met the diagnostic criteria for pathological gambling at admission to the programme (Stinchfield & Winters, 2001).

Daily gambling rates dropped markedly from 36% of patients to between one and three percent following treatment. Abstinence rates increased markedly from pre-treatment to immediately post-treatment but then declined at follow-up. SOGS scores also showed a large shift from the majority (87%) of patients scoring over five on the measure, to less than one-quarter at the six- and 12-month follow-up points. Multivariate analysis indicated there was significant improvement in gambling frequency and SOGS score post-treatment and over the follow-up periods. In addition, improvements were also seen post-treatment and over follow-up on other quality of life and psychological measures. However, due to a large amount of missing cases (over 50% of the sample by the 12-month follow-up) it is difficult to directly compare percentages. The authors also noted that it is difficult to judge whether to include missing data as treatment failures or to exclude it from the analyses (Stinchfield & Winters, 2001).

General counselling

General non-specific counselling or clinical social work is commonly used by treatment providers across the problem gambling sector (MacDonald, Sheldon & Gillespie, 1992; Smith, Thomas & Jackson, 2004; Jackson, Thomas, Thomason, Borrell, Crisp, Ho, Holt & Smith, 2000). Those who use these non-specific techniques are often trained counsellors, trained social workers, or individuals who hold some other form of qualification which permits them to work in the industry. They use counselling techniques drawn from a range of strategies and sources and can also be expected to liaise with courts and provide budgeting or financial advice (Smith et al., 2004; Delfabbro, 2011).

Jackson and colleagues (1997) examined the type of therapy that counsellors believed had the more beneficial effect on their clients' gambling problems. Counsellors who had the best rates of problem resolution with their clients were more likely to report using a combination of the following:

- Client-centred humanistic psychology
- CBT
- Solution-focused counselling
- Assessment of the client's readiness to change
- Goal setting

Outcome studies on non-specific gambling counselling are few. Jackson and colleagues (2000) conducted an evaluation of the Victoria, Australia 'BreakEven' counselling service and found that 43% of clients reported experiencing a full or satisfactory resolution of their general problems following treatment and 41% reported a partial resolution of their general problems. In terms of their specific problems with gambling, 70% of clients reported that their situation had improved, with over half of these reporting that it had improved significantly.

Natural recovery

Natural recovery refers to moving from having a gambling problem to no longer having a problem without accessing any formal treatment services. Obviously, this is not a form of structured intervention but is discussed in this review as it is a path followed by many problem gamblers. This is evidenced by the lack of problem gamblers that seek formal treatment, with international research showing that between six percent and 17% of problem gamblers ever access help from formal treatment providers (Productivity Commission, 2010; Slutske, 2006; Suurvali, Hodgins, Toneatto, & Cunningham, 2008). In addition, the steady or declining rates of problem gambling prevalence and incidence across many populations indicate that problem gambling is not a lifelong chronic affliction for many people (Ministry of Health, 2009; Abbott & Volberg, 1996). Natural recovery could be used to inform more formal interventions.

There is a lack of literature on natural recovery from problem gambling, most likely due to the difficulty in studying this phenomenon. In a national longitudinal study of 143 problem and non-problem gamblers, and smaller in-depth study seven years later, Abbott and colleagues reported that of those considered probable pathological gamblers at the first data collection point, less than one quarter remained in this category seven years later. The greatest change was noted for people with less serious problems. None of those probable pathological gamblers reported seeking formal treatment of any kind in those intervening years. The authors argue that this indicates a high rate of natural recovery amongst those with serious gambling problems (Abbott, Williams and Volberg, 1999; 2004).

Shaffer and Hall (2001) assert that problem gambling is a dynamic disorder, with those affected moving in and out of risk categories over time. When looking at casino employees (a group with a high risk of developing gambling problems) they found that those with severe gambling problems were very likely to have moved to having less serious problems one year later, rather than remain in that high risk category, despite not undergoing any formal treatment (Shaffer & Hall, 2001).

In a study by Hodgins and Peden (2005), 63 pathological gamblers were followed for a period of three and a half years in order to explore the process of natural recovery. Participants completed baseline measures of gambling severity (SOGS) and gambling frequency. Of the 63 participants at baseline, 40 completed measures at follow-up, with the mean follow-up period being 40.2 months. At follow-up, twelve participants considered themselves to no longer have a gambling problem. Of these twelve, seven were abstinent and five were gambling in a controlled manner. Two members of the abstinent group and two members of the controlled gambling group had received formal treatment for their gambling problem since baseline measures were taken.

Those who reported no longer having a gambling problem but still participated in controlled gambling generally had the lowest SOGS scores of the sample at baseline and those who reported being abstinent from gambling had the highest SOGS scores. Hodgins and Peden (2005) argue that this shows that different treatment goals may be necessary for different severities of problem gambling, with those experiencing more negative effects requiring a more absolute goal such as abstinence. Of the 28 participants who remained pathological gamblers, eight had received formal treatment, four had received minimal treatment and sixteen had received no treatment since baseline measures were taken.

Another study investigating students aged 18 to 29 years showed that over an 11-year period the prevalence of problem gambling stayed the same but individual gambling problems were characterised as being episodic and dynamic (Slutske, Jackson & Sher, 2003).

Natural recovery was also explored in two national studies conducted in the United States. Data from the Gambling Impact and Behavior Study (GIBS) (N=2,417) and the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) (N=43,093) were examined by Slutske (2006). Of the 21 participants in the GIBS study who reported ever having had a gambling problem, 18 no longer met the DSM-IV criteria for pathological gambling and nine reported having no symptoms in the past 12-months. Only two participants who reported ever having a gambling problem also reported seeking treatment.

Of the 185 participants in the NESARC who reported a lifetime history of gambling problems, 111 (63%) no longer met the DSM-IV criteria for pathological gambling and 70 (36%) had no symptoms in the past 12-months. Of this group of 185 lifetime pathological gamblers, only 22 (9.9%) had ever sought treatment. However, in this group there was a strong relationship between the likelihood of seeking treatment and the severity of the problem. Of those who had 5, 6, 7, 8, 9 and 10 criteria for pathological gambling, 6%, 4%, 6%, 17%, 31% and 76% respectively sought treatment. When examining the data as a whole, the author concluded that 33% to 36% of those who experience pathological gambling at some time in their lives will recover naturally (Slutske, 2006).

Therapist effect

The 'therapist effect' refers to a person experiencing a positive outcome as a result of treatment, due to the relationship developed with the therapist, not the actual treatment that is administered. This theory may be supported by the fact that it has been concluded that most psychological interventions are successful (e.g. Lambert & Bergin, 1994; Smith, Glass & Miller, 1980; Stiles, Shapiro & Elliot, 1986). In a meta-analysis of 69 studies that examined therapeutic alliance and patient outcome Martin, Garske and Davis (2000), found that it is the alliance between therapist and patient that has a greater effect on the patient's outcome than the intervention chosen. They concluded that it is, thus, more important to focus on the therapeutic alliance than which intervention to use. However, research in this area is lacking.

Pharmacotherapy

Studies examining the effectiveness of pharmacotherapy on problem gambling are, for the vast majority, randomised controlled trials. Hence, these studies are not included in this literature review. This section will examine case studies and trials of pharmacotherapy for treating problem gambling that do not contain either control groups or randomisation.

In a study by Hollander and colleagues (1998), 16 problem gamblers recruited through professional referrals and the media underwent a 16-week drug treatment trial. Measures completed at baseline included the Clinical Global Impression (CGI) pathological gambling scale, measuring pathological gambling severity, and a modified Yale-Brown Obsessive Compulsive Scale for pathological gambling, measuring urges and behaviour. The first eight weeks of the single-blind study consisted of participants being administered a placebo. This was an attempt to minimise any short-term placebo effects and ensuing relapse. The second stage of the trial was eight weeks of fluvoxamine, a selective serotonin re-uptake inhibitor often used in the treatment of obsessive compulsive disorder.

Of the 16 participants in the fluvoxamine study, six dropped out during the placebo stage. The remaining 10 participants all completed the full course of treatment. The authors reported that seven of the 10 treatment completers responded positively to the treatment. The seven that responded positively all were rated 'very much improved' or 'much improved' on

their CGI score and had a mean improvement of 86% on their Yale-Brown gambling behaviour score. In addition, all seven were abstinent at the end of treatment. However, Hollander et al. (1998) warn that these results must be interpreted with caution due to the lack of double-blinding, randomisation and control groups.

In another pharmacotherapy study, Black (2004) conducted an open-label trial of bupropion, a norepinephrine-dopamine re-uptake inhibitor that is commonly used to treat depression and assist with smoking cessation. Ten problem gamblers participated in the eight week trial and at the conclusion, seven of the ten were rated as being much or very much improved in their CGI score. However, Black (2004) includes caveats, such as the lack of blinding and placebo control.

Conclusion

The current literature review examined outcome studies and case studies that investigated the outcomes of various treatment types in treating problem gambling. Due to the fact that these studies do not adhere to the rigours inherent in randomised controlled trials, there are limitations. These limitations include small sample sizes, a lack of control groups, a lack of blinding and the use of non-standardised measures. Due to these limitations, results must be interpreted with caution.

As can be seen from the variety of treatments available and lack of strong evidence pointing to any one being significantly more effective than another, more research is needed in this area. The current study aims to evaluate the outcome of a group of participants who called a national gambling helpline, received standard helpline care and were then referred to face-to-face gambling help services for additional treatment. The array of treatment services available across New Zealand means that different participants will have encountered different intervention modalities, similar to those discussed in the current literature review.

3	RESEARCH METHODOLOGY

3.1	**Ethics approval**

All participant materials (i.e. survey questionnaires, information sheets and consent forms) and other relevant documents were submitted to the Multi-Region Health and Disability Ethics Committee (a Health Research Council accredited human ethics committee) which considers the ethical implications of proposals for research with humans where participants are asked questions in relation to their health.

The ethics approval for the study was granted on 3 June 2009 (Appendix 1). The Ethics Committee was kept apprised of any changes as the study progressed.

During the research the following measures were taken to protect the identity of the participants:
- All participants were allocated a code by the research team to protect their identities
- No personal identifying information has been reported.

In addition:
- Participants were informed that participation in the research was voluntary and that they could withdraw at any time, prior to data reporting.

3.2	**Study design**

3.2.1 Study aims

The main aims of the study are to:
- Ascertain if there are any differences in participant outcomes between those who only access telephone assistance for gambling problems in comparison with those who also access professional counselling services additional to the initial telephone intervention
- Identify client characteristics associated with treatment outcome.

3.2.2 Overview

This study was a (prospective) cohort study of problem gamblers calling the Gambling Helpline and receiving the standard treatment. Recruitment occurred in parallel with, and using the same entry criteria, as a randomised controlled trial of four different helpline interventions, the Control (or "Treatment as Usual") arm of which was recruited into the cohort.

3.2.3 Study population

As described throughout this report, the data discussed here represent an extension of the 'standard care' control group from a large four group randomised controlled trial recruited from callers to the Gambling Helpline. The extended recruitment for the standard care group

was designed so that the group could function as a stand-alone outcome study, describing and documenting the outcomes for those accessing help services for their gambling problems in New Zealand. In the randomised controlled trial, 116 participants were recruited to the standard care control group. An additional 34 participants were recruited to the group to increase the group size to 150 for the purpose of this outcome study. Recruitment was terminated at this point due to funding and time constraints.

All callers to the helpline initially received brief non-directive counselling to identify presenting concern/s and establish rapport. If the caller met eligibility criteria they were asked if they would like to participate in the study. Immediately after consenting to take part in the study, participants underwent an initial baseline assessment (detailed in section 3.2.6) and then received their treatment which was delivered by telephone by a trained Gambling Helpline counsellor.

The participants received a manualised version of the helpline's standard care. This standard care included brief screening, reflective listening to clients' concerns and, in the instance of first time callers or regular callers who were experiencing persistent difficulties, referral to face-to-face problem gambling counselling services and/or suggestions for self-care. Treatment comprised a single session. The protocol was developed with staff to ensure it was functional and similar to their normal practice; it did not contain any elements of motivational interviewing techniques. Additionally, participants were offered an information pack (relevant information pamphlets, for example detailing venue self-exclusion processes, or budgeting advice).

While the protocol for the Gambling Helpline counsellors was manualised and assessed for compliance and consistency, as part of the protocol included referrals to face-to-face problem gambling counselling services, there is variability in the approach to face-to-face delivery across service providers that is not described or accounted for in the results presented in the current report. Nonetheless, these results provide a reasonable account of the outcomes for people seeking help for their gambling problems in New Zealand.

3.2.4 Eligibility criteria

The inclusion criteria were:
- Minimum age of 18 years
- Perception of having a gambling problem
- Willingness to:
    - Read a short workbook (to ensure reading ability)
    - Have calls recorded
    - Provide follow-up data on gambling
    - Provide the name of collateral/s.

Present or past involvement in treatment or mutual help groups for gambling or other mental health problems was documented and did not preclude participation.

Callers were excluded from the study if:
- They were considered by the counsellor to be actively psychotic
- They required immediate crisis or police intervention because they posed a serious risk to themselves or others.

3.2.5   Setting and location

The study took place at the Gambling Helpline, Auckland, New Zealand. Treatment was delivered by trained Gambling Helpline counsellors. As the treatment was delivered by telephone, participants were based throughout New Zealand. Recruitment and delivery of treatment occurred from August 2009 to May 2011.

Follow-up assessment calls were made by telephone by trained university research assistants from Auckland University of Technology (AUT), Auckland, New Zealand.

3.2.6   Schedule of assessments

Initial assessment

The initial assessment was conducted with the participant by a helpline counsellor prior to the participant receiving the treatment. Due to the length of the initial assessment, some of the baseline initial assessment was conducted by an AUT researcher within seven days of a participant receiving the intervention. This is detailed at the end of this section.

Gambling/problem gambling history, impacts and past help-seeking
A brief gambling history was obtained including length of gambling problem; type/s of gambling causing problems; number, nature and outcomes of past attempts to quit or reduce gambling; and past treatment and mutual help involvement. The impacts of gambling on financial status, employment, family and other relationships, criminal offending and general health (adapted from Abbott & Volberg, 1992; Abbott, 2001) were also assessed.

Problem gambling
The nine-item Problem Gambling Severity Index (PGSI) (Ferris & Wynne, 2001) was used to measure severity of gambling problems. It was administered in both a past 12-month and a past three-month time frame (reported as PGSI-12 and PGSI-3, respectively). The PGSI has been validated against clinician-derived DSM-IV pathological gambling diagnoses and other problem gambling measures including the widely used South Oaks Gambling Screen/South Oaks Gambling Screen-Revised (SOGS/SOGS-R) (Abbott & Volberg, 2006).

Comorbidity and substance use
A brief version (10-item scale) of the Drug Abuse Screening Test (DAST; Skinner, 1982) was administered to assess drug abuse. The DAST has very good internal reliability in samples of substance abusers and psychiatric patients and correlates strongly with a number of drug use measures (Cocco & Carey, 1998).

To identify hazardous alcohol consumption or active alcohol use disorders (including alcohol abuse or dependence) a brief version (AUDIT-C, three-item scale) of the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993) was administered. In a review of research using the AUDIT and shortened versions, the AUDIT-C was reported as showing promise in being time-efficient and accurate when compared with full AUDIT results (Reinert & Allen, 2002).

Participants were also asked about lifetime and current tobacco use and any previous success at quitting a problematic behaviour (i.e. smoking, alcohol, other drugs and other behaviour).
The Kessler-10 (K-10) questionnaire was included to provide a continuous measure of general psychological distress that is responsive to change over time. The K-10 has been well validated internationally. Its brevity and simple response format are attractive features. It

also produces a summary measure indicating probability of currently experiencing an anxiety or depressive disorder (Kessler & Mroczek, 1994).

Quality of life
Quality of life was assessed by the WHOQoL-8, an eight item version of a widely used measure. This short form has been used in a number of countries, is robust psychometrically, and overall performance is strongly correlated with scores from the original WHOQoL instrument (Schmidt, Muhlan & Power, 2005).

Treatment goal
Participants were asked whether their goal was to stop all forms of gambling, stop only problematic forms of gambling, or to gamble in a non-problematic manner.

Self-efficacy
A simple rating was employed to assess belief in likelihood of a participant achieving their treatment goal (0 "not at all confident" to 10 "extremely confident") in the next six months.

Motivation and perceived control over gambling
Treatment goal motivation was measured on the same 0 to 10-point scale ("not at all" to "extremely"). Participant-rated sense of control over gambling was assessed using a similar 0 to 10-point scale ("no control" to "total control").

Socio-demographics
Age, gender, ethnicity, marital status, highest educational level, employment status and area of residence data were collected.

Follow-up baseline questions
Within seven days of the initial assessment and treatment delivery, an AUT researcher asked some follow-up baseline questions of each participant. These included:

Gambling/problem gambling history
A detailed timeline of types of gambling, frequency and money spent gambling over the past two months was administered (based on Sobell & Sobell, 1992). Participants were provided with memory cues such as recent holidays and news events to facilitate retrieval of this information.

Comorbidity and substance use
The mood module of the Primary Care Evaluation of Mental Disorders (PRIME-MD, Spitzer et al., 1994) was administered to provide diagnoses of major depressive disorder, dysthymia, minor depressive disorder, and alcohol abuse/dependence. This is a structured interview designed for primary care clinicians and researchers to diagnose these and other current DSM-IV mental health disorders. It has been validated against the Structured Clinical Interview for the DSM-IV (Spitzer et al., 1992) and has been administered by telephone and shown to yield valid diagnoses (Spitzer et al., 1994; Kobak et al., 1997). The use of psychotropic medication and history of manic episodes was assessed using questions modified from the Gambling Impact Study (Gerstein et al., 1999).

Socio-demographics
The eight-item New Zealand Index of Socio-economic Deprivation for Individuals (Salmond, 2005) was administered.

Follow-up assessments

Participants were contacted by an AUT researcher to complete a follow-up assessment at three, six and 12 months post-treatment. At each follow-up assessment, a timeline follow-back interview was conducted to capture the number of days gambling during the follow-up period and the amount of money lost on each occasion. Participants were asked whether they had met their goal ('not at all', 'partially', 'mostly', 'completely') and what their present goal and personal sense of control over their gambling were (0 'no control' to 10 'total control').

At each assessment, participants were asked what other treatment or help, if any, they received for their problem gambling during the follow-up period. These forms of treatment/ help were listed and, for each, they were asked how often the treatment or help was obtained (number of occasions) and how helpful it was in reaching their goal ('not at all', 'partially', 'mostly', 'completely'). At the three- six- and 12-month assessments, in addition to the previously mentioned assessments, the current tobacco use, gambling impacts, AUDIT-C, K-10 and WHOQol-8 were re-administered. At the 12-month assessment point, participants were also re-administered the DAST and PRIME-MD mood module as well as being asked to reflect on their overall experience during the past 12 months in seeking and receiving help for gambling and making changes in their lives. They were also asked about the cultural appropriateness of the help they received (linked to source/type of help) and, if inappropriate, what could be changed to make it more appropriate. They were invited to comment on other changes that could make help more accessible, appropriate and effective.

3.2.7 Training

Training for gambling helpline counsellors included practice in introducing the project, recruitment of participants, and the initial assessment questions. The training also incorporated how to use the protocol. All training included pilot interviews with volunteers that were digitally recorded and assessed for compliance and consistency by Dr Sean Sullivan and Professor David Hodgins (two of this report's authors). The training included additional ad hoc sessions, particularly at the beginning of the study, to address any issues.

Dr Sullivan also trained the AUT researchers who conducted the follow-up assessments. The training included identification of risk level of participants and how to safely intervene when participants expressed symptoms of risk or suicidal ideation.

3.2.8 Treatment integrity and fidelity

To assess how well the counsellors delivered the intervention (i.e. to assess treatment integrity and fidelity), approximately 20% of telephone calls (including intervention delivery) with participants were randomly digitally recorded. The recordings were subsequently (usually within one month) listened to and assessed by Dr Sean Sullivan who provided personal feedback and, where required, additional training to counsellors. Approximately one-third of the recordings were also listened to by Professor David Hodgins in order to assess reliability of the first assessment of the recordings.

3.2.9 Data analyses

Participant profiles
Baseline data utilised for the participant profiles are primarily descriptive. These include frequencies of demographics, gambling, mental health and behavioural measures, as well as means and standard deviations or medians and ranges, where appropriate.

Baseline data for profiles include:
- Demographics:
    - Age group, ethnicity, gender, marital status, employment status, highest educational level, area (town/city) of residence, total household income
- Gambling-related, mental health and other behavioural measures including:
    - Number of days gambled, amount of money spent
    - Problem Gambling Severity Index (PGSI), control over gambling, gambling impact
    - Psychological distress (Kessler-10), Mood Module of Primary Care Evaluation of Mental Disorders (Prime-MD)
    - Quality of life (WHOQoL-8), individual deprivation
    - Alcohol abuse or dependence (AUDIT-C), Drug Abuse Screening Test (DAST), tobacco use

Trends
Follow-up data from three-, six- and twelve-months have been presented descriptively, examining measures at each time point and change since treatment, providing frequencies, means and standard deviations, or medians and ranges, where appropriate.

Data for profiles by time point (baseline, three-, six- and 12-months) include:
- Follow-up rates of participants
- Gambling measures
    - Number of days gambled, amount of money spent
    - Problem Gambling Severity Index (PGSI), control over gambling, gambling impacts
    - Goals met
- Additional assistance from problem gambling intervention services, other services, family or friends

Predictors of further utilisation of formal gambling treatment services
The participants have been classified into those who utilised, and those who did not utilise, any additional formal gambling treatment services (Problem Gambling Foundation, Salvation Army Oasis Centres, Gamblers Anonymous, any other problem gambling support services, and additional gambling helpline contact) within the three months to the first follow-up assessment.

Baseline characteristics were examined for any differences in formal service utilisation in the first three months (Yes/No) using logistic regression to identify predictors of uptake of formal services. Baseline characteristics examined included those detailed previously in *Participant profiles*.

Multivariate models were then examined utilising all baseline characteristics with p values ≤ 0.20 to identify the best combination of variables to predict further utilisation of formal gambling treatment services and, therefore, to adjust for any confounding effects.

Predictors of successful problem gambling outcomes through helpline standard care
Successful problem gambling outcome measures were derived from the following factors:

- Number of days gambled, amount of money spent
- Control over gambling
- Problem Gambling Severity Index (PGSI)
- Goals met of treatment success (Gambling-Quit or improved)

Data for the past 12-month PGSI measure was only collected at the baseline and 12-month assessments, therefore, the statistical analysis for this measure was an unweighted linear mixed effects model of the 12-month assessment measures, adjusting for baseline measures. The number of days gambled, amount of money spent and control over gambling, which were measured at baseline, three months, six months and 12 months, were analysed using weighted linear mixed effects models for the three follow-up time points, adjusting for baseline measures. The treatment success measures which were dichotomous measures (i.e. true or false), and measured at all four time points, were analysed using a weighted logistic mixed effects model.

Baseline characteristics detailed previously in *Participant profiles* were examined to identify any significant associations with the positive problem gambling outcomes. Additionally, the following factors were examined:

- Treatment assistance
  - o Utilisation of referral to formal services (as defined above)
  - o Utilisation of any problem gambling intervention services
  - o Utilisation of any other services
  - o Utilisation of family or friends assistance

Multivariate models were then examined utilising all baseline characteristics with p values ≤ 0.20 to identify the best combination of variables to predict successful problem gambling outcomes through helpline standard care and, therefore, to adjust for any confounding effects.

Whilst power calculations were not specifically computed for this outcome study (they were computed for the randomised controlled trial), post-hoc power calculations for PGSI as an outcome measure indicated there was enough power for a difference of +/-3.5 PGSI units.

4	RESULTS

This chapter details the results of data analyses obtained from the 150 participants who received the helpline's standard care intervention.

Section 4.1 contains the descriptive statistics detailing socio-demographic characteristics of the participants, their gambling participation data, and outcome data showing time trends over the assessment points.

Section 4.2 details the predictors for utilisation of formal (professional) treatment services for problem gambling within three months of receiving the study intervention.

Sections 4.3 to 4.7 detail predictors of successful problem gambling outcomes focusing on PGSI, number of days gambling per month, money lost gambling per day, control over gambling, and treatment success.

4.1	Descriptive statistics

4.1.1 Socio-demographic characteristics at each assessment point

One hundred and fifty participants received the helpline's standard care intervention. Ninety-nine participants received a follow-up assessment at 12-months representing a 66% retention rate (Table 1).

Table 1: Number and percentage of participants at each assessment point

	Assessment point			
	Baseline	**3 months**	**6 months**	**12 months**
Number	150	129	119	99
Percentage of baseline	100%	86%	79%	66%

Socio-demographic characteristics of the participants are detailed in Appendix 2, Table 2.1. Visual examination of percentages of socio-demographic characteristics over time revealed no major differences. Thus, differential attrition is considered not to be an issue.

4.1.2 Baseline socio-demographic characteristics by baseline and follow-up data availability and whether formal assistance accessed in first three months

Socio-demographic characteristics of the participants are detailed in Appendix 2, Table 2.2. The characteristics are detailed as total number and percentage of participants at the initial baseline assessment; the number and percentage with any follow-up assessment data; and the number and percentage, at the three-month assessment, who responded ('yes' or 'no') to the question asking whether they had sought assistance from a professional problem gambling treatment provider (other than the initial gambling helpline intervention) during the last three months.

Of the 150 participants, follow-up assessment data were available for 130 (87%), and 121 (81%) responded to the question regarding accessing professional assistance for their problem gambling during the previous three months.

There were slightly more females (57%) than males (43%) at the baseline assessment. This profile differed slightly from the overall gambler caller profile to the Gambling Helpline from 2009 to 2011 (the period of study recruitment) where the gender split across the years was 47% to 49% female and 52% to 53% male (Gambling Helpline, 2012).

Just less than half (49%) of the participants were partnered, either married (23%) or in a de facto relationship (26%). Participants represented all adult age groups with the larger percentages being in the 25 to 34 year (25%) and 35 to 44 year (27%) age groups.

A majority of participants identified primary ethnicity as either Maori (43%) or European (42%) with 10% identifying primarily as Pacific and five percent as Asian/Other. The ethnicity profiles differed slightly from the overall new gambler caller profile to the gambling helpline from 2009 to 2011 where: 28% to 35% (in each individual year) were European, 18% to 23% were Maori, seven percent to nine percent were Pacific, six percent to nine percent were Asian, and 25% to 27% were Other/multiple ethnicity (Gambling Helpline, 2012). Based on this, the study recruited more participants of European, Maori or Pacific ethnicity and less of Asian/Other ethnicity than the general Gambling Helpline gambler caller profile at that time.

One-quarter (27%) of the participants had no educational qualification, one-third (32%) reported being educated to secondary school level, one-fifth (18%) reported having a trade or technical certificate, and the remainder had a tertiary or professional qualification.

Two-fifths (44%) of the participants were in full-time employment and a further 13% had part-time employment. Just less than half (46%) of the participants reported gross family income in the past 12-months as either < $20,000 (28%) or between $20,001 and $30,000 (18%). Almost one-quarter (23%) of participants reported gross annual family income of $30,001 to $50,000, two-fifths (21%) between $50,001 and $100,000, and 11% reported more than $100,001.

Participants were recruited from around the country with a larger proportion residing in the three major cities of Auckland, Christchurch and Wellington (Appendix 2, Table 2.3).

4.1.3   Primary mode of problem gambling

Eighty-nine percent of the participants reported electronic gaming machines to be their primary mode of problem gambling at the baseline assessment with a majority (76%) citing machines in pubs, nine percent citing machines in clubs and three percent citing machines in casinos. The remaining participants cited track betting, casino table games, card gambling, keno, sports betting or other forms of gambling as their primary problem mode (Appendix 2, Table 2.4).

4.1.4   Time trends

Tabulated data of changes over time are presented in Appendix 2, Table 2.5. For each variable examined, the greatest change was in the first three months from baseline assessment to the three-month assessment[3]. Thereafter, changes were generally maintained.

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[3] These data are not adjusted for attrition.

Days gambling per month, expenditure per day and control over gambling
Figure 1 presents median values for self-reported number of days gambling per month and gambling expenditure per day, and self-reported control over gambling (10-point scale from 0 'no control' to 10 'total control) across the four assessment points. Number of days gambling and expenditure were both substantially lower at the three-month assessment compared to the baseline assessment, with the improvement maintained at the subsequent assessments. Self-reported control over gambling median value increased from 3 at the baseline assessment to 7 at the three-month assessment. A further improvement (median score 8) was noted at the six- and 12-month assessments.

Figure 1: Days gambling, dollars lost and control over gambling by assessment point
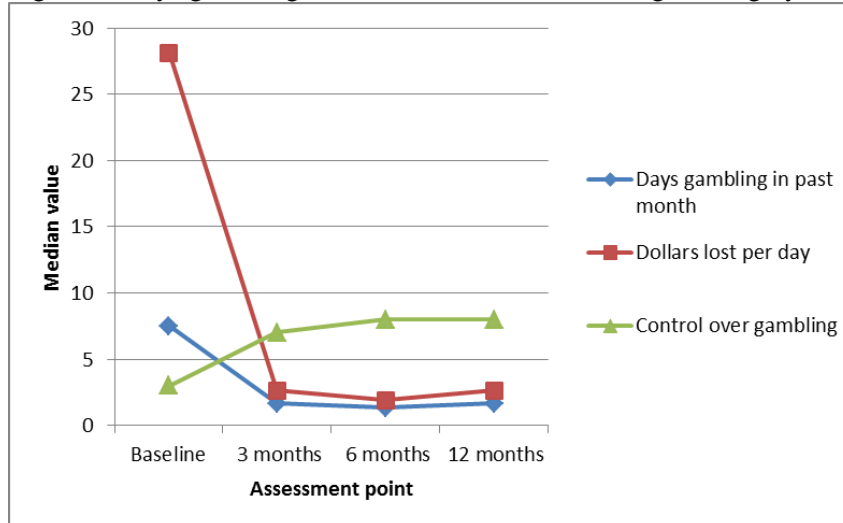
Gambling goal
At each assessment point, participants were asked to state their current goal. Goals were to quit all modes of gambling, quit some modes of gambling (problematic modes), gamble in a controlled manner, maintain gambling abstinence, or some other goal. At the baseline assessment, a majority (61%) of participants reported their goal to be to quit all forms of gambling. This decreased to 38% at the three-month assessment with a gradual decrease continuing at the six- and 12-month assessments. Mirroring this finding, only five percent of participants reported their goal to be to maintain gambling abstinence at the baseline assessment, with an increase to 21.5% at the three-month assessment and continued gradual increases at the six- month assessment, which then stabilised. Participants whose goal was to gamble in a controlled manner showed a slight increase across time, from 13% of participants at the baseline assessment to 19% at the 12-month assessment. Overall, across time, the percentage of participants reporting their goal to be to quit some modes of gambling decreased slightly from 20% to 16% (Figure 2).

Figure 2: Gambling goal by assessment point
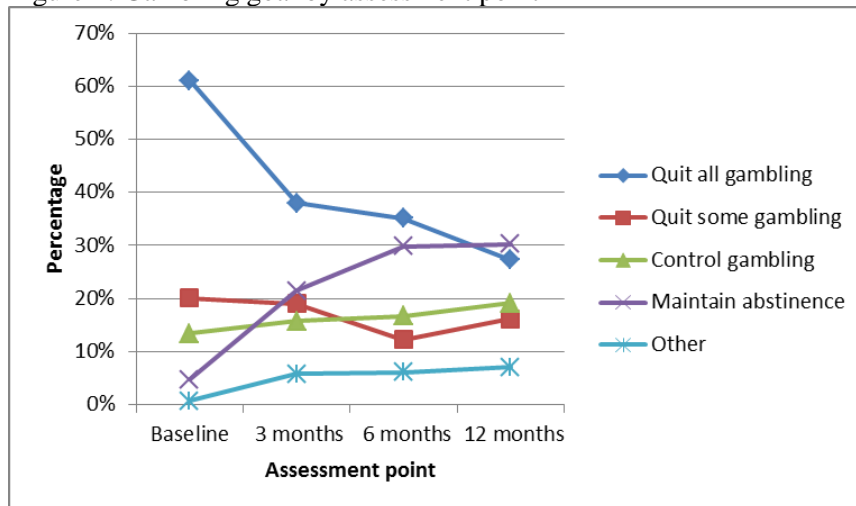
Problem gambling severity index

Participants' PGSI scores improved over time. When the PGSI-12 (past 12-month time frame) was administered to participants, the median score at the 12-month assessment was almost half the score at the baseline assessment (9 vs. 17). The PGSI-3 (past three-month time frame) scores show that the largest decrease in score was noted at the three-month assessment from baseline and that this was maintained at the six- and 12-month assessments (Figure 3).

Figure 3: PGSI by assessment point
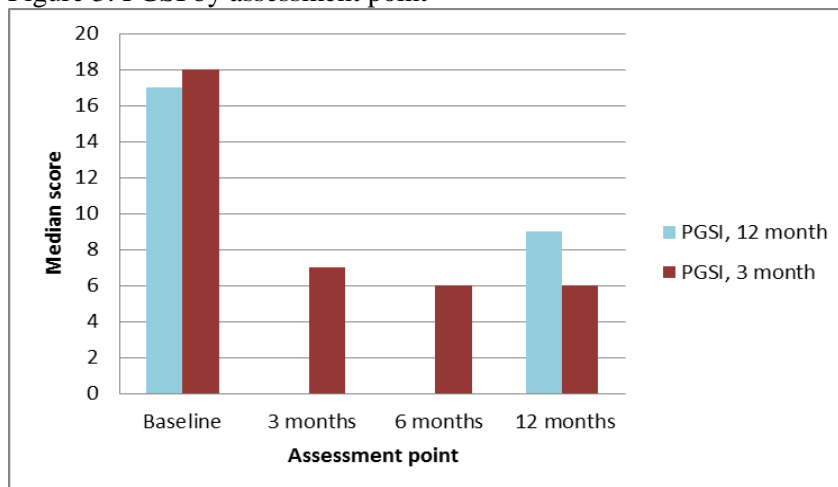
At the baseline assessment, 97% of participants were categorised as problem gamblers using the PGSI-12, with 3.5% in the moderate risk group and no participants categorised as low risk or non-problem gamblers. At the 12-month assessment, 58% of participants remained categorised as problem gamblers with one-quarter (26%) in the moderate-risk group, 12% in the low-risk group, and five percent categorised as non-problem gamblers (Figure 4). Thus, although there was an overall decrease in PGSI-12 score over time (as detailed above) and improvement made in gambling outcome, four-fifths (83%) of the participants remained problem gamblers or at moderate risk for developing problem gambling at the 12-month assessment. However, almost one-fifth (17%) had improved significantly to a low risk or non-problem gambling level.

Figure 4: PGSI-12 categorisation by assessment point
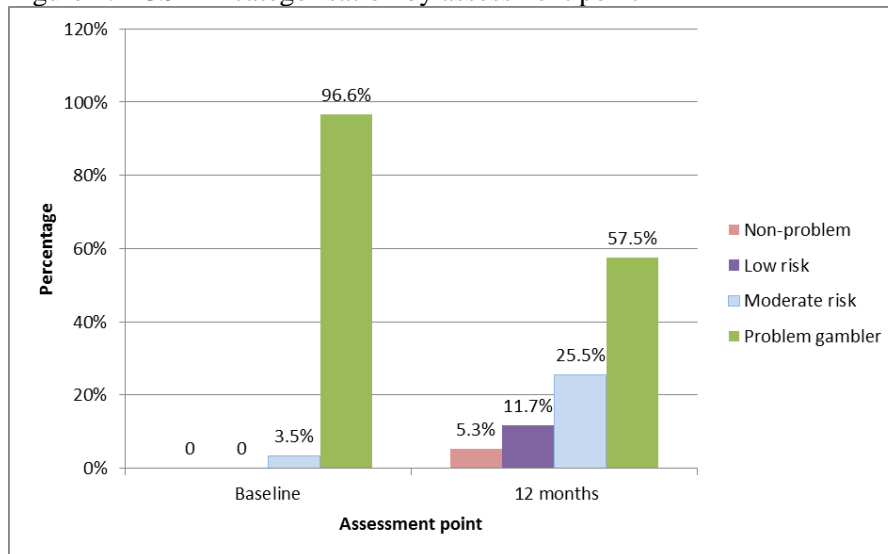
Psychological distress

Over time, the percentage of participants with a high level of psychological distress (measured via Kessler-10) decreased from the baseline assessment (56%) to the 12-month assessment (10%) although the greatest decrease was noted at the three-month assessment which stabilised thereafter. Conversely, a minority of participants reported psychological distress at a low level at the baseline assessment (3%), which increased to approximately 50% at the three- and six-month assessments, with a further increase noted at the 12-month assessment (63%). Similar percentages of participants reporting moderate psychological distress were noted at the first three assessment points (approximately 40%) with a decrease to 27% at the 12-month assessment (Figure 5).

Figure 5: Psychological distress by assessment point
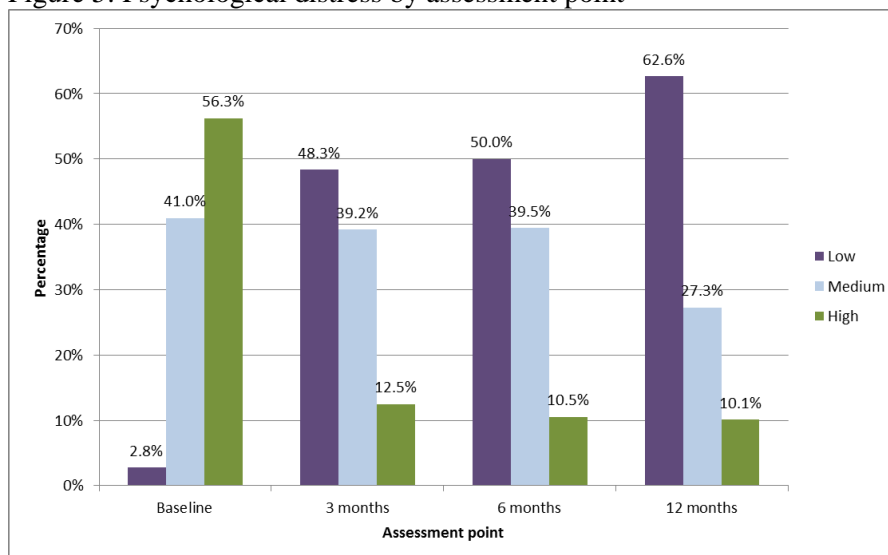
On the PRIME-MD scale, a substantially lower percentage of participants reported major or minor depressive disorder or dysthymia at the 12-month assessment in comparison with the baseline assessment. For major depressive disorder, over half (58%) of participants reported this mental health issue at the baseline assessment with less than one-fifth (18%) reporting it at the 12-month assessment. This was a decrease of about one-third. A similar finding was noted for minor depression (12% at baseline, 4% at 12-months). A smaller percentage

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decrease occurred for dysthymia over time (42% to 32%). However, a decrease was not noted in percentage of participants reporting bipolar disorder whereby three percent reported the disorder at the baseline assessment and four percent reported it at the 12-month assessment; due to the small number of participants with bipolar disorder (n=4 at both time points) this finding could be due to attrition and should be treated with caution (Figure 6).

Figure 6: Major and minor depressive disorder, dysthymia, bipolar disorder by assessment point
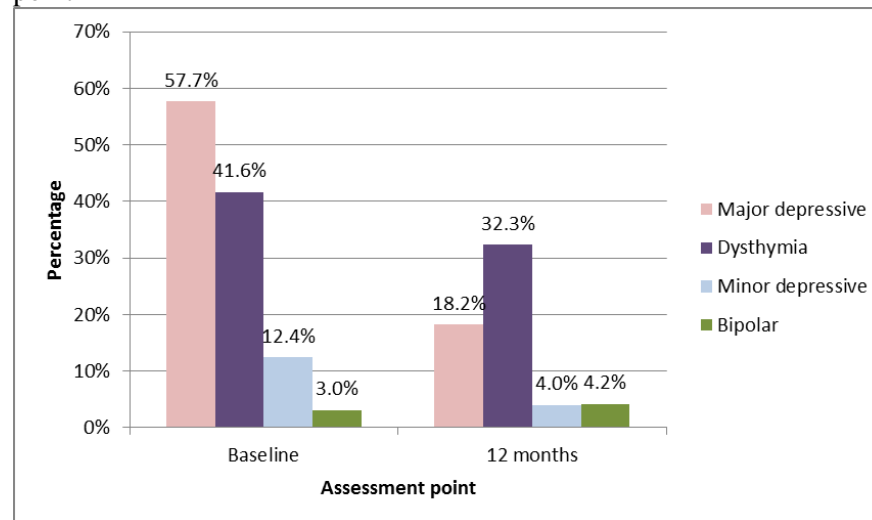
Substance abuse/dependence
There appeared to be a slight decreasing trend over time in regard to participants who smoked tobacco, with 60% reporting smoking at the baseline assessment, and half reporting smoking by the 12-month assessment. A similar trend was not noted for participants reporting alcohol abuse or dependence (measured via AUDIT-C). Sixty-two percent of participants reported alcohol abuse/dependence at the baseline assessment and whilst the percentage gradually decreased over the next two assessment points (55% and 50% respectively), by the 12-month assessment, the percentage had returned to baseline levels (60%) (Figure 7).

Figure 7: Alcohol abuse/dependence and smoking by assessment point
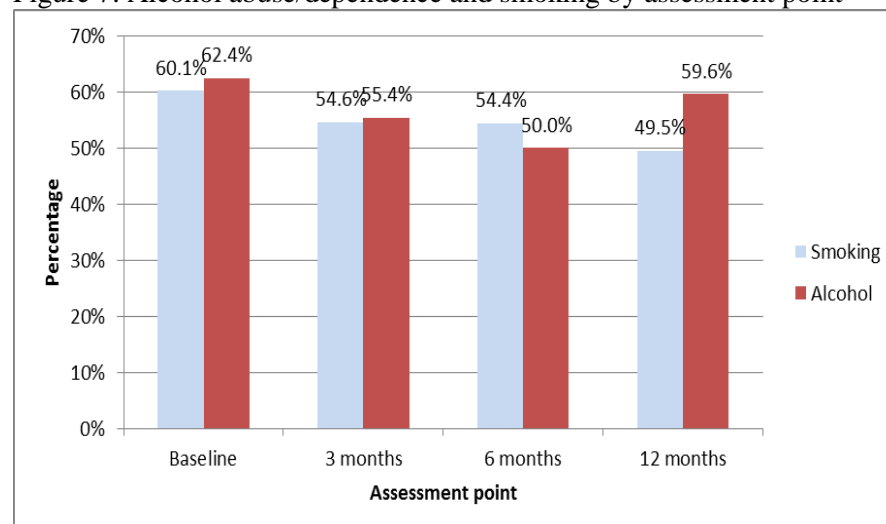
A majority of participants (77%) showed no drug use problems (measured via DAST) at the baseline assessment, with the percentage increasing to almost all participants (92%) at the 12-

month assessment. The percentage of participants showing low, moderate or substantial drug problems at the baseline assessment decreased at the 12-month assessment (Figure 8).

Figure 8: Drug abuse by assessment point
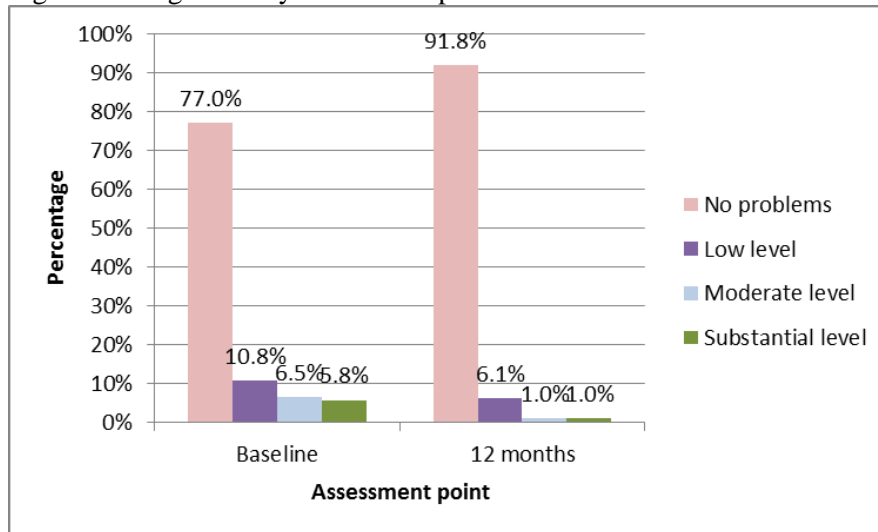
Life aspects affected by gambling
The extent to which gambling had affected aspects of participants' lives (10-point scale from 0 'not at all' to 10 'very severely) again showed marked improvement from the baseline assessment to the three-month assessment. Slight improvement continued to be noted at the six- and 12-month assessments for the self-rated mean scores for gambling affecting past-month work, social life and family life/home responsibilities. The continued slight improvement was not noted for gambling affecting physical health in the past month, which stabilised from the three-month assessment (Figure 9).

Figure 9: Aspects of life affected by gambling by assessment point
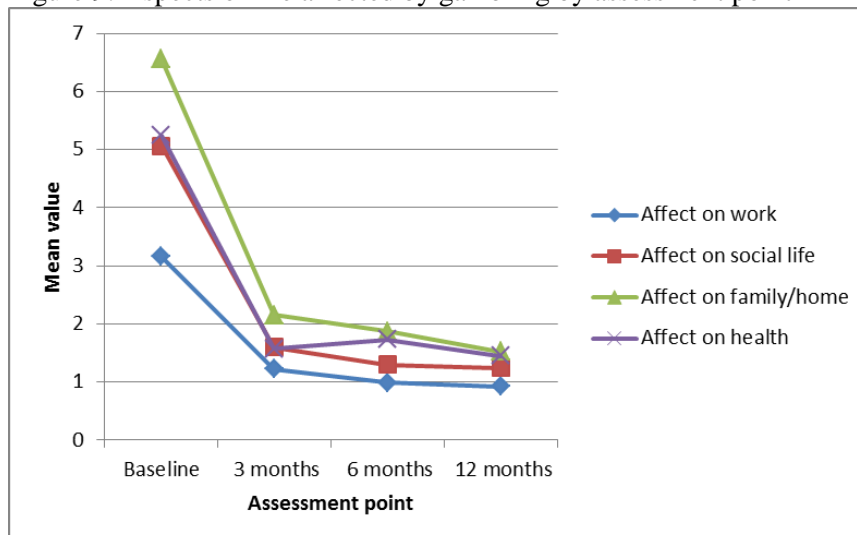
<u>Additional assistance</u>
At the baseline assessment, 38 participants reported that they had previously received formal (professional treatment services) and/or informal (e.g. family, friend and work colleagues) assistance for their problem gambling, and 23 participants reported that they were currently receiving formal or informal assistance. Eight of the participants were both currently receiving, and had previously received, assistance (Table 2).

Table 2: Previously and/or currently receiving assistance at baseline assessment

| At baseline | Currently receiving assistance | | | |
	No	**Yes**	Not Answered	*Total*
Previously received assistance			-	*88*
No	73	15		
Yes	30	8	-	*38*
Not Answered	17	1	6	*24*
Total	*120*	*24*	*6*	*150*

At the three-month assessment, 60% of respondents reported receiving assistance for their problem gambling from formal and/or informal sources in the past three months (additional to the study intervention). A greater percentage reported receiving assistance from informal sources (39%) than formal services (31%). The percentage seeking assistance decreased at the subsequent assessments to 19% and 25% for formal and informal assistance at the 12-month assessment, respectively (Figure 10, Table 3).

Figure 10: Assistance received for gambling problem by assessment point
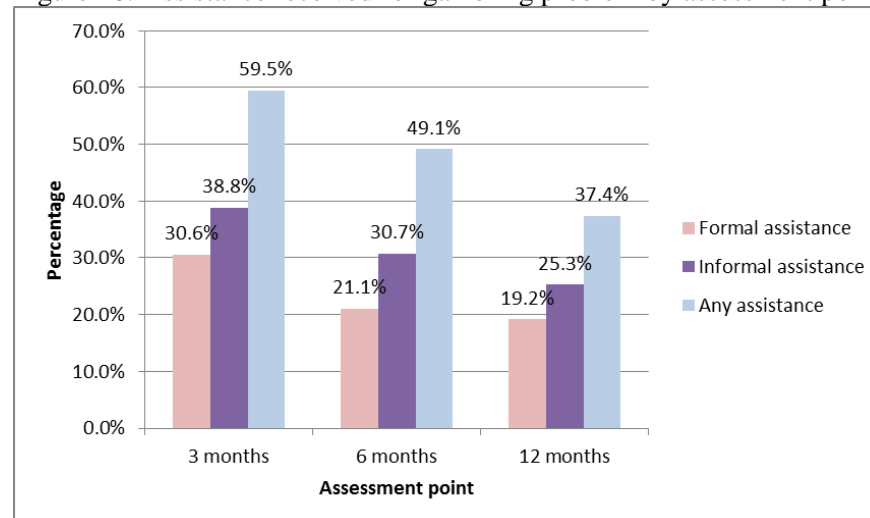
Ten percent or less of respondents at the three-month assessment reported accessing any individual formal treatment service for their problem gambling with this percentage, although fluctuating, remaining similar at the six- and 12-month assessment points. Some respondents accessed formal treatment services across the assessment points. There was no apparent preference for treatment provider although only one respondent accessed an online/internet provider for their problem gambling, reported only at the three-month assessment (Table 3).

The median number of sessions, for individual treatment services accessed by respondents, was six or less at the three-month assessment, 12 or less at the six-month assessment and 24 or less at the 12-month assessment. This latter assessment covered the previous six-month period whilst the three- and six-month assessments covered a previous three-month period. The maximum number of sessions attended by any respondent was 12 at the three- and six-

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month assessments and 24 at the 12-month assessment and represents approximately weekly attendance at a service (Table 4).

One-fifth (22%) or less of respondents at the three-month assessment reported receiving informal assistance from a partner, family member or friend for their problem gambling. Generally, the percentage of respondents reporting informal assistance from any single source decreased at subsequent assessments. Some respondents sought informal assistance across the assessment points. Respondents appeared slightly more likely to seek assistance from partners or family members rather than from friends or other people (Table 3).

Some respondents sought assistance from more than one source. For example, at the three-month assessment, 31% of participants reported receiving assistance from formal sources compared with a maximum of 10% seeking assistance from any one organisation. This finding continued to be apparent at the six- and 12-month assessments and was also apparent for informal assistance received (Table 3).

Table 3: Individual additional assistance access

	3 months N	3 months (%)	6 months N	6 months (%)	12 months N	12 months (%)	At any time point N	At any time point (%)
Formal treatment service								
Gambling Helpline								
No	117		112		97		123	
Yes	4	(3.3)	2	(1.8)	2	(2.0)	7	(5.4)
Problem Gambling Foundation								
No	109		110		94		116	
Yes	12	(9.9)	4	(3.5)	5	(5.1)	14	(10.8)
Salvation Army Oasis Centres								
No	114		107		97		119	
Yes	7	(5.8)	7	(6.1)	2	(2.0)	11	(8.5)
Gamblers Anonymous								
No	114		109		95		121	
Yes	7	(5.8)	5	(4.4)	4	(4.0)	9	(6.9)
Other problem gambling service								
No	112		107		91		111	
Yes	9	(7.4)	7	(6.1)	8	(8.1)	19	(14.6)
Online/internet service								
No	120		114		99		129	
Yes	1	(0.8)	0	-	0	-	1	(0.8)
Any of above formal services								
No	84		90		80		84	
Yes	37	(30.6)	24	(21.1)	19	(19.2)	46	(35.4)
Informal assistance								
Partner								
No	98		99		88		99	
Yes	23	(19.0)	15	(13.2)	11	(11.1)	31	(23.8)
Family member								
No	94		90		86		85	
Yes	27	(22.3)	24	(21.1)	13	(13.1)	45	(34.6)
Friend								
No	105		106		94		103	
Yes	16	(13.2)	8	(7.0)	5	(5.1)	27	(20.8)
Any of above informal assistance								
No	74		79		74		61	
Yes	47	(38.8)	35	(30.7)	25	(25.3)	69	(53.1)
Other person								
No	108		104		93		108	
Yes	13	(10.7)	10	(8.8)	6	(6.1)	22	(16.9)
Any formal/informal								
No	49		58		62		40	
Yes	72	(59.5)	56	(49.1)	37	(37.4)	90	(69.2)
Total N	*121*		*114*		*99*		*130*	
N Missing	*29*		*36*		*51*		*20*	

Table 4: Formal service access by assessment point - number of respondents, median, minimum and maximum number of sessions

	Assessment point								
	3 months			**6 months**			**12 months**		
	No.	**Median**	**(Min, Max)**	**No.**	**Median**	**(Min, Max)**	**No.**	**Median**	**(Min, Max)**
Gambling Helpline	4	3	(2, 6)	2	3	(2, 4)	2	7	(5, 9)
Problem Gambling Foundation	12	4.5	(1, 13)	4	5.5	(2, 7)	5	12	(2, 24)
Salvation Army Oasis Centres	7	6	(2, 12)	7	7	(1, 12)	2	13.5	(3, 24)
Gamblers Anonymous	7	3	(1, 12)	5	12	(3, 12)	4	24	(20, 24)
Other problem gambling support service	9[#]	6	(2, 12)	7	6	(2, 12)	8	3	(1, 12)
Online/internet service	1	2	(2, 2)	-			-		

[#] One respondent did not provide number of sessions

4.2 Predictors of utilisation of formal treatment services

This section presents data pertaining to associations between use of formal treatment[4] services in the first three-months (i.e. whether the participants accessed formal gambling treatment services in the first three months after receiving their helpline treatment) and socio-demographic characteristics, as well as gambling and related behaviours and other baseline covariates.

4.2.1 Uptake of formal services by socio-demographic characteristics

Table 5 details the odds ratios of uptake of formal gambling treatment services in the first three-months and associations with socio-demographic characteristics which attained a level of statistical significance.

Males had statistically significant (p=0.02) greater odds for uptake of formal services in comparison with females. This significant association was retained in the multivariate analyses controlling for confounding factors, with greater odds of 2.85 times.

Table 5: Odds ratios for uptake of services by gender

Variable	Category	Uptake of services		Univariate odds ratio			Adjusted odds ratio†		
		N	(%)	OR	(95% CI)	p-value	OR	(95% CI)	p-value
Gender	Female	68	(22.1)	1.00					
	Male	53	(41.5)	2.51	(1.14, 5.54)	0.02	2.85	(1.17, 6.98)	0.02

† Adjusted by previous assistance received for gambling problem and baseline treatment received for mental health in past year.

Variables which did not achieve a level of statistical significance are presented in Appendix 3, Table 3.1. These related to baseline marital status, age, ethnicity, employment status, highest educational qualification, gross annual family income, and area of residence.

4.2.2 Uptake of formal services by baseline gambling and related behaviours

Table 6 details the odds ratios of uptake of formal gambling treatment services in the first three-months and associations with baseline gambling and related behaviours which attained a level of statistical significance.

Participants whose had previously received assistance for a gambling problem had statistically significant (p=0.03) greater odds for uptake of formal services in comparison with participants who had not previously received assistance for a gambling problem. This significant association was retained in the multivariate analyses controlling for confounding factors, with greater odds of 2.95 times.

A statistically significant association between participants self-rated control[5] over gambling at the baseline assessment and uptake of formal services was noted in the univariate analyses.

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[4] This includes face-to-face counselling services, Gamblers Anonymous, online/internet treatment services, and additional gambling helpline contact.
[5] Control over gambling was rated on a scale of 0 to 10 where 0 = 'no control' and 10 = 'total control'.

However, as a level of statistical significance was not retained in the multivariate analyses, this finding is likely to be due to confounding from one or more other variables.

Table 6: Odds ratios for uptake of services by baseline gambling and related behaviours

Variable	Category	Uptake of services		Univariate odds ratio			Adjusted odds ratio†		
		N	(%)	OR	(95% CI)	p-value	OR	(95% CI)	p-value
Prev. assist. for gambling prob.	No	72	(26.4)	1.00					
	Yes	32	(46.9)	2.46	(1.03, 5.88)	0.04	2.95	(1.11, 7.80)	0.03
Control over gambling	0-1	24	(12.5)	1.00					
	2-3	32	(40.6)	4.79	(1.18, 19.42)				
	4-5	21	(52.4)	7.70	(1.75, 33.89)				
	6+	42	(23.8)	2.20	(0.54, 8.89)	0.02			

† Adjusted by gender and baseline treatment received for mental health in past year.

Variables which did not achieve a level of statistical significance are presented in Appendix 3, Table 3.2. These related to baseline: primary problem gambling mode (dichotomised to EGM vs. other); self-reported number of days gambling per month and gambling expenditure per day; length of problem duration; number of days since the last gamble; level of motivation to overcome gambling problem; current goal (i.e. to quit some or all modes of gambling or to control gambling); belief in treatment success, and perceived level of difficulty in overcoming gambling problems; and if assistance was currently being received for a gambling problem.

4.2.3   *Uptake of formal services by other baseline covariates*

Table 7 details the odds ratios of uptake of formal gambling treatment services in the first three-months and associations with other baseline covariates which attained a level of statistical significance.

Participants who had, at baseline, received treatment for a mental health issue in the past 12 months had statistically significant (p=0.03) greater odds for uptake of formal services in comparison with participants who had not received treatment. This significant association was retained in the multivariate analyses controlling for confounding factors, with greater odds of 2.77 times.

A statistically significant association between participants who, at baseline, had been prescribed medication for an emotional, nervous or mental health issue in the past 12 months and uptake of formal services was noted in the univariate analyses. However, as a level of statistical significance was not retained in the multivariate analyses, this finding is likely to be due to confounding from one or more other variables.

Table 7: Odds ratios for uptake of services by other baseline covariates

Variable	Category	Uptake of services		Univariate odds ratio			Adjusted odds ratios†		
		N	(%)	OR	(95% CI)	p-value	OR	(95% CI)	p-value
Treatment, mental health last year	No	92	(26.1)	1.00					
	Yes	28	(46.4)	2.46	(1.02, 5.90)	0.04	2.77	(1.10, 7.03)	0.03
Prescription, mental health last year	No	84	(26.2)	1.00					
	Yes	27	(51.9)	3.03	(1.24, 7.45)	0.02			

† Adjusted by gender and previous assistance received for gambling problem.

Variables which did not achieve a level of statistical significance are presented in Appendix 3, Table 3.3. These related to baseline: problem gambling status (PGSI, past 12-month and past three-month time frame); psychological distress (Kessler-10); alcohol abuse/dependence (Audit-C, dichotomised to low risk and high risk); drug abuse/dependence (DAST); suicide ideation (dichotomised to no ideation and some ideation); major depressive disorder, dysthymia and minor depressive disorder (PRIME-MD); current tobacco use; quality of life (WHOQoL); deprivation level (NZDI); treatment for an alcohol or drug problem in the past 12 months; how work, social life, family and home life, and health were affected in the past month; and legal problems in the past 12 months.

4.2.4   Multivariate model examining interactions

When examining for interactions between variables which retained a level of statistical significance in the multivariate analyses, a statistically significant interaction (p=0.02) was noted between gender and receiving treatment for a mental health issue in the past year (baseline assessment). Females who had not previously received mental health treatment were less likely to access formal services for their problem gambling. Females who had received mental health treatment and males who either had or had not received mental health treatment had greater odds for accessing formal services for problem gambling (4.41 to 6.55 times greater) than females who had not received mental health treatment. Previously receiving assistance for a gambling problem did not show an interaction with the other variables (Table 8).

Table 8: Multivariate model of interactions between variables

Variable	Category	Uptake of services		Multivariate odds ratio		
		N	(%)	OR	(95% CI)	p-value
Gender x mental health treatment last year	Female, no prev. treatment	40	(15.4)	1.00		
	Female, prev. treatment	12	(43.8)	4.41	(1.45, 13.45)	
	Male, no prev. treatment	52	(40.0)	6.55	(1.52, 28.22)	
	Male, prev. treatment	16	(50.0)	5.89	(1.47, 23.62)	0.02
Prev. assist. for gambling prob.	No	72	(26.4)	1.00		
	Yes	32	(46.9)	2.67	(1.04, 6.84)	0.04

This section presents data pertaining to associations between change in PGSI-12 (past 12-month time frame) score at the 12-month assessment from the baseline assessment score and uptake of formal gambling treatment services in the first three-months (section 4.3.1). It also details data pertaining to associations between change in PGSI-12 score and socio-demographic characteristics (section 4.3.2), baseline gambling and related behaviours (section 4.3.3) and other baseline covariates (section 4.3.4). As the difference in PGSI scores between the time points gives an indication of change in problem gambling severity/risk level, these analyses indicate which variables are associated with likelihood of better (i.e. improved) problem gambling severity outcomes 12-months after initial helpline contact and treatment.

4.3.1   PGSI-12 change at 12-months by uptake of formal services in first three months

Table 9 details mean PGSI-12 score change at the 12-month assessment from the baseline score and associations with uptake of formal gambling treatment services in the first three months. There was no significant difference in change in mean PGSI-12 score between participants who sought additional formal treatment in the first three months compared with participants who did not seek formal treatment[6].

Table 9: PGSI change by uptake of formal services in first 3 months

Variable	Category	Unadjusted values		
		Estimated least squares mean diff.	Standard error	p-value
Uptake of formal services	No	-7.76	0.75	
	Yes	-6.35	0.98	0.547

4.3.2   PGSI-12 change at 12-months by socio-demographic characteristics

Table 10 details mean PGSI-12 score change at the 12-month assessment from the baseline score and associations with baseline gambling and related behaviours which attained a level of statistical significance.

Marital status was statistically significantly associated with mean PGSI-12 score change (unadjusted values). However, as a level of statistical significance was not retained in the multivariate analyses, this finding is likely to be due to confounding from one or more other variables.

In the multivariate analyses, when confounding factors were accounted for, a statistically significant (p=0.03) association between mean PGSI-12 score change and baseline employment status was noted. On average, participants who were disabled, had an illness or were on sick leave, showed a smaller improvement in mean PGSI-12 score (estimated mean PGSI change -8.06) than other participants (estimated mean PGSI change -11.56 or more).

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[6] The estimated least squares mean difference between no uptake of formal services, and uptake, was -1.4 which is not a clinically significant difference. Post-hoc power calculations indicated that there was sufficient power for a difference of +/-3.5 to be identified, which would be a clinically significant difference.

Table 10: PGSI-12 change by socio-demographic characteristics

Variable	Category	Unadjusted values			Adjusted values†		
		Est. least squares mean diff.	Standard error	p-value	Est. least squares mean diff.	Standard error	p-value
Marital status	Partnered	-5.74	0.80				
	Not partnered	-8.86	0.83	0.008			
Employment status	Full time	-7.71	0.82		-11.56	1.79	
	Part time	-7.93	1.70		-11.83	2.08	
	Homemaker/ student/retired	-6.01	2.01		-14.39	2.47	
	Unemployed	-5.85	1.62		-12.72	2.08	
	Disabled/illness /sick leave	-2.40	2.33		-8.06	3.29	
	Other	-10.92	2.17		-18.65	2.55	0.030

† Adjusted by baseline NZDI, primary problem gambling mode, and PRIME-MD minor depressive disorder.

Variables which did not achieve a level of statistical significance are presented in Appendix 4, Table 4.1. These related to gender, age, ethnicity, highest educational qualification, gross annual family income, and area of residence.

4.3.3   PGSI-12 change at 12-months by baseline gambling and related behaviours

Table 11 details mean PGSI-12 score change at the 12-month assessment from the baseline score and associations with baseline gambling and related behaviours which attained a level of statistical significance.

A statistically significantly association for number of days since the last gamble and mean PGSI-12 score change was noted (unadjusted values). However, as a level of statistical significance was not retained in the multivariate analyses, this finding is likely to be due to confounding from one or more other variables.

In the multivariate analyses, when confounding factors were accounted for, a statistically significant (p=0.01) association between mean PGSI-12 score change and baseline primary mode of problem gambling was noted. On average, participants who gambled on pub electronic gaming machines showed a smaller improvement in mean PGSI-12 score (estimated mean PGSI change -8.22) than other participants, particularly participants who gambled on casino electronic gaming machines or casino table games (estimated mean PGSI change -18.15 and -17.17 respectively)[7].

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[7] Note that the statistical significance is across the whole table of primary modes of problem gambling and is not a pairwise comparison. Some of the pairwise comparisons (e.g. between pub and club EGMs) are not statistically significant but the pairwise comparison between pub EGMs and casino EGMs is.

Table 11: PGSI-12 change by baseline gambling and related behaviours

Variable	Category	Unadjusted values			Adjusted values†		
		Est. least squares mean diff.	Standard error	p-value	Est. least squares mean diff.	Standard error	p-value
Number of days since last gamble	0 - 1	-6.76	0.77				
	2 - 4	-5.74	1.26				
	5+	-9.84	1.23	0.049			
Primary mode of problem gambling	Casino EGMs	-11.56	4.11		-18.15	3.82	
	Casino tables	-14.66	3.23		-17.17	3.01	
	Other	-10.37	4.01		-16.08	4.90	
	Sports betting	-10.58	5.68		-12.30	4.97	
	Club EGMs	-9.13	2.28		-11.94	2.28	
	Keno	-5.16	5.59		-10.06	5.81	
	Track	-3.09	2.80		-9.01	3.13	
	Pub EGMs	-6.77	0.66	0.154	-8.22	0.99	0.010

† Adjusted by baseline employment status, NZDI and PRIME-MD minor depressive disorder.

Variables which did not achieve a level of statistical significance are presented in Appendix 4, Table 4.2. These related to baseline: self-reported number of days gambling per month and gambling expenditure per day; self-rated control over gambling; length of problem duration; level of motivation to overcome gambling problem; current goal (i.e. to quit some or all modes of gambling or to control gambling); belief in treatment success, and perceived level of difficulty in overcoming gambling problems; if assistance was currently being received for a gambling problem; and if assistance had previously been received for a gambling problem.

4.3.4 PGSI-12 change at 12-month assessment by other baseline covariates

Table 12 details mean PGSI-12 score change at the 12-month assessment from the baseline score and associations with other baseline covariates which attained a level of statistical significance.

Statistically significantly associations between baseline major and minor depressive disorder (measured by PRIME-MD) and mean PGSI-12 score change were noted (unadjusted values). However, the association was different dependent on whether participants had major or minor depressive disorder at the baseline assessment. In the multivariate analyses, when confounding factors were accounted for, the association between mean PGSI-12 score change and major depressive disorder was no longer evident suggesting that it is likely to be due to confounding from one or more other variables. However, the statistically significant association was retained for minor depressive disorder and mean PGSI-12 score change (p=0.003) when confounding factors were accounted for. On average, participants who had minor depressive disorder at the baseline assessment were more likely to have a greater mean PGSI-12 score change at the 12 month assessment (estimated mean PGSI change -15.41) whilst participants who did not have minor depression at the baseline assessment showed a smaller improvement in mean PGSI-12 score change (estimated mean PGSI change -10.32).

Level of deprivation (NZDI) was also statistically significantly associated with mean PGSI-12 score change. This finding was retained (p=0.014) in the multivariate analyses when confounding factors were accounted for. On average, participants in the lowest two deprivation quartiles were more likely to have a larger mean PGSI-12 score change (estimated mean PGSI change -14.75 or more) than participants in the higher two deprivation quartiles (estimated mean PGSI change -11.62 or lower).

Statistically significantly associations were also noted for mean PGSI-12 score change and participants who had received treatment or prescriptions for mental health issues in the past 12 months when assessed at baseline (unadjusted values). However, as a level of statistical significance was not retained in the multivariate analyses, these findings are likely to be due to confounding from one or more other variables.

Table 12: PGSI change by other baseline covariates

Variable	Category	Unadjusted values			Adjusted values†		
		Est. least squares mean diff.	Standard error	p-value	Est. least squares mean diff.	Standard error	p-value
Prime MD - Major depressive disorder	No	-8.96	0.89				
	Yes	-5.90	0.81	0.014			
Prime MD - Minor depressive disorder	No	-6.70	0.63		-10.32	1.31	
	Yes	-11.28	1.64	0.011	-15.41	2.08	0.003
Treatment, mental health last year	No	-8.25	0.65				
	Yes	-4.34	1.17	0.005			
Prescription, mental health last year	No	-7.80	0.71				
	Yes	-4.74	1.24	0.494			
NZDI (quartiles)	0 - 0.58	-9.97	1.04		-14.75	1.73	
	0.59 - 1.23	-7.82	1.17		-15.27	1.96	
	1.24 - 2.37	-4.10	1.27		-9.83	1.91	
	2.38+	-5.83	1.36	0.006	-11.62	1.97	0.014

† Adjusted by baseline employment status and primary problem gambling mode.

Variables which did not achieve a level of statistical significance are presented in Appendix 4, Table 4.3. These related to baseline psychological distress (Kessler-10); alcohol abuse/ dependence (Audit-C, dichotomised to low risk and high risk); drug abuse/dependence (DAST); suicide ideation (dichotomised to no ideation and some ideation); dysthymia (PRIME-MD); current tobacco use; quality of life (WHOQoL); treatment for an alcohol or drug problem in the past 12 months; how work, social life, family and home life, and health were affected in the past month; and legal problems in the past 12 months.

4.4 Predictors of successful problem gambling outcomes - days gambled

This section presents data pertaining to mean change in time-averaged number of days gambled per month from the baseline values. Section 4.4.1 details change in days gambled from baseline values by assessment point. Associations between change in time-averaged number of days gambled per month from the baseline values and uptake of formal gambling treatment services is presented in section 4.4.2. Also presented are data pertaining to associations between change in time-averaged number of days gambled per month from the baseline values and socio-demographic characteristics (section 4.4.3), baseline gambling and related behaviours and other baseline covariates (section 4.4.4). As the difference in number of days gambled per month gives an indication of change in amount of gambling, these analyses indicate which variables are associated with likelihood of better (i.e. improved) outcomes after initial helpline contact and intervention delivery.

4.4.1 Days gambled by assessment point

No statistically significant difference was noted between assessment points for mean change in number of days gambled per month from baseline values (Table 13).

Table 13: Change in days gambled by assessment point

Variable	Category	Unadjusted values		
		Estimated least squares mean diff.	Standard error	p-value
Assessment point	3 months	-5.74	0.40	
	6 months	-6.33	0.32	
	12 months	-6.15	0.36	0.27

4.4.2 Days gambled by uptake of formal services

Uptake of formal gambling treatment services in the first three months was statistically significantly associated with time-averaged mean change in number of days gambled per month (Table 14). This finding was retained (p=0.04) in the multivariate analyses when confounding factors were accounted for. On average, participants who accessed formal treatment services were more likely to report a slightly greater number of days per month when they did not gamble (estimated mean days gambled change -6.33) than participants who did not access formal treatment services (estimated mean days gambled change -4.98). A level of statistical significance was not attained when uptake of formal services by any of the follow-up assessments (three, six or 12 months) was examined (Table 14).

Table 14: Change in days gambled by uptake of formal services

Variable	Category	Unadjusted values			Adjusted values†		
		Est. least squares mean diff.	Standard error	p-value	Est. least squares mean diff.	Standard error	p-value
Uptake of formal services by 3 months	No	-5.55	0.36		-4.98	0.43	
	Yes	-6.82	0.53	0.05	-6.33	0.55	0.04
Uptake of formal services by 3, 6 or 12 months	No	-5.86	0.36				
	Yes	-6.69	0.48	0.17			

† Adjusted by marital status.

4.4.3   Days gambled by socio-demographic characteristics

Table 15 details mean change in time-averaged number of days gambled per month from the baseline score and associations with socio-demographic characteristics which attained a level of statistical significance.

In the multivariate analyses, when confounding factors were accounted for, a statistically significantly association (p=0.03) between mean change in time-averaged number of days gambled per month and marital status was noted. On average, widowed participants were least likely to have reduced their number of days gambling per month (estimated mean days gambled change -1.61) than other participants (estimated mean days gambled change -5.81 or more).

Table 15: Change in days gambled by socio-demographic characteristics

Variable	Category	Unadjusted values			Adjusted values†		
		Est. least squares mean diff.	Standard error	p-value	Est. least squares mean diff.	Standard error	p-value
Marital status	Never married	-5.86	0.55		-5.81	0.57	
	Married	-7.03	0.57		-6.97	0.59	
	De facto	-5.70	0.59		-6.12	0.62	
	Separated	-6.18	0.82		-6.18	0.82	
	Divorced	-7.21	0.90		-7.24	0.93	
	Widowed	-2.69	1.43	0.07	-1.61	1.53	0.03

† Adjusted by uptake of formal services in first three months.

Variables which did not achieve a level of statistical significance are presented in Appendix 5, Table 5.1. These related to gender, age, ethnicity, employment status, highest educational qualification, gross annual family income, and area of residence.

4.4.4   Days gambled by baseline gambling and related behaviours and other baseline covariates

No statistically significant differences were noted for the change in time-averaged mean number of days gambled per month from baseline values and baseline gambling (dichotomised to EGM vs. other) and related behaviours, or any other baseline covariates examined (Appendix 5, Tables 5.2 to 5.3).

This section presents data pertaining to change in time-averaged money lost (dollars) gambling per month from the baseline values. Section 4.5.1 details change in money lost per month from baseline values by assessment point. Associations between change in time-averaged money lost gambling per month from the baseline values and uptake of formal gambling treatment services is presented in section 4.5.2. Also presented are data pertaining to associations between change in time-averaged money lost gambling per month from the baseline values and socio-demographic characteristics (section 4.5.3), baseline gambling and related behaviours (section 4.5.4) and other baseline covariates (section 4.5.5). As the difference in money lost gambling per month gives an indication of change in amount of gambling, these analyses indicate which variables are associated with likelihood of better (i.e. improved) outcomes after initial helpline contact and treatment.

4.5.1   Money lost by assessment point

No statistically significant difference was noted between assessment points for the mean change in money lost gambling per month from baseline values (Table 16).

Table 16: Change in money lost by assessment point

| Variable | Category | Unadjusted values | | |
		Estimated least squares mean diff.	Standard error	p-value
Assessment point	3 months	-36.79	1.70	
	6 months	-38.17	1.26	
	12 months	-36.57	1.51	0.49

4.5.2   Money lost by uptake of formal services

A level of statistical significance for time-averaged mean change in money lost gambling per month (unadjusted values) was not attained when uptake of formal services in the first three months, or by any of the follow-up assessments (three, six or 12 months) was examined (Table 17).

Table 17: Change in money lost by uptake of formal services

| Variable | Category | Unadjusted values | | |
		Estimated least squares mean diff.	Standard error	p-value
Uptake of formal services by 3 months	No	-36.40	1.28	
	Yes	-40.50	1.91	0.08
Uptake of formal services by 3, 6 or 12 months	No	-36.39	1.39	
	Yes	-39.29	1.85	0.21

4.5.3   Money lost by socio-demographic characteristics

No statistically significant differences were noted for time-averaged mean change in money lost gambling per month and any socio-demographic characteristics (Appendix 6, Table 6.1).

4.5.4 Money lost by baseline gambling and related behaviours

Table 18 details change in time-averaged mean change in money lost gambling per month from the baseline score and associations with baseline gambling and related behaviours which attained a level of statistical significance.

A statistically significantly association between time-averaged mean change in money lost gambling per month and PGSI-12 (past 12-month time frame) at the baseline assessment was noted. This finding was retained (p=0.02) in the multivariate analyses. On average, participants who scored 18 or more on the PGSI-12 were more likely to have a lower reduction in money lost gambling per month (estimated mean money lost change -$34.76 or less) than participants who scored 17 or less on the PGSI-12 (estimated mean money lost change -$38.82 or more).

Table 18: Change in money lost by baseline PGSI-12

Variable	Category	Unadjusted values			Multivariate values†		
		Est. least squares mean diff.	Standard error	p-value	Est. least squares mean diff.	Standard error	p-value
PGSI-12 (12 month time frame) (quartiles)	0 - 14	-38.82	1.95		-38.82	1.95	
	15 - 17	-41.12	1.89		-41.12	1.89	
	18 - 20	-34.76	2.21		-34.76	2.21	
	21+	-32.44	2.33	0.02	-32.44	2.33	0.02

† PGSI-12 was the only factor appearing in the multivariate analyses.

Variables which did not achieve a level of statistical significance are presented in Appendix 6, Table 6.2. These related to baseline: primary mode of problem gambling (dichotomised to EGM vs. other); self-reported number of days gambling per month; self-rated control over gambling; length of problem duration; level of motivation to overcome gambling problem; current goal (i.e. to quit some or all modes of gambling or to control gambling); belief in treatment success, and perceived level of difficulty in overcoming gambling problems; if assistance was currently being received for a gambling problem; and if assistance had previously been received for a gambling problem.

4.5.5 Money lost by other baseline covariates

Table 19 details mean change in time-averaged money lost gambling per month from the baseline score and associations with other baseline covariates which attained a level of statistical significance.

On average, participants who had major depressive disorder at the baseline assessment showed a statistically significant lower mean change in time-averaged money lost gambling per month than participants who did not have major depression (unadjusted values). However, as a level of statistical significance was not retained in the multivariate analyses, this finding is likely to be due to confounding from one or more other variables.

Table 19: Change in money lost by baseline major depressive disorder

Variable	Category	Unadjusted values			Multivariate values†		
		Est. least squares mean diff.	Standard error	p-value	Est. least squares mean diff.	Standard error	p-value
PRIME-MD - Major depressive disorder	No	-40.77	1.68				
	Yes	-35.70	1.51	0.03			

† PGSI-12 was the only factor appearing in the multivariate analyses.

Variables which did not achieve a level of statistical significance are presented in Appendix 6, Table 6.3. These related to baseline psychological distress (Kessler-10); alcohol abuse/ dependence (Audit-C, dichotomised to low risk and high risk); drug abuse/dependence (DAST); suicide ideation (dichotomised to no ideation and some ideation); minor depressive disorder and dysthymia (PRIME-MD); current tobacco use; quality of life (WHOQoL); level of deprivation (NZDI); treatment or prescriptions for mental health issues in the past 12 months; treatment for an alcohol or drug problem in the past 12 months; how work, social life, family and home life, and health were affected in the past month; and legal problems in the past 12 months.

4.6 Predictors of successful problem gambling outcomes - control over gambling

This section presents data pertaining to change in time-averaged control over gambling from the baseline values. Section 4.6.1 details change in control over gambling by assessment point. Associations between change in time-averaged control over gambling from the baseline values and uptake of formal gambling treatment services is presented in section 4.6.2. Also presented are data pertaining to associations between change in time-averaged control over gambling from the baseline values and socio-demographic characteristics (section 4.6.3), baseline gambling and related behaviours (section 4.6.4) and other baseline covariates (section 4.6.5). These analyses indicate which variables are associated with likelihood of better (i.e. improved) outcomes after initial helpline contact and treatment.

4.6.1 Control over gambling by assessment point

No statistically significant difference was noted between assessment points for mean change in control over gambling from baseline values (Table 20).

Table 20: Change in control over gambling by assessment point

| Variable | Category | Unadjusted values | | |
		Estimated least squares mean diff.	Standard error	p-value
Assessment point	3 months	3.52	0.31	
	6 months	3.87	0.25	
	12 months	3.98	0.28	0.32

4.6.2 Control over gambling by uptake of formal services

A level of statistical significance for mean change in time-averaged control over gambling was not attained when uptake of formal services in the first three months, or by any of the follow-up assessments (three, six or 12 months) was examined (Table 21).

Table 21: Change in control over gambling by uptake of formal services

| Variable | Category | Unadjusted values | | |
		Estimated least squares mean diff.	Standard error	p-value
Uptake of formal services by 3 months	No	3.70	0.28	
	Yes	4.19	0.40	0.32
Uptake of formal services by 3, 6 or 12 months	No	3.63	0.28	
	Yes	4.17	0.37	0.25

4.6.3 Control over gambling by socio-demographic characteristics

Table 22 details mean change in time-averaged control over gambling from the baseline score and associations with socio-demographic characteristics which attained a level of statistical significance.

Marital status was statistically significantly associated with change in time-averaged mean control over gambling (unadjusted values). However, as a level of statistical significance was not retained in the multivariate analyses, this finding is likely to be due to confounding from one or more other variables.

Table 22: Change in control over gambling by marital status

		Unadjusted values		
Variable	Category	Estimated least squares mean diff.	Standard error	p-value
Marital status	Partnered	3.28	0.30	
	Not partnered	4.43	0.31	0.01

Variables which did not achieve a level of statistical significance are presented in Appendix 7, Table 7.1. These related to gender, age, ethnicity, employment status, highest educational qualification, gross annual family income, and area of residence.

4.6.4   Control over gambling by baseline gambling and related behaviours

Table 23 details mean change in time-averaged control over gambling from the baseline value and associations with baseline gambling and related behaviours which attained a level of statistical significance.

A statistically significantly association between baseline level of belief in treatment success and mean change in time-averaged control over gambling was noted (unadjusted values). This finding was retained in the multivariate analyses controlling for confounding factors (p=0.022). On average, participants who had higher than median belief in treatment success at the baseline assessment were more likely to have a slightly larger mean improvement in control over gambling (estimated mean change in control 3.90) than participants who had a lower than median belief in treatment success (estimated mean change in control 2.91).

A statistically significantly association between baseline perceived level of difficulty in overcoming the gambling problem and mean change in time-averaged control over gambling was noted (unadjusted values). This finding was retained in the multivariate analyses controlling for confounding factors (p=0.032). On average, participants who perceived a high level of difficulty at the baseline assessment (score 8+) were more likely to have a slightly lower mean improvement in control over gambling (estimated mean change in control 2.88 or less) than participants who had a lower perception of difficulty (estimated mean change in control 3.53 or more).

Table 23: Change in control over gambling by baseline gambling and related behaviours

		Unadjusted values			Adjusted values†		
Variable	Category	Est. least squares mean diff.	Standard error	p-value	Est. least squares mean diff.	Standard error	p-value
Belief in treatment success, dichotomised	Lower than median	3.31	0.31		2.91	0.33	
	Higher than median	4.31	0.33	0.029	3.90	0.33	0.022
Perceived level of difficulty in overcoming problem (scale 1-10) (quartiles)	0 - 5	5.05	0.44		4.40	0.46	
	6 - 7	4.11	0.50		3.53	0.49	
	8 - 9	3.26	0.41		2.88	0.40	
	10	3.09	0.41	0.005	2.81	0.42	0.032

† Adjusted by baseline WHOQoL and received treatment for mental health issues in past 12 months.

Variables which did not achieve a level of statistical significance are presented in Appendix 7, Table 7.2. These related to baseline: primary problem gambling mode (dichotomised to EGM vs. other); PGSI-12 (12-month time frame); self-reported number of days gambling per month and gambling expenditure per day; length of problem duration; level of motivation to

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overcome gambling problem; current goal (i.e. to quit some or all modes of gambling or to control gambling); if assistance was currently being received for a gambling problem; and if assistance had previously been received for a gambling problem.

4.6.5 Control over gambling by other baseline covariates

Table 24 details mean change in time-averaged control over gambling from the baseline value and associations with other baseline covariates which attained a level of statistical significance.

A statistically significantly association between baseline quality of life (WHOQoL) and mean change in time-averaged control over gambling was noted (unadjusted values). This finding was retained in the multivariate analyses controlling for confounding factors (p=0.002). On average, participants in the lowest quartile for quality of life were less likely to improve in mean control over gambling (estimated mean change in control 1.90) than participants who scored in the other three quartiles for quality of life (estimated mean change in control 3.59 or more).

A statistically significant association was also noted for mean change in control over gambling and participants who had received treatment for mental health issues in the past 12 months when assessed at baseline (unadjusted values). This finding was retained in the multivariate analyses controlling for confounding factors (p=0.004). On average, participants who had not received treatment for mental health issues were more likely to have a greater improvement in mean control over gambling (estimated mean change in control 4.13) than participants who had received treatment (estimated mean change in control 2.67).

Although the unadjusted analyses also indicated that there was an association between change in control over gambling and: baseline psychological distress (Kessler-10), major depressive disorder and dysthymia (PRIME-MD), level of deprivation (NZDI), and effect of gambling on physical health, a statistically significant association was not retained in the multivariate analyses controlling for confounding factors. Thus, these findings are likely to be due to confounding from one or more other variables.

Table 24: Change in control over gambling by other baseline covariates

Variable	Category	Unadjusted values			Adjusted values†		
		Est. least squares mean diff.	Standard error	p-value	Est. least squares mean diff.	Standard error	p-value
Kessler-10 (quartiles)	12 - 23	3.83	0.43				
	24 - 31	4.31	0.43				
	32 - 36	4.40	0.44				
	37+	2.48	0.45	0.01			
Prime MD - Major depressive disorder	No	4.44	0.34				
	Yes	3.43	0.30	0.03			
Prime MD - Dysthymia	No	4.29	0.29				
	Yes	3.28	0.35	0.03			
WHOQoL (quartiles)	0 - 20	2.23	0.48		1.90	0.49	
	21 - 25	4.07	0.44		3.59	0.45	
	26 - 29	4.21	0.42		4.06	0.43	
	30+	4.62	0.43	0.02	4.06	0.43	0.002
NZDI (quartiles)	0 - 0.58	5.01	0.41				
	0.59 - 1.23	4.13	0.44				
	1.24 - 2.37	3.14	0.44				
	2.38+	3.18	0.47	0.01			
Treatment, mental health last year	No	4.10	0.25		4.13	0.24	
	Yes	2.88	0.45	0.02	2.67	0.44	0.004
How was health affected in past month? (10 point scale) (quartiles)	0 - 3	4.82	0.40				
	4 - 6	3.78	0.42				
	7 - 8	3.22	0.41				
	9 - 10	3.05	0.58	0.02			

† Adjusted by baseline belief in treatment success and perceived level of difficulty in overcoming problem.

Variables which did not achieve a level of statistical significance are presented in Appendix 7, Table 7.3. These related to alcohol abuse/dependence (Audit-C, dichotomised to low risk and high risk); drug abuse/dependence (DAST); suicide ideation (dichotomised to no ideation and some ideation); minor depressive disorder (PRIME-MD); current tobacco use; treatment for an alcohol or drug problem in the past 12 months; prescription for a mental health issue in the past 12 months, how work, social life, and family and home life were affected in the past month; and legal problems in the past 12 months.

4.7 Predictors of successful problem gambling outcomes - treatment success

This section presents data pertaining to associations between difference in time-averaged treatment success (Gambling-Quit or improved). Section 4.7.1 details treatment success by assessment point. Association between time-averaged treatment success and uptake of formal gambling treatment services is presented in section 4.7.2. Also presented are data pertaining to associations between time-averaged treatment success and socio-demographic characteristics, baseline gambling and related behaviours and other baseline covariates (section 4.7.3).

4.7.1 Treatment success by assessment point

No statistically significant difference was noted between assessment points for treatment success (Table 25).

Table 25: Treatment success by assessment point

Variable	Category	Univariate odds ratio		
		OR	(95% CI)	p-value
Assessment point	3 months	1.40	(0.35, 5.52)	
	6 months	1.26	(0.45, 3.57)	
	12 months	1.00		0.86

4.7.2 Treatment success by uptake of formal services

There was no difference in time-averaged treatment success when examined by uptake of formal services in the first three months, or by any of the follow-up assessments (three, six or 12 months) (Table 26).

Table 26: Treatment success by uptake of formal services

Variable	Category	Univariate odds ratio		
		OR	(95% CI)	p-value
Uptake of formal services by 3 months	No	0.77	(0.27, 2.23)	
	Yes	1.00		0.63
Uptake of formal services by 3, 6 or 12 months	No	0.70	(0.26, 1.88)	
	Yes	1.00		0.48

4.7.3 Treatment success by socio-demographic characteristics, gambling and related behaviours and other baseline covariates

No statistically significant differences were noted for time-averaged treatment success and socio-demographic characteristics, gambling and related behaviours, or any other baseline covariates examined (Appendix 8, Tables 8.1 to 8.3).

5	DISCUSSION

The major purpose of the study was to ascertain whether there are differences in treatment outcomes between those who only access the Helpline and those who subsequently obtain additional professional counselling or treatment for problem gambling. A further purpose was to identify client characteristics associated with treatment outcome.

The present study had sufficient participant numbers to examine relationships between many variables relevant to the study purposes. However, a larger sample would have been required to explore more complex interactions between variables. Participants appeared to be broadly representative of Helpline callers during the period of recruitment and the inclusion/exclusion criteria were such that the great majority of callers were eligible. This increases confidence that the results of the present study can be generalised to Helpline clients generally. A number of standardised measures were included that facilitate comparison with findings from other research. While necessary to assess outcomes of theoretical and practical interest, it is possible that the nature of the questions involved and researcher contact with clients during the course of the study may have had a therapeutic effect additional to that associated with Helpline treatment per se and subsequent clinical interventions. Participant retention over the follow-up assessment period was satisfactory given the nature of the population and the mode of contact (telephone). Furthermore, attrition was not differential, at least with regard to a wide range of socio-demographic variables and primary problem gambling mode. This increases confidence in the findings. However, the methodology has some limitations.

This is an uncontrolled outcome study. While changes following intervention can be assessed, it is not possible to determine directly whether or not these changes are a consequence of the intervention per se. That requires the inclusion of defined interventions in a randomised controlled trial that incorporates a no treatment or placebo control group and/or one or more interventions of known effectiveness. Measurement relies on self-report and there is always the possibility that the accuracy of participant responses will be compromised to an unknown degree. In the present study, treatment was clearly defined and was delivered by trained Helpline counsellors with a high degree of integrity and consistency across time and counsellors. However, in the case of face-to-face and other treatment subsequently accessed by some participants, it is not known what interventions were involved. For the most part these services leave it to individual counsellors to decide what modality or modalities to use. This compromises understanding of what therapeutic features contribute to client outcomes.

As part of intervention delivery, participants were referred to, or informed about, other professional gambling treatment services. During the first three months of the follow-up period just under a third (31%) of participants reported receiving assistance for their gambling problem from a professional treatment service and a larger number (39%) indicated that they had received informal support; Both forms of assistance for gambling problems reduced in frequency at subsequent assessment points. At 12 months the corresponding percentages were 19% and 25%. Counselling was received from the range of major providers mentioned previously in the report and there did not appear to be a clear preference. Some participants sought professional help from more than one provider. Men were more likely to access additional treatment than women and this was the case irrespective of whether or not they had previously, during the past 12 months, received help for a mental health problem. However, for women, this was just the case for those who had previously received treatment for a mental health problem. Only 15.4% of women who had not previously received treatment accessed additional problem gambling treatment during the first three months following Helpline intervention. People who had received treatment for a gambling problem during the

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past 12 months prior to contacting the Helpline were also more likely to access further gambling treatment during this period. It is perhaps not surprising that many people who had in the past 12 months obtained professional help for a gambling or mental health problem sought additional, more intensive, specialist assistance with their gambling problems. This may be because they have more serious gambling and mental health problems and/or because they are more familiar and perhaps comfortable with accessing this form of assistance than callers who have not previously. These possibilities require further consideration. It is unclear why almost as many men (40%) who had not received treatment for a mental health problem obtained additional gambling treatment as those who had (50%). Again further examination of the study data and additional research is required to understand this.

Callers contacted the Helpline from all parts of the country. It is of interest that area of residence did not predict the accessing of additional gambling treatment, perhaps reflecting the wide availability of formal problem gambling services in New Zealand and suggesting that geographical location is not a significant access barrier for most callers in regard to follow-up treatment from gambling treatment services. It should be noted that a large number of factors examined did not predict additional treatment involvement. Among others this included primary problem gambling mode (EGM versus other); various indicators of problem gambling severity, impact and duration; motivation to overcome gambling problem; treatment goal; level of belief in treatment success; or perceived difficulty in overcoming problems. This was also the case for the various measures of psychological distress, mental health disorder, substance use/misuse, suicidal ideation, quality of life, and treatment for an alcohol or drug problem in the past 12 months. It is perhaps surprising that people with more serious gambling and comorbid mental health disorders, or with greater perceived difficulty in overcoming gambling problems, were not more likely to seek additional, more intensive assistance. This suggests that the possible association mentioned above concerning past involvement in gambling or mental health treatment and receipt of post-Helpline intervention is more linked to previous experience of help-seeking than to problem severity and need for more intensive treatment. This requires further investigation and has relevance to the development of stepped-care service delivery.

Perhaps the most notable study finding is that participants evidenced substantial, statistically and clinically significant improvement with respect to problem gambling and some associated mental health problems. In many instances these improvements occurred during the first three months and were sustained throughout subsequent assessments. With regard to problem gambling this included days gambled, money lost gambling and control over gambling, and problem gambling severity and impacts on work, social life, family/home and physical health. There were notable reductions in psychological distress and the prevalence of major and minor depression and drug abuse. Less change was evident for tobacco use and while there was some reduction in alcohol misuse post-intervention, by 12 months it had increased to just below the baseline rate. These outcomes are impressive, particularly given the severity of gambling problems and associated comorbidity. The changes are, for the most part, of large magnitude and durable throughout the 12 month follow-up period. They were achieved even through most clients had received only one Helpline counselling session and did not subsequently access other, more intensive, gambling counselling.

The large reductions in levels of psychological distress and the prevalence of common mood disorders is also of note and suggests that the resolution of gambling problems may play a major role. This requires further research including closer examination of associated changes in life situation and use of medical interventions. It is likely that many of these clients would have been prescribed an antidepressant, especially the 57.7% who met the clinical criteria for major depression at the time they contacted the Helpline, if they had presented to a general medical practitioner and their depressive symptoms had been noted. This underlines the

importance of general practitioners and other primary health care practitioners inquiring about problem gambling and other psychological and social factors when patients present with anxiety and mood disorders. The finding that many participants continued to smoke and experience alcohol problems requires consideration. What is the role of problem gambling services in addressing these serious health issues, either by focusing on them concurrently with gambling treatment or by referral? Would this broadening of focus compromise gambling treatment outcomes? These are questions for further discussion and study.

It is sometimes asserted that 'symptom substitution' occurs following treatment for a particular disorder, for example that successful treatment for gambling leads to an alcohol problem or increased tobacco use. Analysis of the data in the present study focuses on the overall group, rather than examines individual trajectories over time. These and other matters concerning change in individuals can be subsequently examined further, particularly when the outcome data from the 36-month assessment become available. Given that there was no overall increase in smoking or alcohol misuse and that the prevalence of drug abuse, psychological distress and major and minor depression reduced markedly, this type of substitution is unlikely except, perhaps, in a small number of cases.

The finding that 57.5% of participants, based on the PGSI-12, remained problem gamblers at the 12-month assessment requires discussion. First, it needs to be noted that the mean PGSI-12 score reduced substantially, from 17 to 9. This indicates a clinically meaningful reduction in the severity of gambling problems for most participants, even though the majority continued to meet the criteria for problem gambling. Additionally, a number of the PGSI items refer to experiences and consequences that could be expected to continue for some time, even when people stop gambling completely. For example the PGSI-12 asks if, during the past 12 months, respondents have felt they might have a problem with gambling, experienced health problems caused by gambling, had financial problems caused by gambling and felt guilty about the way they gamble or what happens when they gamble. Further analysis is required to assess changes in responses to individual questions over time. It is likely that responses to some questions will change markedly within the first three months and that others will change later.

People who accessed formal gambling treatment services during the first three months of follow-up were more likely than those who did not access services to report time-averaged reductions in mean days gambled per month throughout the follow-up assessment period. However, while statistically significant, the difference was not large and accessing additional gambling services at later periods during the 12-month follow-up period was not associated with better outcome on this measure and may be due, in part, to the fact that active referral or information about other services was only provided to participants when they received their Helpline intervention (i.e. at initial contact). Involvement in additional gambling treatment was also found not to be associated with PGSI-12 problem reduction, time-averaged mean change in money lost gambling per month or time-averaged self-assessed treatment success (gambling- quit or improved). On the face of it these findings suggest that involvement in gambling treatment, additional to the Helpline intervention, contributed little if at all to treatment outcome. However, it may be that many or most participants who chose not to seek problem gambling assistance additional to that received from the Helpline (including the self-help manual) were of the view that they did not require additional professional assistance, and that this assessment was often correct. Many will have received informal support. Similarly, perhaps those who are of the view that they require more professional support and subsequently received it may have had a better outcome than would otherwise be the case. This could also explain the finding that there is little or no difference in gambling treatment outcomes between those who accessed additional treatment and those who did not. If this is

the case, however, it is odd that it was not reflected in more serious gambling problems, psychopathology and some other relevant measures at baseline.

While additional treatment engagement appeared to have little impact on treatment outcomes, some participant attributes did. The following were associated with worse outcomes on one of the problem gambling outcome measures: having pub EGMs as primary problem gambling mode; PGSI-12 problem gambling severity at initial contact; living in high deprivation areas; being disabled, having an illness or being on sick leave; being a widow; having a low quality of life; having received treatment for a mental health problem in the past year; and perceiving a high level of difficulty in overcoming their gambling problem. People with a higher belief in treatment success and having a minor (but not major) depressive disorder, improved more. These findings are interesting and potentially important. However, the association in all cases was with only one outcome measure, not across the board.

The finding of large differences in treatment outcome (measured by changes in PGSI-12 scores) depending on where people predominantly access EGMs was unexpected. However, on reflection, there might be a link between poorer outcomes for problem gamblers who play machines in pubs, rather than in casinos, and living in high deprivation areas. Residence in high deprivation areas was also associated with lower levels of improvement on the PGSI-12 measure. Pub EGMs are more heavily concentrated in high deprivation neighbourhoods and previous New Zealand studies have found high levels of participation and gambling problems among people living in closer proximity to EGMs as well as in more deprived areas. To date there has been a tendency to categorise EGM participants together irrespective of where they are located. Location could, however, be important, both in terms of access and contextual features that may influence participation, as well with regard to the types of people who frequent the different settings.

Some of the groups that did not change as much as others may also be more likely to reside in high deprivation areas, as well as experience lower levels of social capital including social support and a lack of meaningful occupation. Problem severity was found to be a strong predictor of future problem gambling in a previous New Zealand study (Abbott, Williams & Volberg, 2004). This was a longitudinal study of pathological, problem and frequent non-problem gamblers recruited from a national prevalence study, not a treatment sample.

Self-efficacy has been shown to predict better treatment outcomes in previous studies involving problem gamblers and other clinical groups (Project MATCH Research Group, 1997; Hodgins et al., 2009). Perceiving higher levels of difficulty in overcoming a gambling problem and believing in treatment success are measures of this construct. Further research on the role of self-efficacy in treatment and ways to enhance it early in treatment would be helpful. The association of minor (but not major) depression at baseline and better treatment outcome might suggest that moderate but not high levels of depression in some way help to facilitate behaviour change. However, again this association was found with regard to just one outcome measure and probably not too much should be made of it.

The factors discussed above have relevance to understanding client variation in treatment-seeking and treatment response and ways to better match client subgroups with interventions to enhance outcomes. However, a major conclusion, and an important one, is that many of the factors examined had little or no association with treatment outcomes. This includes age, gender and ethnicity, characteristics often found to influence access and response to health and social services. While some caution is required owing to low numbers of people in some groups such as Pacific people and Asians, perhaps the most notable finding is that clients generally, irrespective of their socio-demographic characteristics, experienced clinically significant, sustained improvement for their gambling and some related problems following

access to the Helpline. This requires further examination in larger studies with longer-term follow-up assessments.

As mentioned, an outcome study does not enable direct comparison with other interventions, including those of known efficacy. In one sense this does not matter. If relatively low cost interventions such as telephone counselling are associated with significant clinical gains, that is sufficient information for some purposes. However, what if the outcomes are not better than they would have been if clients had not sought help? From prospective general population studies it is apparent that gambling problems fluctuate considerably over time and that recovery, without professional intervention, is not uncommon. However, relapse is also common, particularly among people with more serious problems (Abbott & Clark, 2007).

Psychotherapy research, generally, as well that relating to gambling, provides convincing evidence that most people improve during therapy and these improvements are often sustained (Lambert & Ogles, 2004). In part this is because people who seek help for gambling and other problems have usually reached a crisis point and are at a stage where they are more open to behaviour change. At this time, if a client engages with a counsellor or therapist who is perceived to be credible and the counsellor delivers an intervention that he or she believes is likely to be effective, positive outcomes are common. Clinical trials with problem gambling and other mental health disorders have often found little or no difference in outcome between treatments. In part, this is because of shared 'non-specific' placebo effects. Westphal and Abbott (2006) have noted that problem gambling trials typically appear to have high rates of non-specific response, apparently even higher than rates found with trials involving other mental health disorders. The major clinical interest, apart from finding ways to enhance the impact of non-specific effects, is to develop specific, defined interventions that further enhance effectiveness, and to better match clients to particular therapies and therapy components. This information is required to inform the development of services that reach more people at an earlier stage, deliver better outcomes and are cost-effective.

As Helpline treatment was included in the randomised controlled trial (RCT), it is possible to compare it with interventions that had previously been studied in RCTs that included a wait-list control group. While follow-up was relatively short, for ethical reasons, participants allocated to treatment groups did significantly better than those who were waiting to access treatment. Given that there were no significant differences between helpline treatment and these interventions on gambling outcome measures, it is highly likely that Helpline counselling is contributing to the marked reductions in gambling and related problems reported and discussed in the present study. Currently, for the first time, there are large scale-prospective general population studies of gambling being conducted (in Sweden, Australia, Canada and New Zealand). Among many other things these studies will provide detailed information on the natural history of problem gambling, including problem onset, change over time, help-seeking, 'natural' recovery and relapse. Information from these studies will enable comparisons of rates of change with and without therapy to be made. Little is known about the long-term effects of problem gambling treatment, beyond one or two years. Longer term tracking of the present clinical sample and other clients in the RCT would enable large clinical and non-clinical samples of problem and at-risk gamblers to be studied in parallel.

While the addition of formal professional counselling to Helpline treatment did not generally lead to better outcomes this does not mean that such services are without value. Had clients first presented to these other services, as the majority of clients do, it is likely that similar improvements would have occurred. Further, it may well be that supplementing these interventions with Helpline engagement would have made little or no difference to these clients. However, it would be helpful to know what interventions are being delivered by face-

to-face services across the country and to what extent they correspond to those interventions that have been found to be more efficacious with problem gamblers. It would also be helpful to know which clients do as well or better from a relatively low-cost, brief intervention as they would from more intensive face-to-face interventions and which do better with the latter. This will require further investigation of face-to-face interventions using both prospective cohort and RCT study designs.

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APPENDIX 1
Ethical approval

**Health
and
Disability
Ethics
Committees**

3 June 2009

Prof. Max Abbott
Auckland University of Technology
Faculty of Health & Environmental Sciences
Private Bag 92006
Auckland 1142

Dear Prof. Abbott

Effectiveness study of problem gambling standard and brief interventions
Lead Investigator: Prof. Max Abbott,
Co-Investigators: Dr. Maria Bellringer, Dr David Hodgins, Dr Phillip Schluter, Dr Valery Feigin, Dr Justin Pulford
Approved site: AUT University
MEC/09/04/043

The above study has been given ethical approval by the **Multi-region** Ethics Committee.

Approved Documents
- Initial Assessment Questionnaire
- Follow-up questionnaire one (one month post assessment)
- Follow-up questionnaire two (three months post assessment)
- Follow-up questionnaire three (twelve months post assessment)
- Collateral questionnaire one (three months post assessment)
- Collateral questionnaire two (twelve months post assessment)
- Participant Information Sheet Version 1
- Helpline Script for Obtaining Participant Consent
- Collateral Information Sheet
- Self Help Workbook Version 1 entitled 'Becoming a Winner: Defeating Problem Gambling'

Certification
The Committee is satisfied that this study is not being conducted principally for the benefit of the manufacturer or distributor of the medicine or item in respect of which the trial is being carried out.

Accreditation
The Committee involved in the approval of this study is accredited by the Health Research Council and is constituted and operates in accordance with the Operational Standard for Ethics Committees, April 2006.

Progress Reports
The study is approved until June 2012. The Committee will review the approved application annually and notify the Principal Investigator if it withdraws approval. It is the Principal Investigator's responsibility to forward a progress report covering all sites prior to ethical review of the project in **June 2010**. The report form is available on http://www.ethicscommittees.health.govt.nz. Please note that failure to provide a progress report may result in the withdrawal of ethical approval. A final report is also required at the conclusion of the study.

Requirements for SAE Reporting
The Principal Investigator will inform the Committee as soon as possible of the following:
- Any related study in another country that has stopped due to serious or unexpected adverse events
- withdrawal from the market for any reason

Effectiveness of problem gambling brief telephone interventions: An uncontrolled outcome study
Provider No: 467589, Contract No: 326673/00 and 326673/01
Gambling and Addictions Research Centre, Auckland University of Technology
Final Report, re-issued 18 July 2013

- all serious adverse events occurring during the study in New Zealand which result in the investigator breaking the blinding code at the time of the SAE or which result in hospitalisation or death.
- all serious adverse events occurring during the study worldwide which are considered related to the study medicine. Where there is a data safety monitoring board in place, serious adverse events occurring outside New Zealand may be reported quarterly.

All SAE reports must be signed by the Principal Investigator and include a comment on whether he/she considers there are any ethical issues relating to this study continuing due to this adverse event. It is assumed by signing the report, the Principal Investigator has undertaken to ensure that all New Zealand investigators are made aware of the event.
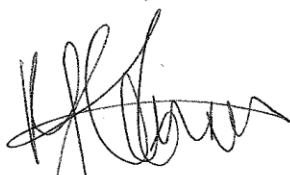
Amendments
All amendments to the study must be advised to the Committee prior to their implementation, except in the case where immediate implementation is required for reasons of safety. In such cases the Committee must be notified as soon as possible of the change.

Please quote the above ethics committee reference number in all correspondence.

The Principal Investigator is responsible for advising any other study sites of approvals and all other correspondence with the Ethics Committee.

It should be noted that Ethics Committee approval does not imply any resource commitment or administrative facilitation by any healthcare provider within whose facility the research is to be carried out. Where applicable, authority for this must be obtained separately from the appropriate manager within the organisation.

Yours sincerely

Rebecca Stewart
Multi-region Ethics Committee Administrator
Email: rebecca_stewart@moh.govt.nz

Table 2.1: Socio-demographics by assessment point

	Assessment point							
	Baseline		**3 months**		**6 months**		**12 months**	
Variable	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**
Gender								
Male	64	(42.7)	56	(43.4)	51	(42.9)	42	(42.4)
Female	86	(57.3)	73	(56.6)	68	(57.1)	57	(57.6)
Marital Status								
Never married	39	(26.2)	35	(27.1)	31	(26.1)	25	(25.3)
Married	34	(22.8)	32	(24.8)	30	(25.2)	25	(25.3)
De facto	39	(26.2)	30	(23.3)	28	(23.5)	21	(21.2)
Separated	19	(12.8)	16	(12.4)	13	(10.9)	12	(12.1)
Divorced	12	(8.1)	12	(9.3)	12	(10.1)	12	(12.1)
Widowed	6	(4.0)	4	(3.1)	5	(4.2)	4	(4.0)
Age Group								
18-24 years	20	(13.7)	17	(13.3)	15	(12.7)	8	(8.1)
25-34 years	37	(25.3)	28	(21.9)	26	(22.0)	21	(21.2)
35-44 years	39	(26.7)	36	(28.1)	31	(26.3)	28	(28.3)
45-54 years	29	(19.9)	28	(21.9)	27	(22.9)	25	(25.3)
55+ years	21	(14.4)	19	(14.8)	19	(16.1)	17	(17.2)
Ethnicity - Priority								
Maori	65	(43.3)	56	(43.4)	51	(42.9)	40	(40.4)
Pacific	15	(10.0)	12	(9.3)	10	(8.4)	6	(6.1)
Asian & Other	7	(4.7)	4	(3.1)	4	(3.4)	4	(4.0)
European	63	(42.0)	57	(44.2)	54	(45.4)	49	(49.5)
Ethnicity - Any								
Maori	65	(43.3)	56	(43.4)	51	(42.9)	40	(40.4)
Pacific	18	(12.0)	14	(10.9)	12	(10.1)	7	(7.1)
Asian & Other	7	(4.7)	4	(3.1)	4	(3.4)	4	(4.0)
European	74	(49.3)	64	(49.6)	61	(51.3)	56	(56.6)
Employment status								
Full time	65	(43.6)	59	(45.7)	55	(46.2)	50	(50.5)
Part time	19	(12.8)	15	(11.6)	13	(10.9)	12	(12.1)
Homemaker/student/retired	23	(15.4)	17	(13.2)	15	(12.6)	9	(9.1)
Unemployed	20	(13.4)	18	(14.0)	18	(15.1)	14	(14.1)
Disabled/illness/sick leave	9	(6.0)	9	(7.0)	6	(5.0)	7	(7.1)
Other	13	(8.7)	11	(8.5)	12	(10.1)	7	(7.1)
Highest educational qualification achieved								
None	40	(26.7)	37	(28.7)	31	(26.1)	26	(26.3)
Secondary school qualification	48	(32.0)	40	(31.0)	39	(32.8)	32	(32.3)
Trade or technical certificate	27	(18.0)	24	(18.6)	22	(18.5)	18	(18.2)
Professional qualification	5	(3.3)	3	(2.3)	3	(2.5)	3	(3.0)
Undergrad. Dip. or Cert.	13	(8.7)	11	(8.5)	10	(8.4)	8	(8.1)
University degree & above	11	(7.3)	10	(7.8)	10	(8.4)	9	(9.1)
Other	6	(4.0)	4	(3.1)	4	(3.4)	3	(3.0)
Gross family income in last 12 months								
<$20,000	37	(28.0)	31	(27.0)	27	(25.2)	23	(25.8)
$20,001 - $30,000	24	(18.2)	21	(18.3)	17	(15.9)	14	(15.7)
$30,001 - $50,000	30	(22.7)	25	(21.7)	26	(24.3)	19	(21.4)
$50,001 - $100,000	27	(20.5)	25	(21.7)	25	(23.4)	22	(24.7)
$100,001 +	14	(10.6)	13	(11.3)	12	(11.2)	11	(12.4)

Table 2.1: Socio-demographics by assessment point - continued

Variable	Baseline		3 months		6 months		12 months	
	N	(%)	N	(%)	N	(%)	N	(%)
Area of residence								
Northland	5	(3.3)	5	(3.9)	5	(4.2)	5	(5.1)
Auckland	47	(31.3)	36	(27.9)	31	(26.1)	24	(24.2)
Waikato/Coromandel	8	(5.3)	8	(6.2)	8	(6.7)	7	(7.1)
East Coast (Bay of Plenty/	25	(16.7)	23	(17.8)	21	(17.7)	18	(18.2)
Lakes/Hawkes Bay)	18	(12.0)	15	(11.6)	15	(12.6)	14	(14.1)
Tarankai/Manawatu/Wairarapa	20	(13.3)	17	(13.2)	16	(13.5)	13	(13.1)
Wellington	19	(12.7)	18	(14.0)	16	(13.5)	11	(11.1)
Canterbury	8	(5.3)	7	(5.4)	7	(5.9)	7	(7.1)
Southland	5	(3.3)	5	(3.9)	5	(4.2)	5	(5.1)
Primary problem gambling mode								
Card gambling	1	(0.7)	1	(0.8)	1	(0.9)	0	(0.0)
Casino gaming machines	5	(3.4)	5	(4.0)	4	(3.5)	2	(2.1)
Casino table games	5	(3.4)	3	(2.4)	3	(2.6)	3	(3.1)
Club gaming machines	13	(8.8)	11	(8.7)	9	(7.8)	9	(9.4)
Pub gaming machines	112	(76.2)	95	(75.4)	90	(77.6)	74	(77.1)
Keno	1	(0.7)	1	(0.8)	1	(0.9)	1	(1.0)
Sports betting	1	(0.7)	1	(0.8)	1	(0.9)	1	(1.0)
Track	6	(4.1)	6	(4.8)	5	(4.3)	4	(4.2)
Other	3	(2.0)	3	(2.4)	2	(1.7)	2	(2.1)
Primary mode - EGM								
No	17	(11.3)	15	(11.6)	13	(10.9)	11	(11.1)
Yes	133	(88.7)	114	(88.4)	106	(89.1)	88	(88.9)

Table 2.2: Baseline socio-demographics by follow-up data availability and formal assistance accessed in first three months

Variable	Baseline data available N	(%)	Follow-up data available N	(%)	Y/N to formal help at 3-months N	(%)
Gender						
Male	64	(42.7)	56	(43.1)	53	(43.8)
Female	86	(57.3)	74	(56.9)	68	(56.2)
N	*150*	*(100.0)*	*130*	*(100.0)*	*121*	*(100.0)*
N Missing	*0*	*-*	*0*	*-*	*0*	*-*
Marital Status						
Never married	39	(26.2)	35	(26.9)	33	(27.3)
Married	34	(22.8)	32	(24.6)	30	(24.8)
De facto	39	(26.2)	30	(23.1)	28	(23.1)
Separated	19	(12.8)	16	(12.3)	15	(12.4)
Divorced	12	(8.1)	12	(9.2)	11	(9.1)
Widowed	6	(4.0)	5	(3.9)	4	(3.3)
N	*149*	*(100.0)*	*130*	*(100.0)*	*121*	*(100.0)*
N Missing	*1*	*-*	*0*	*-*	*0*	*-*
Age Group						
18-24 years	20	(13.7)	17	(13.2)	15	(12.5)
25-34 years	37	(25.3)	28	(21.7)	26	(21.7)
35-44 years	39	(26.7)	36	(27.9)	34	(28.3)
45-54 years	29	(19.9)	28	(21.7)	27	(22.5)
55+ years	21	(14.4)	20	(15.5)	18	(15.0)
N	*146*	*(100.0)*	*129*	*(100.0)*	*120*	*(100.0)*
N Missing	*4*	*-*	*1*	*-*	*1*	*-*
Ethnicity - Priority						
Maori	65	(43.3)	57	(43.9)	53	(43.8)
Pacific	15	(10.0)	12	(9.2)	11	(9.1)
Asian & Other	7	(4.7)	4	(3.1)	4	(3.3)
European	63	(42.0)	57	(43.9)	53	(43.8)
N	*150*	*(100.0)*	*130*	*(100.0)*	*121*	*(100.0)*
N Missing	*0*	*-*	*0*	*-*	*0*	*-*
Ethnicity - Any						
Maori	65	(43.3)	57	(43.9)	53	(43.8)
Pacific	18	(12.0)	14	(10.8)	13	(10.7)
Asian & Other	7	(4.7)	4	(3.1)	4	(3.3)
European	74	(49.3)	64	(49.2)	60	(49.6)
N	*150*	*(100.0)*	*150*	*(100.0)*	*121*	*(100.0)*
N Missing	*0*	*-*	*0*	*-*	*0*	*-*
Employment status						
Full time	65	(43.6)	59	(45.4)	55	(45.5)
Part time	19	(12.8)	15	(11.5)	14	(11.6)
Homemaker/student/retired						
Homemaker	12	(8.1)	10	(7.7)	8	(6.6)
Student	6	(4.0)	4	(3.1)	4	(3.3)
Retired	4	(2.7)	3	(2.3)	3	(2.5)
Maternity leave	1	(0.7)	0	(0.0)	0	(0.0)
Total	*23*	*(15.4)*	*17*	*(13.1)*	*15*	*(12.4)*
Unemployed	20	(13.4)	18	(13.9)	18	(14.9)
Disabled/illness/sick leave						
Illness/sick leave	8	(5.4)	8	(6.2)	7	(5.8)
Disables	1	(0.7)	1	(0.8)	1	(0.8)
Total	*9*	*(6.0)*	*9*	*(6.9)*	*8*	*(6.6)*
Other	13	(8.7)	12	(9.2)	11	(9.1)
N	*149*	*(100.0)*	*130*	*(100.0)*	*121*	*(100.0)*
N Missing	*1*	*-*	*0*		*0*	

Table 2.2: Socio-demographics - continued

Variable	Baseline data available		Follow-up data available		Y/N to formal help at 3-months	
	N	(%)	N	(%)	N	(%)
Highest educational qualification achieved						
None	40	(26.7)	37	(28.5)	35	(28.9)
Secondary school qualification	48	(32.0)	40	(30.8)	40	(33.1)
Trade or technical certificate	27	(18.0)	24	(18.5)	23	(19.0)
Professional qualification	5	(3.3)	3	(2.3)	2	(1.7)
Undergrad. Dip. or Cert.	13	(8.7)	12	(9.2)	9	(7.4)
University degree & above						
Degree - undergraduate	8	(5.3)	8	(6.2)	6	(5.0)
Dip./Cert. - postgrad.	1	(0.7)	1	(0.8)	1	(0.8)
Degree - postgraduate	2	(1.3)	1	(0.8)	1	(0.8)
Total	*11*	*(7.3)*	*10*	*(7.7)*	*8*	*(6.6)*
Other	6	(4.0)	4	(3.1)	4	(3.3)
N	*150*	*(100.0)*	*130*	*(100.0)*	*121*	*(100.0)*
N Missing	*0*	*-*	*0*		*0*	
Gross family income in last 12 months						
<$20,000	37	(28.0)	31	(26.7)	31	(28.7)
$20,001 - $30,000	24	(18.2)	21	(18.1)	21	(19.4)
$30,001 - $50,000	30	(22.7)	26	(22.4)	24	(22.2)
$50,001 - $100,000	27	(20.5)	25	(21.6)	21	(19.4)
$100,001 +						
$100,001 - $200,000	12	(9.1)	11	(9.5)	10	(9.3)
$200,001 +	2	(1.5)	2	(1.7)	1	(0.9)
Total	*14*	*(10.6)*	*13*	*(11.2)*	*11*	*(10.2)*
N	*132*	*(100.0)*	*116*	*(100.0)*	*108*	*(100.0)*
N Missing	*18*	*-*	*14*		*13*	

Table 2.3: Area of residence

Region	Residential Area	Baseline data available		Follow-up data available		Y/N to formal help at 3-months	
		N	(%)	N	(%)	N	(%)
Northland	Hokianga	1	(0.7)	1	(0.8)	1	(0.8)
	Kaikohe	1	(0.7)	1	(0.8)	1	(0.8)
	Kaitaia	1	(0.7)	1	(0.8)	1	(0.8)
	Northland	1	(0.7)	1	(0.8)	1	(0.8)
	Whangarei	1	(0.7)	1	(0.8)	1	(0.8)
	Total	*5*	*(3.3)*	*5*	*(3.9)*	*5*	*(4.1)*
Auckland	Auckland	39	(26.0)	31	(23.9)	28	(23.1)
	Manukau	5	(3.3)	3	(2.3)	3	(2.5)
	North Shore	2	(1.3)	2	(1.5)	2	(1.7)
	Waitakere	1	(0.7)	1	(0.8)	1	(0.8)
	Total	*47*	*(31.3)*	*37*	*(28.5)*	*34*	*(28.1)*
Waikato/Coromandel	Coromandel	1	(0.7)	1	(0.8)	1	(0.8)
	Hamilton	4	(2.7)	4	(3.1)	4	(3.3)
	Morrinsville	2	(1.3)	2	(1.5)	2	(1.7)
	Paeroa	1	(0.7)	1	(0.8)	1	(0.8)
	Total	*8*	*(5.3)*	*8*	*(6.2)*	*8*	*(6.6)*
East Coast (Bay of Plenty/Lakes/Hawkes Bay)	Bay of Plenty	1	(0.7)	0	-	0	-
	Gisborne	2	(1.3)	2	(1.5)	2	(1.7)
	Hastings	2	(1.3)	2	(1.5)	2	(1.7)
	Hawkes Bay	1	(0.7)	1	(0.8)	1	(0.8)
	Mt Maunganui	1	(0.7)	1	(0.8)	1	(0.8)
	Napier	1	(0.7)	1	(0.8)	1	(0.8)
	Papamoa	1	(0.7)	1	(0.8)	1	(0.8)
	Rotorua	10	(6.7)	10	(7.7)	10	(8.3)
	Taupo	3	(2.0)	2	(1.5)	2	(1.7)
	Tauranga	2	(1.3)	2	(1.5)	2	(1.7)
	Whakatane	1	(0.7)	1	(0.8)	1	(0.8)
	Total	*25*	*(16.7)*	*23*	*(17.7)*	*23*	*(19.0)*
Tarankai/Manawatu/ Wairarapa	Carterton	1	(0.7)	1	(0.8)	1	(0.8)
	Dannevirke	2	(1.3)	1	(0.8)	1	(0.8)
	Foxton	2	(1.3)	2	(1.5)	2	(1.7)
	Havelock	1	(0.7)	1	(0.8)	1	(0.8)
	Levin	1	(0.7)	1	(0.8)	1	(0.8)
	New Plymouth	1	(0.7)	1	(0.8)	1	(0.8)
	Opunake	1	(0.7)	1	(0.8)	1	(0.8)
	Palmerston North	8	(5.3)	6	(4.6)	6	(5.0)
	Wanganui	1	(0.7)	1	(0.8)	1	(0.8)
	Total	*18*	*(12.0)*	*15*	*(11.5)*	*15*	*(12.4)*
Wellington	Kapiti Coast	1	(0.7)	0	-	0	-
	Otaki	1	(0.7)	1	(0.8)	0	-
	Paraparaumu	1	(0.7)	1	(0.8)	1	(0.8)
	Wellington	16	(10.7)	14	(10.8)	11	(9.1)
	Whitby	1	(0.7)	1	(0.8)	1	(0.8)
	Total	*20*	*(13.3)*	*17*	*(13.1)*	*13*	*(10.7)*
Canterbury	Ashburton	1	(0.7)	1	(0.8)	1	(0.8)
	Blenheim	1	(0.7)	0	-	0	-
	Christchurch	16	(10.7)	16	(12.3)	14	(11.6)
	Motueka	1	(0.7)	1	(0.8)	1	(0.8)
	Total	*19*	*(12.7)*	*18*	*(13.9)*	*16*	*(13.2)*
Southland	Dunedin	2	(1.3)	2	(1.5)	2	(1.7)
	Invercargill	2	(1.3)	1	(0.8)	1	(0.8)
	Otago	1	(0.7)	1	(0.8)	1	(0.8)
	Southland	1	(0.7)	1	(0.8)	1	(0.8)
	Timaru	2	(1.3)	2	(1.5)	2	(1.7)
	Total	*8*	*(5.3)*	*7*	*(5.4)*	*7*	*(5.8)*

Table 2.4: Primary problem gambling mode

Variable	Baseline data available		Follow-up data available		Y/N to formal help at 3-months	
	N	(%)	N	(%)	N	(%)
Primary problem gambling mode						
Card gambling	1	(0.7)	1	(0.8)	0	-
Casino gaming machines	5	(3.4)	5	(3.9)	5	(4.2)
Casino table games	5	(3.4)	3	(2.4)	3	(2.5)
Club gaming machines	13	(8.8)	11	(8.7)	10	(8.5)
Pub gaming machines	112	(76.2)	96	(75.6)	89	(75.4)
Keno	1	(0.7)	1	(0.8)	1	(0.9)
Sports betting	1	(0.7)	1	(0.8)	1	(0.9)
Track	6	(4.1)	6	(4.7)	6	(5.1)
Other	3	(2.0)	3	(2.4)	3	(2.5)
N	*147*	*(100.0)*	*127*	*(100.0)*	*118*	*(100.0)*
N Missing	*3[#]*	*-*	*3[#]*	*-*	*3**	*-*
Primary mode - EGM						
No	17	(11.3)	15	(11.5)	14	(11.6)
Yes	133	(88.7)	115	(88.5)	107	(88.4)
N	*150*	*(100.0)*	*150*	*(100.0)*	*121*	*(100.0)*
N Missing	*0*	*-*	*0*	*-*	*0*	*-*

[#] Three participants reported multiple primary problem gambling modes for electronic gaming machines

Table 2.5: Trends

		Assessment point			
		Baseline	**3 months**	**6 months**	**12 months**
Self-reported days gambled per month	MEAN	8.9	3.3	2.7	3.1
	STD	7.0	4.2	3.7	4.1
	MIN	0.0	0.0	0.0	0.0
	Q1	3.5	0.3	0.0	0.3
	MEDIAN	7.5	1.7	1.3	1.7
	Q3	12.5	4.7	4.0	4.3
	MAX	30.0	25.3	18.3	25.3
	N	*141*	*129*	*119*	*99*
	N MISSING	*9*	*0*	*0*	*0*
Self-reported money lost per day ($)	MEAN	43.3	8.6	7.3	8.9
	STD	47.1	18.8	12.7	16.8
	MIN	0.0	0.0	0.0	0.0
	Q1	13.2	0.7	0.0	0.3
	MEDIAN	28.1	2.6	1.9	2.6
	Q3	55.8	7.8	6.6	7.4
	MAX	263.6	166.7	52.6	85.4
	N	*141*	*129*	*119*	*99*
	N MISSING	*9*	*0*	*0*	*0*
PGSI-12 (12 month time frame)	MEAN	16.8	-	-	9.2
	STD	4.7	-	-	6.2
	MIN	3	-	-	0
	Q1	14	-	-	4
	MEDIAN	17	-	-	9
	Q3	20	-	-	13
	MAX	27	-	-	23
	N	*145*	*-*	*-*	*94*
	N MISSING	*5*	*-*	*-*	*5*
PGSI-12 (12 month time frame)	Non-problem N (%)	0 (-)	-	-	5 (5.3)
	Low risk N (%)	0 (-)	-	-	11 (11.7)
	Moderate risk N (%)	5 (3.5)	-	-	24 (35.5)
	Problem gambler N (%)	140 (96.6)	-	-	54 (57.5)
	N	*145*	*-*	*-*	*94*
	N MISSING	*5*	*-*	*-*	*5*
PGSI-3 (3 month time frame)	MEAN	17.1	8.0	7.3	6.4
	STD	5.2	7.1	7.0	6.4
	MIN	0	0	0	0
	Q1	14	1	1	0
	MEDIAN	18	7	6	6
	Q3	21	13.5	12.5	11
	MAX	27	26	24	23
	N	*144*	*120*	*112*	*97*
	N MISSING	*6*	*9*	*7*	*2*
Control over gambling behaviour (scale 1 to 10)	MEAN	3.3	6.9	7.3	7.2
	STD	2.8	2.7	3.0	2.8
	MIN	0	0	0	0
	Q1	1	5	5	6
	MEDIAN	3	7	8	8
	Q3	5	9	10	10
	MAX	10	10	10	10
	N	*147*	*121*	*114*	*99*
	N MISSING	*3*	*8*	*5*	*0*

Table 2.4: Trends - continued

		Baseline	3 months	6 months	12 months
				Assessment point	
Work affected in past month (scale 1 to 10)	MEAN	3.2	1.2	1.0	0.9
	STD	3.5	2.6	2.4	2.0
	MIN	0	0	0	0
	Q1	0	0	0	0
	MEDIAN	2	0	0	0
	Q3	6	1	0	0
	MAX	10	10	10	8
	N	*129*	*111*	*103*	*90*
	N MISSING	*21*	*18*	*16*	*9*
Social life affected in past month (scale 1 to 10)	MEAN	5.1	1.6	1.3	1.2
	STD	3.4	2.9	2.8	2.4
	MIN	0	0	0	0
	Q1	1.5	0	0	0
	MEDIAN	5.5	0	0	0
	Q3	8	2	0	1
	MAX	10	10	10	9
	N	*148*	*121*	*113*	*99*
	N MISSING	*2*	*8*	*6*	*0*
Family/home affected in past month (scale 1 to 10)	MEAN	6.6	2.2	1.9	1.5
	STD	3.2	3.3	3.1	2.8
	MIN	0	0	0	0
	Q1	5	0	0	0
	MEDIAN	7	0	0	0
	Q3	9	4	4	2
	MAX	10	10	10	10
	N	*150*	*121*	*114*	*99*
	N MISSING	*0*	*8*	*5*	*0*
Physical health affected in past month (scale 1 to 10)	MEAN	5.2	1.6	1.7	1.5
	STD	3.1	2.8	2.9	2.6
	MIN	0	0	0	0
	Q1	3	0	0	0
	MEDIAN	6	0	0	0
	Q3	8	3	3	2.5
	MAX	10	10	10	10
	N	*148*	*121*	*114*	*98*
	N MISSING	*2*	*8*	*5*	*1*
Received assistance in past 3 months	Formal N (%)	-	38 (30.6)	24 (21.1)	19 (19.2)
	Informal N (%)	-	47 (38.8)	25 (30.7)	25 (25.3)
	Any (formal + informal) N (%)	-	73 (59.5)	56 (49.1)	37 (37.4)
	N	*-*	*121*	*114*	*99*
	N MISSING	*-*	*8*	*5*	*0*
Current gambling goal	Quit all forms N (%)	91 (61.1)	46 (38.0)	40 (35.1)	27 (27.3)
	Quit some forms N (%)	30 (20.1)	23 (19.0)	14 (12.3)	16 (16.2)
	Control gambling N (%)	20 (13.4)	19 (15.7)	19 (16.7)	19 (19.2)
	Maintain abstinence N (%)	7 (4.7)	26 (21.5)	34 (29.8)	30 (30.3)
	Other N (%)	1 (0.7)	7 (5.8)	7 (6.1)	7 (7.1)
	N	*149*	*121*	*114*	*99*
	N MISSING	*1*	*8*	*5*	*0*
Kessler-10	Low (score 10 - 15) N (%)	4 (2.8)	58 (48.3)	57 (50.0)	62 (62.6)
	Medium (score 16 - 29) N (%)	59 (41.0)	47 (39.2)	45 (39.5)	27 (27.3)
	High (score 30 - 50) N (%)	81 (56.3)	15 (12.5)	12 (10.5)	10 (10.1)
	N	*144*	*120*	*114*	*99*
	N MISSING	*6*	*9*	*5*	*0*
PRIME-MD Major depressive disorder	No N (%)	58 (42.3)	-	-	81 (81.8)
	Yes N (%)	79 (57.7)	-	-	18 (18.2)
	N	*137*	*-*	*-*	*99*
	N MISSING	*13*	*-*	*-*	*0*

Table 2.5: Trends - continued

		Assessment point			
		Baseline	**3 months**	**6 months**	**12 months**
PRIME-MD Minor depressive disorder	No N (%)	120 (87.6)	-	-	95 (96.0)
	Yes N (%)	17 12.4)	-	-	4 (4.0)
	N	*137*	*-*	*-*	*99*
	N MISSING	*13*	*-*	*-*	*0*
PRIME-MD Dysthymia	No N (%)	80 (58.4)	-	-	67 (67.7)
	Yes N (%)	57 (41.6)	-	-	32 (32.3)
	N	*137*	*-*	*-*	*99*
	N MISSING	*13*	*-*	*-*	*0*
PRIME-MD Bipolar disorder	No N (%)	129 (97.0)	-	-	91 (95.8)
	Yes N (%)	4 (3.0)	-	-	4 (4.2)
	N	*133*	*-*	*-*	*95*
	N MISSING	*17*	*-*	*-*	*4*
AUDIT-C	No N (%)	53 (37.6)	54 (44.6)	57 (50.0)	40 (40.4)
	Yes N (%)	88 (62.4)	67 (55.4)	57 (50.0)	59 (59.6)
	N	*141*	*121*	*114*	*99*
	N MISSING	*9*	*8*	*5*	*0*
Current tobacco smoking	No N (%)	57 (39.9)	55 (45.5)	52 (45.6)	50 (50.5)
	Yes N (%)	86 (60.1)	66 (54.6)	62 (54.4)	49 (49.5)
	N	*143*	*121*	*114*	*99*
	N MISSING	*7*	*8*	*5*	*0*
DAST	No problem N (%)	107 (77.0)	-	-	90 (91.8)
	Low N (%)	15 (10.8)	-	-	6 (6.1)
	Moderate N (%)	9 (6.5)	-	-	1 (1.0)
	Substantial N (%)	8 (5.8)	-	-	1 (1.0)
	N	*139*	*-*	*-*	*98*
	N MISSING	*11*	*-*	*-*	*1*

Table 3.1: Univariate odds ratios for uptake of services by socio-demographic characteristics

Variable	Category	Uptake of services		Univariate odds ratio		p-value
		N	(%)	OR	(95% CI)	
Marital status	Never Married	33	(24.2)	1.00		
	Married	30	(30.0)	1.34	(0.44, 4.09)	
	De facto	28	(21.4)	0.85	(0.26, 2.84)	
	Separated	15	(53.3)	3.57	(0.98, 12.97)	
	Divorced	11	(36.4)	1.79	(0.41, 7.72)	
	Widowed	4	(50.0)	3.13	(0.38, 25.92)	0.31
Age group	18-24 years	15	(33.3)	1.00		
	25-34 years	26	(23.1)	0.60	(0.15, 2.46)	
	35-44 years	34	(32.4)	0.96	(0.26, 3.48)	
	45-54 years	27	(37.0)	1.18	(0.31, 4.44)	
	55+ years	18	(27.8	0.77	(0.17, 3.41)	0.85
	Missing	*1*				
Prioritised ethnicity	Maori	53	(30.2)	0.71	(0.32, 1.60)	
	Pacific	11	(9.1)	0.17	(0.02, 1.39)	
	Asian & Other	4	(0.0)	-	-	
	European	53	(37.7)	1.00		0.39
Ethnicity - any						
European	No	61	(23.0)	1.00		
	Yes	60	(38.3)	2.09	(0.95, 4.61)	0.07
Maori	No	68	(30.9)	1.00		
	Yes	53	(30.2)	0.97	(0.44, 2.11)	0.93
Pacific	No	108	(31.5)	1.00		
	Yes	13	(23.1)	0.65	(0.17, 2.53)	0.54
Asian & Other	No	117	(31.6)	1.00		
	Yes	4	(0.0)	-	-	
Employment status	Full time	55	(32.7)	1.00		
	Part time	14	(35.7)	1.14	(0.33, 3.91)	
	Homemaker/student/retired	15	(13.3)	0.32	(0.06, 1.55)	
	Unemployed	18	(33.3)	1.03	(0.33, 3.18)	
	Disabled/illness/sick leave	8	(37.5)	1.23	(0.27, 5.74	
	Other	11	(27.3)	0.77	(0.18, 3.26)	0.78
Highest educational qualification achieved	None	35	(28.6)	1.00		
	Secondary school qual.	40	(32.5)	1.20	(0.45, 3.23)	
	Trade/technical certificate	34	(30.4)	1.09	(0.35, 3.46)	
	Professional qualification	2	(100.0)	-	-	
	Undergrad. Deg./Dip./Cert.	9	(11.1)	0.31	(0.03, 2.83)	
	University degree & above	8	(37.5)	1.50	(0.30, 7.49)	
	Other	4	(25.0)	0.83	(0.08, 9.00)	0.94
Gross family income in last 12 months	<$20,000	31	(38.7)	1.00		
	$20,000 - $30,000	21	(23.8)	0.50	(0.14, 1.71)	
	$30,001 - $50,000	24	(29.2)	0.65	(0.21, 2.04)	
	$50,001 - $100,000	21	(28.6)	0.63	(0.19, 2.08)	
	$100,001 +	11	(45.5)	1.32	(0.33, 5.30)	0.67
	Missing	*13*	-			
Area of residence	Northland	5	(40.0)	1.85	(0.27, 12.95)	
	Auckland	34	(26.5)	1.00		
	Waikato/Coromandel	8	(25.0)	0.93	(0.16, 5.45)	
	East Coast	23	(26.1)	0.98	(0.29, 3.26)	
	Taranaki/Manawatu/ Wairarapa	15	(33.3)	1.39	(0.37, 5.18)	
	Wellington	13	(30.8)	1.24	(0.30, 5.02)	
	Canterbury	16	(37.5)	1.67	(0.47, 5.92)	
	Otago/Southland	7	(42.9)	2.08	(0.39, 11.18)	0.97

Table 3.2: Univariate odds ratios for uptake of services by baseline gambling and related behaviours

Variable	Category	Uptake of services		Univariate odds ratio		p-value
		N	(%)	OR	(95% CI)	
EGMs as gambling type, dichotomised	No	14	(35.7)	1.00		
	Yes	107	(29.9)	0.77	(0.24, 2.47)	0.66
Self-reported days gambled per month in past 2 months (quartiles)	0 - 3	32	(28.1)	1.00	)	
	4 - 7	27	(18.5)	0.58	(0.17, 2.01)	
	8 - 12	33	(27.3)	0.96	(0.32, 2.84)	
	13+	27	(48.2)	2.37	(0.81, 6.98)	0.12
Self-reported amount of money lost per day in past 2 months ($)(quartiles)	0 - 13	31	(19.4)	1.00		
	14 - 28	27	(29.6)	1.75	(0.52, 5.91)	
	29 - 55	29	(31.0)	1.88	(0.57, 6.16)	
	56+	32	(40.6)	2.85	(0.92, 8.88)	0.35
Level of motivation to overcome problem (scale 1-10)	0 - 7	18	(38.9	1.00		
	8 - 9	26	(26.9)	0.58	(0.16, 2.09)	
	10	77	(29.9)	0.67	(0.23, 1.94)	0.68
Current goal, dichotomised	Quit	102	(32.4)	1.00		
	Control	19	(21.1)	0.56	(0.17, 1.81)	0.33
Belief in treatment success, dichotomised	Lower than median	63	(31.2)	1.00		
	Higher than median	52	(28.9)	0.87	(0.39, 1.94)	0.74
Perceived level of difficulty in overcoming problem (scale 1-10) (quartiles)	0 - 5	30	(26.7)	1.00		
	6 - 7	23	(30.4)	1.20	(0.36, 4.00)	
	8 - 9	29	(48.3)	2.57	(0.86, 7.62)	
	10	37	(21.6)	0.76	(0.25, 2.33)	0.13
Length of problem duration (months) (quartiles)	0 - 12	29	(20.7)	1.00		
	13 - 36	29	(31.0)	1.73	(0.52, 5.69)	
	37 - 120	39	(38.5)	2.40	(0.79, 7.24)	
	121+	22	(31.8)	1.79	(0.50, 6.37)	0.49
Number of days since last gamble	0 - 1	64	(29.7)	1.00		
	2 - 4	28	(35.7)	1.32	(0.51, 3.37)	
	5+	29	(27.6)	0.90	(0.34, 2.39)	0.78
Current assistance for gambling prob.	No	94	(27.8)	1.00		
	Yes	23	(39.1)	1.52	(0.59, 3.91)	0.39

Table 3.3: Univariate odds ratios for uptake of services by other baseline covariates

Variable	Category	Uptake of services		Univariate odds ratio		p-value
		N	(%)	OR	(95% CI)	
PGSI-12 (12 month time frame) (quartiles)	0 - 14	26	(34.6)	1.00		
	15 - 17	25	(40.0)	1.26	(0.40, 3.93)	
	18 - 20	36	(22.2)	0.54	(0.18, 1.67)	
	21+	31	(29.0)	0.77	(0.25, 2.37)	0.49
PGSI-3 (3 month time frame) (quartiles)	0 - 14	25	(32.0)	1.00		
	15 - 17	28	(32.1)	1.01	(0.32, 3.20)	
	18 - 20	28	(28.6)	0.85	(0.26, 2.75)	
	21+	34	(35.3)	1.16	(0.39, 3.47)	0.96
Kessler-10 (quartiles)	12 - 23	31	(32.3)	1.00		
	24 - 31	22	(36.4)	1.20	(0.38, 3.79)	
	32 - 36	30	(23.3)	0.64	(0.21, 1.98)	
	37+	32	(25.0)	0.70	(0.23, 2.10)	0.69
Audit-C, dichotomised	Low risk	42	(26.2)	1.00		
	High risk	70	(32.9)	1.38	(0.59, 3.23)	0.46
DAST, dichotomised	No	86	(33.7)	1.00		
	Yes	25	(24.0)	0.62	(0.22, 1.72)	0.36
Suicide ideation	No	82	(30.5)	1.00		
	Yes	39	(30.8)	1.01	(0.44, 2.32)	0.97
Prime MD - Major depressive disorder	No	51	(35.3)	1.00		
	Yes	64	(26.6)	0.66	(0.30, 1.47)	0.31
Prime MD - Dysthymia	No	67	(31.3)	1.00		
	Yes	48	(29.2)	0.90	(0.40, 2.03)	0.80
Prime MD - Minor depressive disorder	No	101	(30.7)	1.00		
	Yes	14	(28.6)	0.90	(0.26, 3.10)	0.87
Tobacco - Current smoking	No	47	(40.4)	1.00		
	Yes	69	(26.1)	0.52	(0.24, 1.15)	0.11
WHOQoL (quartiles)	0 - 20	25	(12.0)	1.00		
	21 - 25	28	(42.9)	5.50	(1.33, 22.73)	
	26 - 29	29	(37.9)	4.48	(1.08, 18.54)	
	30+	33	(30.3)	3.19	(0.77, 13.14)	0.11
NZDI (quartiles)	0 - 0.58	30	(36.7)	1.00		
	0.59 - 1.23	27	(29.6)	0.73	(0.24, 2.21)	
	1.24 - 2.37	25	(20.0)	0.43	(0.13, 1.48)	
	2.38+	26	(34.6)	0.91	(0.31, 2.74)	0.57
Treatment - drugs/ alcohol in last year	No	107	(31.8)	1.00		
	Yes	8	(12.5)	0.31	(0.04, 2.59)	0.28
How was work affected in past month? (10 point scale) (quartiles)	0	48	(25.0)	1.00		
	1 - 2	14	(35.7)	1.67	(0.47, 6.00)	
	3 - 6	18	(50.0)	3.00	(0.97, 9.30)	
	7 - 10	24	(25.0)	1.00	(0.32, 3.10)	0.24
How was social life affected in past month? (10 point scale) (quartiles)	0 - 1	29	(31.0)	1.00		
	2 - 5	28	(35.7)	1.24	(0.41, 3.72)	
	6 - 8	43	(27.9)	0.86	(0.31, 2.41)	
	9 - 10	20	(30.0)	0.95	(0.28, 3.29)	0.92
How was family/ home affected in past month? (10 point scale) (quartiles)	0 - 4	28	(21.4)	1.00		
	5 - 7	35	(37.1)	2.17	(0.70, 6.73)	
	8 - 9	30	(33.3)	1.83	(0.56, 5.96)	
	10	28	(28.6)	1.47	(0.43, 4.97)	0.58
How was health affected in past month? (10 point scale) (quartiles)	0 - 3	35	(31.4)	1.00		
	4 - 6	32	(40.6)	1.49	(0.55, 4.07)	
	7 - 8	33	(27.3)	0.82	(0.29, 2.33)	
	9 - 10	19	(21.1)	0.58	(0.16, 2.16)	0.49
Legal problems in past 12 months	No	102	(32.4)	1.00		
	Yes	15	(26.7)	0.76	(0.23, 2.57)	0.66

Table 4.1: PGSI-12 change at 12-month assessment by socio-demographic characteristics

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
Gender	Female	-7.66	0.80	
	Male	-6.68	0.91	0.427
Marital status	Never Married	-5.26	1.13	
	Married	-9.00	1.12	
	De facto	-8.69	1.25	
	Separated	-7.55	1.77	
	Divorced	-3.94	1.60	
	Widowed	-10.72	3.21	0.038
Age group	18-24 years	-9.48	2.07	
	25-34 years	-6.65	1.27	
	35-44 years	-7.38	1.15	
	45-54 years	-6.30	1.19	
	55+ years	-8.10	1.52	0.669
Prioritised ethnicity	Maori	-7.27	0.96	
	Pacific	-9.81	2.36	
	Asian & Other	-9.65	2.96	
	European	-6.66	0.86	0.512
Ethnicity - any				
European	No	-7.81	0.91	
	Yes	-6.79	0.80	0.403
Maori	No	-7.19	0.78	
	Yes	-7.30	0.96	0.929
Pacific	No	-7.10	0.62	
	Yes	-8.87	2.18	0.440
Asian & Other	No	-7.13	0.61	
	Yes	-9.68	2.95	0.401
Highest educational qualification achieved	None	-6.17	1.16	
	Secondary school qual.	-7.33	1.04	
	Trade/technical certificate	-7.16	1.37	
	Professional qualification	-11.52	3.35	
	Undergrad. Deg./Dip./Cert.	-5.40	2.19	
	University degree & above	-9.28	2.05	
	Other	-11.55	4.10	0.515
Gross family income in last 12 months	<$20,000	-5.13	1.24	
	$20,000 - $30,000	-7.48	1.63	
	$30,001 - $50,000	-8.14	1.30	
	$50,001 - $100,000	-7.13	1.21	
	$100,001 +	-9.92	1.71	0.223
Area of residence	Northland	-6.33	2.62	
	Auckland	-6.62	1.20	
	Waikato/Coromandel	-6.78	2.22	
	East Coast	-6.89	1.55	
	Taranaki/Manawatu/ Wairarapa	-6.37	1.63	
	Wellington	-8.59	1.70	
	Canterbury	-6.93	1.77	
	Southland	-10.94	2.26	0.773

Table 4.2: PGSI-12 change at 12-month assessment by baseline gambling and related behaviours

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
Self-reported days gambled per month in past 2 months (quartiles)	0 - 3	-6.92	1.19	
	4 - 7	-6.78	1.24	
	8 - 12	-6.93	1.14	
	13+	-8.59	1.27	0.707
Self-reported amount of money lost per day in past 2 months ($)(quartiles)	0 - 13	-6.39	1.20	
	14 - 28	-7.49	1.31	
	29 - 55	-7.32	1.28	
	56+	-7.82	1.11	0.849
Control over gambling	0-1	-7.66	1.02	
	2-3	-5.09	1.19	
	4-5	-8.48	1.34	
	6+	-7.85	1.32	0.219
Level of motivation to overcome problem (scale 1-10)	0 - 7	-7.37	1.85	
	8 - 9	-7.83	1.24	
	10	-7.00	0.74	0.847
Current goal, dichotomised	Quit	-7.25	0.66	
	Control	-7.14	1.42	0.943
Belief in treatment success, dichotomised	Lower than median	-8.11	0.83	
	Higher than median	-6.90	0.89	0.326
Perceived level of difficulty in overcoming problem (scale 1-10) (quartiles)	0 - 5	-7.75	1.26	
	6 - 7	-6.93	1.43	
	8 - 9	-7.38	1.18	
	10	-7.14	1.12	0.974
Length of problem duration (months) (quartiles)	0 - 12	-7.21	1.28	
	13 - 36	-8.38	1.28	
	37 - 120	-7.09	1.05	
	121+	-6.43	1.31	0.755
Current assistance for gambling prob.	No	-7.13	0.68	
	Yes	-7.36	1.36	0.881
Prev. assist. for gambling prob.	No	-7.95	0.77	
	Yes	-5.27	1.14	0.056

Table 4.3: PGSI-12 change at 12-month assessment by other baseline covariates

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
Kessler-10 (quartiles)	12 - 23	-7.82	1.25	
	24 - 31	-7.64	1.18	
	32 - 36	-6.47	1.21	
	37+	-7.86	1.50	0.834
Audit-C, dichotomised	Low risk	-6.89	0.95	
	High risk	-7.47	0.78	0.640
DAST, dichotomised	No	-7.08	0.71	
	Yes	-7.82	1.49	0.658
Suicide ideation	No	-6.99	0.71	
	Yes	-7.82	1.09	0.527
Prime MD - Dysthymia	No	-7.60	0.78	
	Yes	-6.80	1.01	0.544
Tobacco - Current smoking	No	-6.65	0.88	
	Yes	-7.45	0.86	0.517
WHOQoL (quartiles)	0 - 20	-5.92	1.54	
	21 - 25	-7.14	1.23	
	26 - 29	-7.25	1.22	
	30+	-7.96	1.25	0.815
Treatment - drugs/ alcohol in last year	No	-7.46	0.62	
	Yes	-5.64	2.57	0.494
How was work affected in past month? (10 point scale) (quartiles)	0	-7.65	1.01	
	1 - 2	-7.93	1.72	
	3 - 6	-6.39	1.59	
	7 - 10	-6.91	1.37	0.894
How was social life affected in past month? (10 point scale) (quartiles)	0 - 1	-7.80	1.33	
	2 - 5	-8.10	1.26	
	6 - 8	-7.03	1.01	
	9 - 10	-5.46	1.54	0.603
How was family/home affected in past month? (10 point scale) (quartiles)	0 - 4	-7.89	1.45	
	5 - 7	-8.25	1.02	
	8 - 9	-7.12	1.19	
	10	-4.96	1.45	0.367
How was health affected in past month? (10 point scale) (quartiles)	0 - 3	-9.17	1.24	
	4 - 6	-7.06	1.11	
	7 - 8	-6.57	1.08	
	9 - 10	-5.47	1.83	0.350
Legal problems in past 12 months	No	-7.03	0.64	
	Yes	-7.83	1.90	0.695

APPENDIX 5
Predictors of successful problem gambling outcomes: days gambled

Table 5.1: Days gambled change by socio-demographic characteristics

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
Gender	Female	-5.87	0.41	
	Male	-6.68	0.47	0.20
Marital status, dichotomised	Partnered	-5.95	0.40	
	Not partnered	-6.39	0.42	0.45
Age group	18-24 years	-6.16	0.84	
	25-34 years	-6.31	0.63	
	35-44 years	-6.51	0.57	
	45-54 years	-5.51	0.62	
	55+ years	-6.08	0.76	0.82
Prioritised ethnicity	Maori	-5.83	0.45	
	Pacific	-6.13	0.98	
	Asian & Other	-7.86	1.61	
	European	-6.35	0.43	0.61
Ethnicity - any European	No	-6.31	0.42	
	Yes	-6.01	0.41	0.61
Maori	No	-6.40	0.38	
	Yes	-5.83	0.45	0.34
Pacific	No	-6.13	0.31	
	Yes	-6.41	0.94	0.77
Asian & Other	No	-6.10	0.29	
	Yes	-7.84	1.60	0.28
Employment status	Full time	-6.14	0.43	
	Part time	-4.70	0.85	
	Homemaker/student/retired	-7.09	0.80	
	Unemployed	-7.14	0.76	
	Disabled/illness/sick leave	-4.65	1.13	
	Other	-6.27	0.93	0.17
Highest educational qualification achieved	None	-5.45	0.57	
	Secondary school qual.	-6.20	0.51	
	Trade/technical certificate	-6.57	0.67	
	Professional qualification	-8.56	1.85	
	Undergrad. Deg./Dip./Cert.	-6.74	0.98	
	University degree & above	-6.45	1.06	
	Other	-5.02	1.63	0.60
Gross family income in last 12 months	<$20,000	-6.10	0.62	
	$20,000 - $30,000	-5.65	0.78	
	$30,001 - $50,000	-6.93	0.67	
	$50,001 - $100,000	-6.94	0.66	
	$100,001 +	-6.69	0.94	0.64
Area of residence	Northland	-7.91	1.43	
	Auckland	-6.05	0.56	
	Waikato/Coromandel	-3.91	1.14	
	East Coast	-5.91	0.68	
	Taranaki/Manawatu/ Wairarapa	-6.54	0.86	
	Wellington	-6.03	0.79	
	Canterbury	-7.10	0.79	
	Southland	-6.02	1.21	0.41

Table 5.2: Days gambled change by baseline gambling and related behaviours

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
EGMs as gambling type, dichotomised	No	-5.87	0.88	
	Yes	-6.19	0.31	0.73
PGSI-12 (12 month time frame) (quartiles)	0 - 14	-5.90	0.55	
	15 - 17	-6.99	0.53	
	18 - 20	-5.91	0.62	
	21+	-5.65	0.65	0.33
Self-reported amount of money lost per day in past 2 months ($)(quartiles)	0 - 13	-5.83	0.62	
	14 - 28	-5.93	0.60	
	29 - 55	-5.70	0.58	
	56+	-7.06	0.58	0.33
Control over gambling	0-1	-6.53	0.52	
	2-3	-5.63	0.59	
	4-5	-6.10	0.63	
	6+	-6.51	0.65	0.66
Level of motivation to overcome problem (scale 1-10)	0 - 7	-6.77	0.80	
	8 - 9	-5.91	0.62	
	10	-6.12	0.37	0.69
Current goal, dichotomised	Quit	-6.20	0.32	
	Control	-5.95	0.73	0.76
Belief in treatment success, dichotomised	Lower than median	-5.99	0.41	
	Higher than median	-6.49	0.44	0.41
Perceived level of difficulty in overcoming problem (scale 1-10) (quartiles)	0 - 5	-6.98	0.58	
	6 - 7	-6.10	0.66	
	8 - 9	-5.86	0.56	
	10	-5.29	0.54	0.20
Length of problem duration (months) (quartiles)	0 - 12	-6.33	0.60	
	13 - 36	-5.78	0.61	
	37 - 120	-5.71	0.50	
	121+	-6.57	0.66	0.69
Number of days since last gamble	0 - 1	-5.96	0.39	
	2 - 4	-5.88	0.61	
	5+	-6.91	0.63	0.40
Current assistance for gambling prob.	No	-6.13	0.33	
	Yes	-6.84	0.69	0.36
Prev. assist. for gambling prob.	No	-6.00	0.38	
	Yes	-6.50	0.57	0.46

Table 5.3: Days gambled change by other baseline covariates

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
Kessler-10 (quartiles)	12 - 23	-6.72	0.58	
	24 - 31	-6.46	0.61	
	32 - 36	-6.90	0.61	
	37+	-5.41	0.61	0.30
Audit-C, dichotomised	Low risk	-6.23	0.39	
	High risk	-6.14	0.36	0.85
DAST, dichotomised	No	-6.22	0.34	
	Yes	-6.39	0.68	0.82
Suicide ideation	No	-6.13	0.35	
	Yes	-6.22	0.51	0.89
Prime MD - Major depressive disorder	No	-6.66	0.44	
	Yes	-5.74	0.39	0.12
Prime MD - Minor depressive disorder	No	-6.03	0.32	
	Yes	-7.00	0.84	0.28
Prime MD - Dysthymia	No	-6.25	0.38	
	Yes	-6.00	0.47	0.68
Tobacco - Current smoking	No	-5.93	0.47	
	Yes	-6.21	0.40	0.62
WHOQoL (quartiles)	0 - 20	-4.57	0.64	
	21 - 25	-6.48	0.59	
	26 - 29	-6.36	0.57	
	30+	-6.56	0.57	0.07
NZDI (quartiles)	0 - 0.58	-6.19	0.60	
	0.59 - 1.23	-6.66	0.63	
	1.24 - 2.37	-5.65	0.63	
	2.38+	-6.44	0.67	0.71
Treatment, mental health last year	No	-6.15	0.33	
	Yes	-6.21	0.60	0.93
Prescription, mental health last year	No	-6.33	0.35	
	Yes	-6.35	0.65	0.98
Treatment - drugs/ alcohol in last year	No	-6.27	0.31	
	Yes	-4.24	1.16	0.09
How was work affected in past month? (10 point scale) (quartiles)	0	-6.37	0.50	
	1 - 2	-6.12	0.87	
	3 - 6	-7.18	0.83	
	7 - 10	-5.91	0.71	0.69
How was social life affected in past month? (10 point scale) (quartiles)	0 - 1	-6.16	0.58	
	2 - 5	-6.58	0.59	
	6 - 8	-6.17	0.49	
	9 - 10	-4.85	0.73	0.31
How was family/home affected in past month? (10 point scale) (quartiles)	0 - 4	-6.29	0.63	
	5 - 7	-6.15	0.51	
	8 - 9	-6.31	0.59	
	10	-5.85	0.64	0.95
How was health affected in past month? (10 point scale) (quartiles)	0 - 3	-6.88	0.53	
	4 - 6	-5.92	0.57	
	7 - 8	-5.46	0.54	
	9 - 10	-6.04	0.74	0.31
Legal problems in past 12 months	No	-6.32	0.32	
	Yes	-6.22	0.87	0.92

Predictors of successful problem gambling outcomes: money lost

Table 6.1: Money lost change by socio-demographic characteristics

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
Gender	Female	-36.71	1.54	
	Male	-40.23	1.77	0.14
Marital status	Never Married	-37.47	2.14	
	Married	-41.82	2.24	
	De facto	-33.81	2.30	
	Separated	-36.95	3.21	
	Divorced	-37.47	3.50	
	Widowed	-32.88	5.52	0.22
Marital status, dichotomised	Partnered	-37.01	1.54	
	Not partnered	-37.93	1.62	0.68
Age group	18-24 years	-33.06	3.20	
	25-34 years	-37.08	2.38	
	35-44 years	-39.76	2.16	
	45-54 years	-35.71	2.34	
	55+ years	-39.17	2.79	0.41
Prioritised ethnicity	Maori	-36.50	1.72	
	Pacific	-37.74	3.82	
	Asian & Other	-42.73	6.34	
	European	-37.87	1.65	0.79
Ethnicity - any European	No	-37.32	1.60	
	Yes	-37.56	1.55	0.92
Maori	No	-38.13	1.46	
	Yes	-36.52	1.71	0.48
Pacific	No	-37.34	1.17	
	Yes	-38.43	3.65	0.78
Asian & Other	No	-37.26	1.13	
	Yes	-42.71	6.30	0.40
Employment status	Full time	-37.88	1.71	
	Part time	-38.15	3.37	
	Homemaker/student/retired	-38.69	3.19	
	Unemployed	-35.78	2.96	
	Disabled/illness/sick leave	-35.73	4.50	
	Other	-36.55	3.70	0.98
Highest educational qualification achieved	None	-38.87	2.22	
	Secondary school qual.	-35.46	1.98	
	Trade/technical certificate	-38.16	2.62	
	Professional qualification	-44.79	7.10	
	Undergrad. Deg./Dip./Cert.	-39.18	3.81	
	University degree & above	-35.81	4.09	
	Other	-35.29	6.26	0.80
Gross family income in last 12 months	<$20,000	-37.55	2.20	
	$20,000 - $30,000	-34.86	2.69	
	$30,001 - $50,000	-38.12	2.30	
	$50,001 - $100,000	-37.73	2.28	
	$100,001 +	-38.21	3.33	0.90
Area of residence	Northland	-43.66	5.53	
	Auckland	-37.91	2.17	
	Waikato/Coromandel	-34.16	4.39	
	East Coast	-37.97	2.67	
	Taranaki/Manawatu/ Wairarapa	-36.54	3.31	
	Wellington	-34.18	3.05	
	Canterbury	-37.35	3.07	
	Southland	-42.56	4.67	0.74

Table 6.2: Money lost change by baseline gambling and related behaviours

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
EGMs as gambling type, dichotomised	No	-39.23	3.43	
	Yes	-37.22	1.19	0.58
Self-reported days gambled per month in past 2 months (quartiles)	0 - 3	-40.86	2.22	
	4 - 7	-35.49	2.36	
	8 - 12	-36.26	2.16	
	13+	-36.80	2.35	0.33
Control over gambling	0-1	-36.97	1.98	
	2-3	-35.34	2.26	
	4-5	-40.53	2.43	
	6+	-38.76	2.49	0.43
Level of motivation to overcome problem (scale 1-10)	0 - 7	-38.18	3.10	
	8 - 9	-36.84	2.35	
	10	-37.51	1.40	0.94
Current goal, dichotomised	Quit	-37.17	1.21	
	Control	-38.87	2.78	0.58
Belief in treatment success, dichotomised	Lower than median	-38.82	1.58	
	Higher than median	-38.37	1.69	0.85
Perceived level of difficulty in overcoming problem (scale 1-10) (quartiles)	0 - 5	-40.04	2.25	
	6 - 7	-34.88	2.55	
	8 - 9	-36.48	2.16	
	10	-34.18	2.11	0.25
Length of problem duration (months) (quartiles)	0 - 12	-37.27	2.33	
	13 - 36	-37.20	2.37	
	37 - 120	-37.02	1.96	
	121+	-39.67	2.57	0.85
Number of days since last gamble	0 - 1	-36.02	1.47	
	2 - 4	-36.55	2.34	
	5+	-41.91	2.33	0.10
Current assistance for gambling prob.	No	-37.47	1.27	
	Yes	-40.86	2.61	0.25
Prev. assist. for gambling prob.	No	-38.58	1.52	
	Yes	-39.38	2.31	0.77

Table 6.3: Money lost change by other baseline covariates

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
Kessler-10 (quartiles)	12 - 23	-38.31	2.32	
	24 - 31	-39.41	2.35	
	32 - 36	-39.48	2.41	
	37+	-36.36	2.38	0.77
Audit-C, dichotomised	Low risk	-39.40	1.45	
	High risk	-36.65	1.34	0.14
DAST, dichotomised	No	-38.58	1.33	
	Yes	-36.73	2.66	0.54
Suicide ideation	No	-38.39	1.35	
	Yes	-35.47	1.95	0.22
Prime MD - Minor depressive disorder	No	-37.26	1.21	
	Yes	-42.84	3.22	0.11
Prime MD - Dysthymia	No	-38.90	1.46	
	Yes	-36.54	1.79	0.31
Tobacco - Current smoking	No	-37.49	1.80	
	Yes	-37.84	1.53	0.88
WHOQoL (quartiles)	0 - 20	-32.08	2.46	
	21 - 25	-37.58	2.28	
	26 - 29	-40.06	2.22	
	30+	-39.88	2.20	0.07
NZDI (quartiles)	0 - 0.58	-41.69	2.24	
	0.59 - 1.23	-39.45	2.31	
	1.24 - 2.37	-36.51	2.34	
	2.38+	-38.66	2.55	0.47
Treatment, mental health last year	No	-38.03	1.28	
	Yes	-36.49	2.32	0.56
Prescription, mental health last year	No	-37.54	1.36	
	Yes	-38.34	2.53	0.78
Treatment - drugs/ alcohol in last year	No	-38.92	1.20	
	Yes	-33.48	4.53	0.25
How was work affected in past month? (10 point scale) (quartiles)	0	-40.05	1.81	
	1 - 2	-42.27	3.15	
	3 - 6	-40.17	2.99	
	7 - 10	-36.93	2.55	0.59
How was social life affected in past month? (10 point scale) (quartiles)	0 - 1	-37.68	2.23	
	2 - 5	-40.13	2.27	
	6 - 8	-37.93	1.87	
	9 - 10	-31.60	2.78	0.12
How was family/home affected in past month? (10 point scale) (quartiles)	0 - 4	-38.51	2.40	
	5 - 7	-39.11	1.94	
	8 - 9	-37.05	2.23	
	10	-34.20	2.43	0.43
How was health affected in past month? (10 point scale) (quartiles)	0 - 3	-40.58	2.07	
	4 - 6	-37.47	2.20	
	7 - 8	-36.25	2.11	
	9 - 10	-35.50	2.89	0.40
Legal problems in past 12 months	No	-38.54	1.22	
	Yes	-37.44	3.32	0.76

APPENDIX 7
Predictors of successful problem gambling outcomes: control over gambling

Table 7.1: Control over gambling change by socio-demographic characteristics

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
Gender	Female	3.77	0.32	
	Male	4.20	0.37	0.39
Marital status	Never Married	3.04	0.43	
	Married	4.84	0.43	
	De facto	3.96	0.46	
	Separated	3.62	0.63	
	Divorced	3.35	0.70	
	Widowed	3.66	1.09	0.09
Age group	18-24 years	3.26	0.66	
	25-34 years	4.00	0.49	
	35-44 years	4.06	0.44	
	45-54 years	3.71	0.47	
	55+ years	3.98	0.56	0.87
Prioritised ethnicity	Maori	3.77	0.34	
	Pacific	5.47	0.78	
	Asian & Other	4.72	1.21	
	European	3.53	0.33	0.13
Ethnicity - any European	No	4.07	0.32	
	Yes	3.60	0.31	0.30
Maori	No	3.87	0.30	
	Yes	3.78	0.34	0.83
Pacific	No	3.72	0.23	
	Yes	4.85	0.71	0.13
Asian & Other	No	3.80	0.23	
	Yes	4.68	1.23	0.48
Employment status	Full time	4.00	0.33	
	Part time	3.11	0.67	
	Homemaker/student/retired	4.07	0.63	
	Unemployed	3.84	0.60	
	Disabled/illness/sick leave	2.75	0.88	
	Other	4.25	0.73	0.65
Highest educational qualification achieved	None	3.78	0.43	
	Secondary school qual.	3.41	0.40	
	Trade/technical certificate	4.26	0.52	
	Professional qualification	5.15	1.44	
	Undergrad. Deg./Dip./Cert.	3.70	0.79	
	University degree & above	4.37	0.79	
	Other	3.90	1.27	0.78
Gross family income in last 12 months	<$20,000	3.43	0.45	
	$20,000 - $30,000	3.58	0.59	
	$30,001 - $50,000	3.87	0.48	
	$50,001 - $100,000	4.41	0.49	
	$100,001 +	4.71	0.69	0.43
Area of residence	Northland	3.92	1.11	
	Auckland	4.23	0.42	
	Waikato/Coromandel	2.46	0.87	
	East Coast	3.49	0.52	
	Taranaki/Manawatu/ Wairarapa	3.16	0.65	
	Wellington	3.68	0.60	
	Canterbury	4.23	0.62	
	Southland	5.28	0.92	0.37

Table 7.2: Control over gambling change by baseline gambling and related behaviours

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
EGMs as gambling type, dichotomised	No	3.73	0.66	
	Yes	3.84	0.24	0.88
PGSI-12 (12 month time frame) (quartiles)	0 - 14	4.30	0.42	
	15 - 17	4.39	0.40	
	18 - 20	3.28	0.47	
	21+	2.99	0.50	0.06
Self-reported days gambled per month in past 2 months (quartiles)	0 - 3	4.02	0.44	
	4 - 7	3.97	0.48	
	8 - 12	3.64	0.43	
	13+	3.83	0.45	0.93
Self-reported amount of money lost per day in past 2 months ($)(quartiles)	0 - 13	3.85	0.45	
	14 - 28	3.80	0.47	
	29 - 55	3.48	0.45	
	56+	4.26	0.42	0.66
Level of motivation to overcome problem (scale 1-10)	0 - 7	3.31	0.62	
	8 - 9	3.47	0.46	
	10	4.06	0.28	0.37
Current goal, dichotomised	Quit	3.78	0.24	
	Control	4.11	0.56	0.59
Length of problem duration (months) (quartiles)	0 - 12	4.05	0.48	
	13 - 36	3.66	0.46	
	37 - 120	3.74	0.39	
	121+	3.92	0.51	0.94
Number of days since last gamble	0 - 1	3.51	0.30	
	2 - 4	3.92	0.47	
	5+	4.47	0.45	0.21
Current assistance for gambling prob.	No	3.67	0.25	
	Yes	4.59	0.53	0.11
Prev. assist. for gambling prob.	No	3.77	0.30	
	Yes	3.51	0.45	0.63

Table 7.3: Control over gambling change by other baseline covariates

Variable	Category	Estimated least squares mean diff.	Standard error	p-value
Audit-C, dichotomised	Low risk	4.12	0.29	
	High risk	3.60	0.27	0.14
DAST, dichotomised	No	3.92	0.26	
	Yes	3.82	0.51	0.86
Suicide ideation	No	4.09	0.27	
	Yes	3.29	0.39	0.10
Prime MD - Minor depressive disorder	No	3.78	0.24	
	Yes	4.62	0.66	0.23
Tobacco - Current smoking	No	3.72	0.35	
	Yes	4.10	0.30	0.41
Prescription, mental health last year	No	3.91	0.27	
	Yes	3.27	0.49	0.26
Treatment - drugs/ alcohol in last year	No	3.84	0.24	
	Yes	3.87	0.88	0.97
How was work affected in past month? (10 point scale) (quartiles)	0	3.91	0.36	
	1 - 2	4.57	0.63	
	3 - 6	3.08	0.58	
	7 - 10	3.42	0.51	0.32
How was social life affected in past month? (10 point scale) (quartiles)	0 - 1	4.53	0.46	
	2 - 5	3.90	0.45	
	6 - 8	3.89	0.37	
	9 - 10	3.00	0.56	0.21
How was family/home affected in past month? (10 point scale) (quartiles)	0 - 4	4.48	0.50	
	5 - 7	3.85	0.39	
	8 - 9	3.88	0.44	
	10	3.10	0.48	0.27
Legal problems in past 12 months	No	3.95	0.24	
	Yes	3.19	0.66	0.28

Predictors of successful problem gambling outcomes: treatment success

Table 8.1: Univariate odds ratios for treatment success by socio-demographic characteristics

Variable	Category	Univariate odds ratios		p-value
		OR	95% CI	
Gender	Female	0.38	(0.12, 1.18)	
	Male	1.00		0.09
Marital status	Never Married	0.87	(0.07, 11.24)	
	Married	2.07	(0.14, 30.91)	
	De facto	0.73	(0.06, 9.55)	
	Separated	0.37	(0.03, 5.26)	
	Divorced	1.14	(0.07, 19.64)	
	Widowed	1.00		0.49
Marital status, dichotomised	Partnered	0.64	(0.25, 1.64)	
	Not partnered	1.00		0.35
Age group	18-24 years	0.28	(0.03, 2.60)	
	25-34 years	0.23	(0.03, 1.68)	
	35-44 years	0.38	(0.05, 2.81)	
	45-54 years	0.21	(0.03, 1.53)	
	55+ years	1.00		0.56
Prioritised ethnicity	Maori	0.12	(<0.001, 17.03)	
	Pacific	0.22	(0.00, 41.78)	
	Asian & Other	1.00		0.44
	European	0.24	(0.00, 35.60)	
Ethnicity - any European	No	0.51	(0.20, 1.30)	
	Yes	1.00		0.16
Maori	No	2.14	(0.84, 5.47)	
	Yes	1.00		0.11
Pacific	No	1.24	(0.27, 5.61)	
	Yes	1.00		0.78
Asian & Other	No	0.17	(0.00, 23.97)	
	Yes	1.00		0.48
Employment status	Full time	2.91	(0.58, 14.66)	
	Part time	1.20	(0.18, 7.90)	
	Homemaker/student/retired	1.55	(0.22, 10.73)	
	Unemployed	0.82	(0.15, 4.64)	
	Disabled/illness/sick leave	0.60	(0.08, 4.83)	
	Other	1.00		0.37
Highest educational qualification achieved	None			
	Secondary school qual.			
	Trade/technical certificate			
	Professional qualification	Number of observations too small		
	Undergrad. Deg./Dip./Cert.			
	University degree & above			
	Other			
Gross family income in last 12 months	<$20,000	0.23	(0.03, 1.88)	
	$20,000 - $30,000	0.44	(0.05, 4.29)	
	$30,001 - $50,000	0.42	(0.05, 3.74)	
	$50,001 - $100,000	1.32	(0.11, 15.48)	
	$100,001 +	1.00		0.28
Area of residence	Northland	2.12	(0.06, 71.02)	
	Auckland	1.37	(0.16, 11.92)	
	Waikato/Coromandel	0.85	(0.06, 11.13)	
	East Coast	0.66	(0.08, 5.69)	
	Taranaki/Manawatu/ Wairarapa	0.98	(0.10, 9.92)	
	Wellington	0.70	(0.07, 6.51)	
	Canterbury	0.85	(0.09, 8.37)	
	Southland	1.00		0.98

Table 8.2: Univariate odds ratios for treatment success by baseline gambling and related behaviours

Variable	Category	Univariate odds ratios		p-value
		OR	95% CI	
EGMs as gambling type, dichotomised	No	1.76	(0.32, 9.77)	
	Yes	1.00		0.52
PGSI-12 (12 month time frame) (quartiles)	0 - 14	1.77	(0.51, 6.17)	
	15 - 17	7.58	(1.43, 40.18)	
	18 - 20	1.73	(0.47, 6.36)	
	21+	1.00		0.13
Control over gambling	0-1	1.80	(0.48, 6.71)	
	2-3	1.01	(0.28, 3.67)	
	4-5	1.34	(0.33, 5.45)	
	6+	1.00		0.78
Level of motivation to overcome problem (scale 1-10)	0 - 7	1.01	(0.26, 3.98)	
	8 - 9	1.12	(0.35, 3.54)	
	10	1.00		0.98
Current goal, dichotomised	Quit	0.62	(0.15, 2.53)	0.50
	Control	1.00		
Belief in treatment success, dichotomised	Lower than median	1.56	(0.59, 4.10)	
	Higher than median	1.00		0.36
Perceived level of difficulty in overcoming problem (scale 1-10) (quartiles)	0 - 5	1.36	(0.37, 5.00)	
	6 - 7	1.16	(0.30, 4.51)	
	8 - 9	1.06	(0.32, 3.54)	
	10	1.00		0.97
Length of problem duration (months) (quartiles)	0 - 12	1.47	(0.37, 5.85)	
	13 - 36	1.16	(0.31, 4.41)	
	37 - 120	1.52	(0.42, 5.45)	
	121+	1.00		0.91
Number of days since last gamble	0 - 1	0.83	(0.26, 2.67)	
	2 - 4	1.02	(0.24, 4.27)	
	5+	1.00		0.92
Current assistance for gambling prob.	No	0.94	(0.28, 3.13)	
	Yes	1.00		0.92
Prev. assist. for gambling prob.	No	1.16	(0.40, 3.33)	
	Yes	1.00		0.79

Table 8.3: Univariate odds ratios for treatment success by other baseline covariates

Variable	Category	Univariate odds ratios		p-value
		OR	95% CI	
Kessler-10 (quartiles)	12 - 23	0.97	(0.26, 3.57)	
	24 - 31	1.05	(0.28, 3.93)	
	32 - 36	1.35	(0.34, 5.41)	
	37+	1.00		0.96
Audit-C, dichotomised	Low risk	1.09	(0.40, 2.99)	
	High risk	1.00		0.86
DAST, dichotomised	No	1.44	(0.46, 4.48)	
	Yes	1.00		0.53
Suicide ideation	No	0.92	(0.34, 2.52)	
	Yes	1.00		0.87
Prime MD - Major depressive disorder	No	1.21	(0.46, 3.15)	
	Yes	1.00		0.70
Prime MD - Minor depressive disorder	No	0.79	(0.18, 3.58)	
	Yes	1.00		0.76
Prime MD - Dysthymia	No	1.38	(0.53, 3.58)	
	Yes	1.00		0.51
Tobacco - Current smoking	No	0.68	(0.27, 1.72)	
	Yes	1.00		0.41
WHOQoL (quartiles)	0 - 20	0.47	(0.14, 1.57)	
	21 - 25	2.07	(0.50, 0.50)	
	26 - 29	2.29	(0.54, 0.54)	
	30+	1.00		0.09
NZDI (quartiles)	0 - 0.58	5.60	(1.10, 28.47)	
	0.59 - 1.23	4.01	(0.84, 19.25)	
	1.24 - 2.37	1.04	(0.30, 3.64)	
	2.38+	1.00		0.07
Treatment, mental health last year	No	1.83	(0.66, 5.03)	
	Yes	1.00		0.24
Prescription, mental health last year	No	1.79	(0.62, 5.14)	
	Yes	1.00		0.28
Treatment - drugs/ alcohol in last year	No	1.55	(0.28, 8.69)	
	Yes	1.00		0.62
How was work affected in past month? (10 point scale) (quartiles)	0	1.92	(0.56, 6.64)	
	1 - 2	2.15	(0.38, 12.19)	
	3 - 6	1.21	(0.28, 5.28)	
	7 - 10	1.00		0.69
How was social life affected in past month? (10 point scale) (quartiles)	0 - 1	1.48	(0.35, 6.21)	
	2 - 5	1.41	(0.34, 5.84)	
	6 - 8	1.66	(0.44, 6.34)	
	9 - 10	1.00		0.90
How was family/home affected in past month? (10 point scale) (quartiles)	0 - 4	1.21	(0.31, 4.70)	
	5 - 7	2.32	(0.61, 8.82)	
	8 - 9	1.21	(0.34, 4.35)	
	10	1.00		0.62
How was health affected in past month? (10 point scale) (quartiles)	0 - 3	1.34	(0.33, 5.39)	
	4 - 6	1.37	(0.33, 5.65)	
	7 - 8	2.07	(0.48, 9.00)	
	9 - 10	1.00		0.80
Legal problems in past 12 months	No	1.79	(0.50, 6.46)	
	Yes	1.00		0.37