GAMBLING & ADDICTIONS RESEARCH CENTRE
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AN OUTCOME STUDY OF A PROBLEM GAMBLING BRIEF TELEPHONE INTERVENTION: THREE YEARS LATER

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Disclaimer

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- Median control over gambling increased at 3 months and stayed at the higher level at 36 months.
- Problem gambling severity (past 12 month time frame) median score reduced to 5 at 36 months compared with a baseline score of 17. At baseline 97% were problem gamblers, at 36 months 38% were problem gamblers, 27% were moderate-risk gamblers, 8% were low-risk gamblers and 27% were non-problem gamblers.

Other outcomes

- At baseline, 56% of participants had a high level of psychological distress; this decreased to 3% at 36 months.
- At baseline, 58% of participants had major depressive disorder; this decreased to 22% at 36 months. The corresponding results for minor depressive disorder were 12% to 0%, and for dysthymia were 42% to 32%.
- At baseline, 60% of participants smoked tobacco; this decreased to 43% at 36 months. Participants with drug use problems decreased from 23% to 13%. The percentage of people with alcohol abuse/dependence was similar at baseline and 36 months (62%, 64%).
- Life aspects affected by problem gambling (i.e. work, social and family life, and health) substantially improved at 3 months and showed slight continued improvement at 36 months.

Additional assistance

- At 36 months, 13% of participants reported seeking additional assistance in the past 6 months, both from formal and informal sources. Over the whole study, 36% received additional formal assistance at some time, and 52% received informal assistance (e.g. from a family member, friend or another person).

Predictors of successful problem gambling outcomes at 36 months

- Improved outcomes on problem gambling severity were noted for people who were partnered, or who had not previously received treatment for a gambling or mental health problem.
- Low quality of life and high deprivation were associated with *less* change in control over gambling.

Background

This report presents the findings from the three year (36 month) follow-up of participants of a study investigating the outcomes of a brief telephone intervention for problem gambling. Full methodological details are presented in the report for the outcome study covering the first 12 months after intervention delivery (Abbott et al., 2013). Therefore, only a brief summary of the methods is detailed in this report.

The study was designed as an outcome study with participants recruited from gamblers calling the national gambling helpline for assistance. Recruitment occurred in parallel with, and using the same entry criteria, as a randomised controlled trial (RCT) of four different helpline interventions, the control (or 'Treatment as Usual') arm of which was recruited into the outcome study cohort. The inclusion criteria were the same as those used in the RCT and are fully detailed in the report for that trial (Abbott et al., 2012).

Additional to the 116 participants from the RCT, a further 34 participants were recruited making a total of 150 callers recruited and followed for 36 months. After giving consent, participants received a baseline assessment followed by 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.

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[1] was obtained by a research team member within seven days post-intervention.

Purpose

The primary purpose of the 36 month follow-up was to assess the durability of participant outcomes and to identify predictors of successful outcomes.

Participants

At baseline, there were slightly more females (57%) than males. Just over a quarter (27%) were aged 34 to 44 years, a quarter were aged 25 to 34 years and a fifth were aged 45 to 54 years. Both the youngest (18 to 24 years) and oldest (55 years and older) categories had 14% of participants. Most participants reported their primary ethnicity as Māori (43%) or European (42%) with smaller proportions of Pacific (10%) and Asian or Other (5%). Slightly over a half (51%) were single. Twenty-seven percent had no educational qualification, 32% a secondary school qualification only, 18% a technical or trade qualification and 23% a tertiary or professional qualification. Over half were either in full time (44%) or part-time (12%) employment.

[1] More detailed gambling/problem gambling history, the mood module of the Primary Care Evaluation of Mental Disorders, and the New Zealand Index of Socio-economic Deprivation for Individuals.

At baseline, most participants (89%) cited electronic gaming machines (EGMs) as their main mode of problem gambling with 76% mentioning pub EGMs, nine percent club EGMs and three percent casino EGMs. The great majority (96.5%) scored as problem gamblers on the PGSI-12 (a past 12 month measure). The remainder scored in the moderate-risk category. The median PGSI-12 score was 17, substantially above the cut-score of eight for problem gambling assessment. The median PGSI-3 (a past 3 month measure) score was 18. Most participants had very serious gambling problems at intake. They also had high rates of psychological distress (56% high; 41% medium), affective disorders (major depression 58%, dysthymia 42%, minor depression 12%, bipolar disorder 3.0%) and substance misuse (alcohol abuse or dependence 62%, other drug problems 23%). A majority of participants (60%) smoked tobacco. Moderate to severe effects on family and home, social life and health were reported, with somewhat less severe effects on work.

Results

Follow-up and attrition

Eight-six percent of participants were re-assessed at three months, 79% at six months and 66% at 12 months. Forty percent were re-assessed at 36 months. There was no evidence of major differential attrition based on socio-demographic variables at any follow-up assessment. Consequently no adjustments were made to the data when assessing outcomes and predictors of outcomes.

Treatment goals

At baseline, the majority of participants (61%) reported that their treatment goal was to quit all forms of gambling. A fifth wanted to quit some but not all forms, 13% wanted to gamble in a controlled manner and five percent wanted to maintain gambling abstinence. Treatment goals changed over the 36 month follow-up period. From baseline to 12 months, a lower proportion sought to stop all forms of gambling. From 12 to 36 months there was no change (27% and 29% respectively). These changes were accompanied by a corresponding increase in participants who sought to maintain gambling abstinence, with an increase from five percent at baseline to 21.5% at three-months, 30% at both six- and 12-months and 28% at 36 months. Participants who sought to control rather than stop gambling increased slightly from baseline (13%) to 12 months (19%) and somewhat more substantially at 36 months (28%). By 36 months, similar proportions had treatment goals of stopping all gambling, maintaining abstinence and controlling gambling. Over time there was little change in participants who sought to quit some gambling modes but not all (20% at baseline and 16% at both 12 and 36 months).

Gambling and problem gambling outcomes

At the three month follow-up assessment there were substantial median reductions in reported days gambled per month and dollars lost per day gambling. Participants' median reported control over gambling increased substantially during this period. These changes persisted from three to 12 months and were sustained at the 36 month follow-up assessment.

PGSI-3 median scores also changed markedly from baseline (20) to three months (7) and remained at around this level at six and 12 months. At 36 months the median score further reduced to 2, a score within the PGSI low-risk range.

PGSI-12 assessments were made at baseline, 12 months and 36 months. As mentioned, almost all participants scored in the problem gambling range at baseline, most with scores well above the problem gambling cut-score. At 12 months, over a half (57.5%) remained in this category, 25.5% were classified as moderate-risk, 12% as low-risk and 5% as non-problem gamblers. At 36 months the proportion of problem gamblers reduced further to 38%. The 36 month moderate-risk and low-risk proportions remained much the same (27% and 8%) and non-problem gamblers increased from 5% to 27%.

As with other gambling-related measures that were assessed at baseline, three, six, 12 and 36 months, reports of adverse effects of gambling on work, social life, family and home and health diminished substantially from baseline to three months. At subsequent assessments, including the 36 month assessment, on all four measures there was a trend towards further, albeit modest, improvement.

Other outcomes

Substantial reductions in psychological distress were evident from baseline to 12 months, with most of the improvement again occurring during the first three months. The proportion of participants with high levels of distress reduced from the 12 to the 36 month assessment (10% and 3% respectively). There was little or no change in low distress levels (63% and 58%). However, medium distress levels increased somewhat (27% and 38%). At 36 months the proportion was similar to the baseline proportion (41%).

Affective disorders were assessed at baseline, 12 months and 36 months. The prevalence of major depression reduced from 58% at baseline to 18% at 12 months, and minor depression reduced from 12% to 4%. There was less change in dysthymia (from 42% to 32%). These reductions were sustained at 36 months (22% major depression, 0% minor depression, 32% dysthymia).

There was a gradual reduction in tobacco use throughout the follow-up period, with 60% smoking at baseline, 55% at three months, 54% at six months, 49.5% at 12 months and 43% at 36 months.

Alcohol abuse or dependence reduced slightly from baseline (62%) to three months (55%). It reduced again at six months (50%). Rates increased to 60% at 12 months and 64% at 36 months, similar to the baseline rate.

Slightly less than a quarter (23%) of participants were assessed as having drug use problems (other than alcohol) at baseline. This reduced at 12 months (8%) and increased somewhat at 36 months (13%).

Additional assistance

At three months, 59.5% of participants reported having received additional assistance for their gambling problem from informal sources (39%) or formal services (31%). Rates reduced progressively over time. Informal assistance rates were 31% at six months, 25% at 12 months and 13% at 36 months. Corresponding rates for formal assistance were 21%, 19% and 13%.

The majority (70.5%) of participants reported at one or more of the assessment points that they had received informal or additional formal assistance. Around half (52%) reported receiving informal assistance at some time during the study. Just over a third (36%) mentioned having

receiving assistance from a family member, 23.5% from a partner, 21% from a friend and 17% from another person. Across the study as a whole, around a third (36%) reported receiving additional formal assistance at some time. The Problem Gambling Foundation was mentioned by 11% in this regard, Salvation Army Oasis Centres by 9%, Gamblers Anonymous (GA) by 8% and other problem gambling services by 16%. Only one person (0.8%) accessed an online/internet service.

Predictors of successful problem gambling outcomes

PGSI-12 change

There was significantly greater average change (reduction) in PGSI-12 problem gambling severity from baseline to 36 months than there was from baseline to 12 months. This difference remained statistically significant when the effects of all other baseline factors were assessed in multivariate analyses. In other words, improvement continued over time.

Taking up additional formal assistance for problem gambling, at any of the assessment points, was not associated with greater change in PGSI-12 scores from baseline to 36 months. In other words, outcomes were similar for those who did and did not obtain additional help from specialist treatment providers or GA.

Apart from having a partner, no other socio-demographic characteristics showed a robust relationship with PGSI-12 average score changes from baseline to 36 months. Participants with partners had better outcomes than those who did not. This means that, with this exception, similar improvements were obtained irrespective of gender, age, ethnicity, employment status and the other characteristics considered.

Gambling-related factors at baseline also mostly failed to predict PGSI-12 outcome differences. This was the case for self-reported number of days gambled per month, gambling expenditure per day, primary gambling mode, EGMs as primary gambling mode, self-rated control over gambling, length of problem duration, level of motivation to overcome gambling problem, current treatment goal (quit or control gambling), belief in treatment success, perceived level of difficulty in overcoming problems and whether or not additional assistance for problem gambling was currently being received. Having previously received formal assistance for a gambling problem was the only significant predictor. Clients who had not had previous help for a gambling problem had a better outcome, on average, than those who had received prior help.

Significantly greater PGSI-12 score change was also found for people who had not received treatment for a mental health issue during the past 12 months than for those who had. Baseline variables that were not significantly related to change in PGSI-12 scores from baseline to 36 months included psychological distress, alcohol abuse/dependence, suicidal ideation, depressive disorders and dysthymia, tobacco use, treatment of prescription for a mental health problem during the past 12 months, legal problems and the extent to which gambling affected work, social life and health. When considered on their own, participants who had received treatment for alcohol or drug problems in the past year, who reported a high impact of gambling on family/home, and who had high deprivation all had significantly less PGSI-12 mean change. However, these differences were not significant in multivariate analyses.

In summary, clients improved from baseline to 12 months and continued to improve from 12 to 36 months. There was significantly greater improvement for those who were partnered and had not previously received treatment for a gambling or mental health problem.

Changes in days gambled

Relative to baseline, there was a substantial reduction in reported number of days gambled per month at three months compared to baseline; with the improvement maintained at subsequent follow-up assessments (6, 12 and 36 months). Additionally, at 36 months, the average reduction in number of days gambled per month was statistically significantly greater than at previous assessment points.

As found for PGSI-12 score change, taking up additional formal assistance for gambling at any assessment point was not associated with average change in number of days gambled per month.

None of the baseline socio-demographic, gambling-related, mental health, substance use/ misuse or other factors assessed at baseline were significantly associated with change in number of days gambled per month.

Changes in money lost

Substantial reductions in self-reported time-averaged money lost on gambling took place from baseline to three months. There were no significant differences between assessment points for average change from baseline. In other words, the improvements that took place from baseline to three months were sustained throughout the study, including at the 36 month follow-up assessment.

Taking up formal assistance for gambling, at any assessment point, was not associated with a change in money lost on gambling.

There were no associations between baseline socio-demographic characteristics and money lost on gambling.

Participants who had very high PGSI-12 scores at baseline (18 or higher) showed significantly less reduction in money lost gambling at 36 months than participants with lower scores (17 or less). No other baseline gambling-related factors had statistically significant associations with changes in money lost gambling at 36 months. No other baseline factor other than quality of life was associated changes in this outcome measure. Clients with a lower quality of life had a statistically significant lower mean change in time-average money lost gambling per month than their counterparts with a higher quality of life. However, this relationship did not retain its significance when considered alongside other baseline measures in a multivariate analysis.

Control over gambling

No statistically significant difference was found between assessment points for mean change in client-assessed time-averaged control over gambling from baseline values. As with money lost gambling, improvements from baseline to three months were sustained subsequently, including at 36 months.

There was no relationship between mean change in time-averaged control over gambling at 36 months and taking up formal assistance for gambling at three, six, 12 or 36 months.

Although marital status was significantly associated with change in time-averaged mean control over gambling at 36 months, with partnered and married clients having increased control, this significance was not retained in the multivariate analysis. None of the other baseline socio-demographic characteristics were associated with changed control over gambling.

Higher belief in treatment success and perceived lower level of difficulty in overcoming problem gambling were both significantly associated with greater mean change in control over

gambling at 36 months. Only the former association remained statistically significant in the multivariate analysis.

A number of baseline factors were associated with lower change in control over gambling at 36 months (suicidal thoughts, major depressive disorder, dysthymia, low quality of life, received treatment for a mental health problem in the past year and high levels of deprivation). However, only two remained significant in the multivariate analysis, namely low quality of life and high deprivation.

Treatment success (stopped gambling or improved)

No statistically significant difference was found between assessment points for treatment success. As with most other outcome measures, improvements from baseline to three months were sustained across subsequent assessments including 36 months. There were also no statistically significant differences in time-averaged treatment success at 36 months and any of the baseline factors.

Conclusion

A notable finding of this study is that the clinically and statistically significant treatment gains found at 12 months were either sustained, or showed further improvement, at 36 months. This included gambling behaviours, problem gambling, some associated mental health problems and participant assessed treatment success. Of particular note are the further reductions in median PGSI sores and in the proportion of participants who scored in the problem gambling range. These changes occurred even though around two-thirds only received one helpline counselling session and did not report accessing other, more intensive, therapy for their gambling problems throughout the subsequent 36 months. There was also a substantial reduction in psychological distress and major and minor depression, and some reduction in tobacco and other drug use. At 36 months there was no change from baseline in alcohol misuse. At 36 months substantial numbers of participants continued to smoke and misuse alcohol. Given the adverse health consequences of smoking and alcohol misuse, and their potential to act as triggers for problem gambling relapse, consideration needs to be given to ways to better assist clients with substance use/misuse. This could include additional support from the helpline and/or referral to on-line support/interventions and specialist alcohol and drug services. Ideally the effectiveness of such measures would be evaluated, both with regard to substance use/misuse and gambling outcomes.

Another significant finding was that the third of clients who received additional specialist treatment or support for their gambling problems did not have better outcomes at 36 months than those who did not receive additional treatment. This was also the case at 12 months. As participants chose whether or not to seek additional assistance, it cannot be concluded that this assistance did not help them. They may well have been people who were experiencing difficulties making progress and who, without additional help, would have done significantly worse. Further research is required to identify which types of clients do as well with brief interventions as they do with longer term therapies, and which types benefit from additional therapy and support.

As at 12 months, at 36 months there were some participant characteristics that were associated with better or worse treatment outcomes. However, in all cases, the relationship was with just a single outcome measure. For the most part, participants had similar treatment gains irrespective of problem severity, other morbidities and socio-demographic differences. This includes age, ethnicity and gender, among other attributes. For ethnicity, while Māori and European/Other had similar outcomes, numbers were not sufficient to enable comparison with

Pacific people or Asian people. With regard to PGSI-12 problem gambling severity, participants who had previously received treatment for a gambling, drug/alcohol or mental health problem improved less than those who had not previously received treatment. Although these differences were not found for other outcomes, clients in these groups may have more long-standing and complex problems that would benefit from more intensive intervention from the outset. This requires evaluation in randomised clinical trials.

This study showed that the large majority of participants who accessed helpline standard care, and additional gambling treatment in around a third of cases, improved substantially. Most improvement occurred during the first three months. For problem gambling, further improvement occurred from 12 months to 36 months. It cannot be concluded from an uncontrolled outcome study that these gains were a result of the interventions received. However, the improvements in problem gambling severity, psychological distress and major depression appear to be comparable to those obtained in clinical trials of longer duration therapies for both problem gambling and depression. While most participants did well following a single telephone intervention, a minority did not improve and over a third remained in the problem gambling category at 36 months. Further consideration of the findings from this and other studies, as well as additional research, is required to refine the stepped-care model presently in operation, to optimally and cost-effectively match client need with interventions of various type and intensity.

1 BACKGROUND

This report builds on the previously reported uncontrolled outcome study of a problem gambling brief telephone intervention (Abbott et al., 2013). The outcome study occurred in parallel with, and using the same entry criteria, as a randomised controlled trial (RCT) of four different helpline interventions, the control (or 'Treatment as Usual') arm of which was recruited into the outcome study cohort. Therefore, this report should be read in conjunction with the report detailing results from the RCT 36 month assessment (Abbott et al., in press).

The RCT was a single-site trial of brief telephone interventions for problem gambling involving four groups with repeated measures (pre-treatment, three-, six- and 12 months) enabling investigation of independent, and some interaction, effects of the different interventions. A further follow-up assessment was conducted at 36 months. Participants were recruited from gambler callers to the national gambling helpline.

The four groups were:

- Group 1: Helpline standard care (control group; Treatment as Usual)
- 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 assessing participants at 36 months post-intervention. An outcome study involves the prospective tracking and assessment of a cohort of participants. Participants were 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:

- Assess participant outcomes at 36 months following standard helpline intervention
- Update models of predictors of participants who achieve successful problem gambling outcomes through helpline standard intervention.

2 LITERATURE REVIEW

This literature review does not repeat the review that was reported for the previous phase of the outcome study (Abbott et al., 2013). Instead, key points are summarised and updates are given where relevant literature has been published since 2012.

Background

Gambling remains a popular recreational activity in New Zealand. The results of the first nationally representative study focused on gambling conducted in New Zealand since 1999 (2012 National Gambling Study; NGS) indicate that approximately 86% of adult New Zealanders have participated in at least one type of gambling activity at some stage in their lives (Abbott, Bellringer, Garrett, & Mundy-McPherson, 2014a). This lifetime estimate is lower than estimates from the previous 1991 and 1999 national gambling surveys (95% and 94% respectively). Similarly, the NGS past 12 month gambling participation rate of 80% in 2012 was lower than estimates from the 1991 and 1999 surveys (90% and 86% respectively) (Abbott & Volberg, 1996; 2000).

Gamblers in New Zealand spent $2.07 billion dollars on the four main forms of gambling (Totalisator Agency Board [TAB] betting, New Zealand lotteries products, casino and non-casino electronic gaming machines) in the 2012/13 financial year (Department of Internal Affairs, 2014). This was an increase of just 0.3% from the previous year. However, when adjusted for inflation, total gambling expenditure has declined by almost 19% from the peak recorded in 2004 ($2.57 billion, inflation-adjusted). According to the Department of Internal Affairs, the only form of gambling that has not seen a decrease in inflation-adjusted expenditure over the past decade is Lotteries products ($432 million in 2013), which has increased by 22% since 2004 ($355 million when adjusted for inflation). Table A shows the breakdown of gambling expenditure over the most dominant modes for the 2010/11 to 2012/13 financial years.

Table A: Gambling expenditure[2]

Gambling sector	Expenditure 2010/11 $ million	Expenditure 2011/12 $ million	Expenditure 2012/13 $ million
TAB racing and sports betting	273	283	294
NZ Lotteries products	404	419	432
Non-casino electronic gaming machines	856	854	826
Casino gambling (electronic gaming machines and table games)	471	509	520
Total	*2,005*	*2,065*	*2,072*

(Department of Internal Affairs, 2014)

Although most people are able to gamble without experiencing any harm, it is generally estimated that one percent to two percent of the adult population meet the criteria for problem gambling and experience significant harm because of their gambling. The most recent national gambling study referred to earlier has reported that 0.7% of adults are estimated to be current (past 12 months) problem gamblers, 1.8% moderate-risk gamblers and 5.0% low-risk gamblers (Abbott, Bellringer, Garrett, & Mundy-McPherson, 2014b). These estimates are similar to

[2] Actual dollars (non-inflation adjusted) for gambling operators' financial year-end.

those from recent Australian studies from Victoria (Victorian Responsible Gambling Foundation, 2012), South Australia (Social Research Centre, 2013) and Queensland (Department of Justice & Attorney General, 2012).

Additional to the harm experienced by problem gamblers, other people close to a problem gambler (such as nuclear family, whānau and work colleagues) also experience harm as a result of the other person's gambling. Such wider impacts of gambling were reported in the aforementioned 2012 National Gambling Study. About a third of adults said they knew at least one person whom they thought has (or had) a problem with gambling and about eight percent reported that it had affected them personally. Negative financial impacts were mentioned most often, followed by loss of relationships, stress to family, loss or lack of trust, anger, frustration and resentment. Some people reported that they felt sorry for the person they thought had a problem and had tried to help those people (Abbott et al., 2014b).

Treatment in New Zealand

There is a wide range of problem gambling treatment providers located throughout New Zealand in urban and rural localities, all of which provide services free of charge. National service user statistics for the 2012 and 2013 years showed a slight (5%) increase in the number of people accessing assistance for gambling (total 12,438 clients) compared to the previous year (Ministry of Health, 2014). The gambling helpline continues to provide a free 24-hour, seven-day-a-week service that represents a first contact point for people in crisis as a result of their own or someone else's gambling (Ministry of Health, 2013). The helpline provides information, screening, brief intervention, referral and follow-up services. From late 2008, the helpline has also provided full intervention services, ensuring access to treatment for people in areas without face-to-face services and for people who prefer a telephone-based service (Ministry of Health, 2010). The Ministry of Health has noted that calls to the gambling helpline have been declining for some years, and continued to decline during the 2010/11 to 2012/13 period (Ministry of Health, 2013).

National face-to-face services available to participants during the course of the outcome study included the following:

The Problem Gambling Foundation of New Zealand (PGF) offers counselling in a range of languages including, but not limited to, Māori, Pacific island languages (Samoan and Tongan) and Asian languages (Mandarin, Cantonese, Korean, Thai, Khmer and Vietnamese). As well as face-to-face counselling, PGF has gambling 'hotlines' for telephone counselling for the general public, and for Asian and Pacific help seekers. 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.

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.

Hāpai Te Hauora Tapui is a Māori public health organisation which develops and implements problem gambling policy, research, workforce development and other public health strategies to contribute to whānau ora[3] at a local and national level.

There are also several regional Māori and Pacific problem gambling treatment providers.

Problem gamblers accessing treatment

In terms of the number of people engaging in treatment for problem gambling each year, Table B shows the total clients (excluding brief interventions) over the last five years (Ministry of Health, 2014). Note that equivalent full intervention services provided by the gambling helpline have been included from November 2008. The number of clients presenting for counselling appears to have increased slightly in the most recent year (2012-13), following a 3.7% decrease and small increase (1.4%) over the previous two years.

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

Contact	Jul 08 - Jun 09	Jul 09 - Jun 10	Jul 10 - Jun 11	Jul 11 -Jun 12	Jul 12 - Jun 13
Total clients	6015	6367	6133	6218	6931
New clients	3854	3637	3180	3406	3796
Existing clients	2161	2730	2953	2812	3135
↑ from previous year	1574	352	-234	85	713
% ↑ from previous year	35.4%	5.9%	-3.7%	1.4%	11.5%

Table sourced from Ministry of Health (2014)

Treatment modalities

The following subsections of this review of literature focus on the major modalities of treatment that are available to people who are experiencing harm from gambling and for which outcome study data are available. Again, this review does not seek to repeat information presented in the report of the previous phase of the outcome study (Abbott et al., 2013), but summarises and updates the relevant sections to include outcome studies that have been published more recently than 2012. It is again acknowledged that randomised controlled trials (RCTs) provide more robust data than outcome studies regarding the efficacy and effectiveness of the treatment modalities. A review of RCTs has been updated in the literature review of the main report for the brief interventions RCT at the 36 month assessment (Abbott et al., in press).

Gamblers Anonymous

Based on the Alcoholics Anonymous 12-step model of self-help treatment, members of Gamblers Anonymous (GA) attend group meetings with other recovering problem gamblers and share stories about their experiences with gambling and how they are dealing with life. This treatment programme promotes abstinence as the only acceptable form of recovery and is

[3] Integrated whānau/family approach to providing health and social services.

a lifelong endeavour. A recent review notes that GA is perhaps the least used of the 12-step approaches to dealing with addictions (George, Ijeoma, & Bowden-Jones, 2013).

Studies have reported GA as being largely ineffective in treating problem gambling (e.g. Petry & Armentano, 1999) but that GA may have some benefit in achieving long-term behaviour change for a small minority of attendees (Brown, 1985; Stewart and Brown, 1988). Petry (2003) looked at patterns and correlates of GA attendance among 342 pathological gamblers presenting for professional treatment, concluding that gamblers with a history of GA attendance differ from those who do not, and that these differences (rather than GA attendance in and of itself) could affect their treatment outcome.

GA has elements in common with more well established cognitive behavioural therapy (CBT) approaches, suggesting its potential as an adjunct that may assist some gamblers (Oei & Gordon, 2008; Toneatto & Dragonetti, 2008). Some studies suggest that GA effectiveness can be improved if combined with concurrent attendance at other professional treatment programmes (e.g. Lesieur, 1991; Russo, Taber, McCormick, & Ramirez, 1984; Taber et al., 1987). However, outcome studies of GA are subject to numerous methodological limitations including lack of control groups and treatment fidelity monitoring, such that the role that GA plays in treatment success cannot be reliably concluded.

Behavioural therapy

Behavioural therapy is based on the theory that behaviour is guided by negative and positive reinforcement. With electronic gaming machine (EGM) gambling, it is argued that gamblers experience arousal when in the gambling environment and in response to rewards occurring at random variable intervals[4]. The arousal and rewards can reinforce gambling behaviour increasing the likelihood that a gambler will lose control (Anderson & Brown, 1984). There are different forms of behavioural therapy including aversion therapy, imaginal desensitisation, in-situ exposure with response prevention (ERP), imaginal relaxation with stimulus control, and techniques to assist in avoidance of behavioural triggers.

Recent clinical trial research into exposure therapies has found them to be effective as a cognitive treatment in reducing problem gambling and to retain an effect six months post-intervention (Smith, Battersby, Harvey, Pols & Ladouceur, 2015). A recent outcome study by Jimenez-Murcia and colleagues (2012) examined the value of ERP as an adjunct to group CBT approaches. ERP involves exposing gamblers to the stimuli or situation that triggers the urge to gamble (e.g. gaming machine or bar environments) and preventing gamblers from carrying out any gambling behaviour (response prevention). Improvement did not differ between groups six months post-intervention and the risk of relapse during treatment was similar in the CBT + ERP and CBT groups. However, in that study, compliance with treatment was substantially poorer in the CBT + ERP group compared with the CBT group, with participants dropping-out during treatment at a much higher rate. This led the authors to conclude that the additional use of ERP within a CBT programme was not beneficial when treating problem gamblers, due to its increased effect on attrition. A recent systematic review of cognitive and exposure therapies for problem gambling has concluded that the evidence base remains limited, largely due to a lack of robust clinical trials conducted according to CONSORT[5] Statement guidelines. The authors noted methodological shortcomings in the literature such as small sample size and the

[4] 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'.
[5] Consolidated Standards of Reporting Trials (http://www.consort-statement.org/).

influence of confounding factors for treatment group comparisons (e.g. factors that influence treatment outcome, severity of gambling problem and comorbid conditions (Smith et al, 2013).

Cognitive therapy

Cognitive treatment is based on the theory that problem gambling stems from gamblers' irrational thoughts about their ability to control and predict game outcomes. Psychological research shows that gamblers tend to hold inaccurate beliefs about randomness when gambling (Ladouceur and Walker, 1996; Walker, 1993). Cognitive treatments aim to challenge these erroneous beliefs; they involve encouraging gamblers to identify and restructure their irrational thoughts, replacing them with more realistic and rational thoughts (Korn & Shaffer, 2004). Key research on cognitive therapy has been conducted by Ladouceur and colleagues who reported that cognitive treatments reduce problematic gambling behaviour and desire to gamble, and increase control over gambling and self-efficacy (Ladouceur et al., 2001, 2003). Such research has employed an RCT approach and is, therefore, discussed in more detail in the companion report to this outcome study which reports the findings of the RCT 36 month assessment.

Similar to many behavioural treatment studies, cognitive treatment studies suffer from small sample size and lack of control groups. 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). Generally, cognitive approaches have been combined with behavioural therapy to treat problem gambling.

Cognitive behavioural therapy

Cognitive behavioural therapy is a "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). It is considered the therapy of choice for many mental and psychological disorders. In relation to gambling, CBT approaches often assume poor coping skills are involved in the development and maintenance of problem gambling (Raylu, Loo & Oei, 2013). While there is evidence that CBT, in a variety of forms, can lead to reduced gambling involvement and gambling-related problems over the short to medium term, the sustainability of treatment effects remains unknown.

Recent research has further examined the outcomes of gamblers treated with CBT. A cohort study of 380 treatment seeking gamblers who received CBT in South Australia found that gamblers experienced similar and clinically significant improvement in gambling harm-related outcomes whether or not they also experienced co-occurring affective and anxiety disorders. These gains were sustained at a 12 month follow up (Smith et al., 2014). In Singapore, a manualised CBT programme was associated with significant reductions in gambling frequency, gambling system assessment scale scores, and improvement in personal wellbeing (measured by the personal wellbeing index). The greatest change appeared during the first three months with the change sustained at 12 months. In that study, being unemployed, being in debt, poor treatment satisfaction and attending fewer CBT sessions were associated with significantly poorer outcomes on these measures (Guo et al., 2014). Tolchard and Battersby (2013) have reported that a specifically delineated CBT approach involving cognitive restructuring and active exposure to gambling cues resulted in a recovery rate of 68% at 12 month follow up. These authors commented that whilst CBT approaches are emerging as the most demonstrably effective approach to psychological therapies, the mechanisms of change underlying their

effects are not well understood. Further, in their study, positive results only applied to those who agreed to participate in the treatment and who remained in treatment.

Motivational interviewing

Along with various combinations of cognitive-behavioural therapies, motivational interviews also hold great promise in the treatment of problem gambling and have been shown to be 'possibly efficacious' (Abbott et al., 2004, 2012, 2013; Cowlishaw et al., 2012; Gooding & Tarrier, 2009; Hodgins et al., 2009; Pallesen et al., 2005; Petry, 2005; Problem Gambling Research and Treatment Centre, 2011; Westphal & Abbott, 2006). 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 elements: expressing empathy, highlighting inconsistencies between a participant's behaviour and their goals, avoiding arguing or confronting a 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).

Motivational interviewing is also efficacious in reducing aspects of problem gambling behaviour. However, there is less evidence for a reduction in problem gambling symptoms more generally and, as with CBT, whether treatment effects are maintained over time remains unclear (Carlbring et al., 2010; Diskin & Hodgins, 2009; Hodgins et al., 2001, 2004, 2009; Petry et al., 2008, 2009; Toneatto & Gunaratne, 2009). Research is required to evaluate longer term outcomes and develop and assess ways to sustain treatment effects and prevent relapse.

Recent studies that have assessed 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 RCT 36 month extension.

Multimodal treatment

Many general addiction treatment facilities offer multimodal treatment for problem gambling. Multimodal treatment is where multiple modalities of therapy are drawn on when treating a patient's issues. The multimodal approach can also be termed eclectic or patient tailored. These can include 12-step approaches, psycho-education, individual face-to-face therapy, group therapy, family group therapy, education, relapse prevention, and financial counselling, (Raylu, Loo & Oei, 2013; Stinchfield & Winters, 2001). Studies of multimodal treatment programmes have demonstrated 55% to 71% abstinence rates among former problem gamblers at six to 12 months post-discharge (e.g. Lesieur & Blume, 1991; Russo, Taber, McCormick and Ramirez, 1984; Lindner, 1992; Taber & McCormick, 1987). Raylu and Oei (2002) noted major limitations of these studies in that they were carried out in inpatient settings only, and the majority of participants were male.

Stinchfield and Winters (1996, 2001) examined multimodal outpatient treatment programmes aimed at cultivating gambling abstinence for problem gamblers in Minnesota (USA). In the first study, abstinence rates of 1,342 gamblers were 42% at both six months and 12 months post-treatment, with just over a quarter at each follow-up assessment reporting that they gambled less than once per month (Stinchfield & Winters, 1996). In their outcome study published in 2001, the authors assessed multimodal treatment programmes involving 12-step; individual, group and family therapy; education and financial counselling (Stinchfield &

Winters, 2001). 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. Daily gambling rates reduced markedly from 36% of patients to between one percent and three percent following treatment. Abstinence rates increased substantially from pre-treatment to immediately post-treatment but then declined at follow-up; 28% at six months and 18% at 12 months after discharge. South Oaks Gambling Screen 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 assessments. Limitations of the study included high attrition at the 12 month follow-up and the lack of a no-treatment control group (Stinchfield & Winters, 2001).

Korn and Shaffer (2004) support the view that problem gambling requires a multimodal approach, arguing that problem 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 can vary in terms of quality and implementation of best practice principles (Griffiths & MacDonald, 1999). Due to the variety of components involved in multimodal treatment programmes, it is difficult to assess the effectiveness of each treatment modality. All of the studies mentioned in this section were conducted in naturalistic settings and no comparison groups were used, further limiting the conclusions that can be drawn regarding their effectiveness.

Self-exclusion

Self-exclusion is a behavioural treatment often used with other forms of therapy, rarely in isolation. It involves gamblers voluntarily restricting themselves (with the cooperation of venue staff) from entering certain gambling venues. Studies of self-exclusion have found that breaching these restrictions is common (Bellringer, Coombes, Pulford & Abbott, 2010; Ladouceur et al., 2000; Oneil et al., 2003). Although available evidence is limited, self-exclusion seems effective for some gamblers and is associated with a decrease in urges to gamble, an increase in reported control over gambling (Ladouceur, Sylvain & Gosselin, 2007), and improvements in time and money spent on gambling (Bellringer et al., 2010; Tremblay, Boutin and Ladouceur, 2008). Outcomes were mixed in recent small New Zealand and Australian studies of self-exclusion programmes with key issues identified such as limits on the number of venues participants could self-bar from or inability to self-bar from multiple venues in one go, poor promotion of exclusion processes in venues and inadequate staff monitoring for breaches. While many participants stopped or reduced their gambling after self-excluding, many continued to experience problems and managed to breach their exclusion orders (Bellringer et al., 2010; Hing & Nuske, 2012). A recent review of self-exclusion from gambling venues as an intervention for problem gambling has highlighted that programmes are rated highly by gamblers who take them up and seem to be associated with decreased gambling and increased wellbeing, supporting their continued use as part of harm minimisation strategy (Gainsbury, 2014). Issues with self-exclusion include low gambler compliance and ineffective enforcement of self-exclusion orders.

Natural recovery

Natural recovery from gambling problems is suggested by the low numbers of problem gamblers who seek formal treatment, with international research indicating 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). Additionally, 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 (Abbott & Volberg, 1996; Ministry of Health, 2009; Storer, Abbott & Stubbs, 2009; Williams et al., 2015). Slutske (2006), in two epidemiological surveys from the United States of America, found that the majority of people who recovered from gambling problems did so without accessing formal treatment (just seven percent to 12% sought treatment). Similar results were noted in Ontario, Canada (Cunningham, Hodgins & Toneatto, 2010). In a national longitudinal study of 143 problem and non-problem gamblers, and a smaller in-depth study seven years later, Abbott and colleagues reported that of the 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 the 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 problem gamblers, especially those with less serious gambling problems (Abbott, Williams and Volberg, 1999, 2004).

In a more recent national longitudinal study of 6,251 participants, 46% (n=8) of problem gamblers (n=17) from the baseline assessment had transitioned to low-risk or non-problem categories 12 months later. Similarly, 56% (n=30) of baseline moderate-risk gamblers (n=53) had transitioned to low-risk or non-problem categories 12 months later and seven percent (n=4) had stopped gambling (Abbott, Bellringer, Garrett & Mundy-McPherson, 2015). The proportion of these participants who sought formal help in the 12 month period was not assessed. However, it is intended that analyses of data collected at the 24 and 36 month assessments will investigate natural recovery over all years of the study.

There is a lack of literature on natural recovery from problem gambling, most likely due to the difficulty in studying this phenomenon. However, studies of natural recovery are important in that they can be used to inform more formal interventions. One study currently underway in Canada employs a prospective natural history design to explore life events, motivating factors and strategies used by problem gamblers to quit or reduce their gambling without formal treatment (Kushnir, Cunningham & Hodgins, 2013). The study, scheduled for conclusion in 2016, is expected to inform ways of promoting change among the majority of gamblers who do not seek help as well as improve the service received by those who access treatment.

Therapist effect

The ‘therapist effect’ refers to a person experiencing a positive outcome because of treatment that is, at least in part, due to the relationship developed with the therapist and not due to the actual treatment that is administered. This theory may be supported by the fact that most psychological interventions are concluded to be 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 the alliance between therapist and patient has a greater effect on a patient’s outcome than the intervention chosen. They thus concluded that it is more important to focus on the therapeutic alliance than which intervention to use. However, research in this area in relation to gambling treatment is lacking. Additionally, despite the robust relationship with outcome across a number of different contexts, establishing causality is difficult as the therapeutic alliance cannot easily be manipulated in an experimental situation (Del Re et al., 2012).

Pharmacotherapy

Recent 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. In general, pharmacotherapy in the treatment of problem gambling looks promising. A recent review presents current pharmacological strategies and the results of clinical trials evaluating the efficacy of pharmacotherapy for problem gambling (Łabuzek et al., 2014). That review discussed the importance of distinguishing different pathological gambler subtypes such as impulsive, obsessive-compulsive and addictive subtypes as this may have important pharmacological implications.

Conclusion

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

As can be seen from the variety of available treatment modalities and lack of strong evidence pointing to any one being significantly more effective than another, more research is needed in this area. Phase one of the present study contributed by evaluating the outcome of a group of participants who called a national gambling helpline, received standard helpline care, were informed about available face-to-face gambling help services[6] and, if requested, referred[7] the participants to the face-to-face services. The present report details the findings of a 36-month follow-up assessment of those participants to ascertain if positive outcomes were sustained and the predictors for those successful outcomes.

[6] The array of treatment services available across New Zealand means that different participants encountered different intervention modalities, similar to those discussed in this literature review.

[7] The helpline sent participant contact details to the chosen face-to-face service so that the service could contact the participant directly.

3 RESEARCH METHODOLOGY

3.1 Ethics approval

Ethical approval to conduct a 36 month post-treatment assessment with participants was granted by the Northern B Health and Disability Ethics Committee on 22 August 2012 (Appendix 1). This is a Health Research Council accredited human ethics committee. All participant materials (i.e. survey questionnaires, information sheets and consent forms) and other relevant documents were submitted to the Committee, which considers the ethical implications of proposals for research projects with humans where participants are asked questions in relation to their health.

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 aims of the Phase one study were 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.

The primary aims of the 36 month follow-up assessment of participants are to:

- Assess participant outcomes at 36 months
- Update models of predictors for participants who achieve and sustain successful problem gambling outcomes.

3.2.2 Overview

This study was a prospective cohort study of problem gamblers calling the gambling helpline and receiving the helpline's standard treatment. Recruitment occurred in parallel with, and using the same entry criteria, as a randomised controlled trial (RCT) of four different helpline interventions, the control (or "Treatment as Usual") arm of which was recruited into this cohort and assessed at baseline, three, six and 12 months (Abbott et al., 2012). A 36 month assessment was conducted for that RCT which is reported separately (Abbott et al., in press).

3.2.3 Study population

As described throughout this report, the data discussed here represent the 36 month follow-up assessment of 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.

Detailed information regarding the intervention delivered to participants and the monitoring of treatment integrity and fidelity has previously been described in the Phase one report for this study (Abbott et al., 2013). A brief description is provided below.

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 Abbott et al., 2013) 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. 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 longer-term (36 month) 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 with trained gambling helpline counsellors delivering the intervention. As the intervention was delivered by telephone, participants were based throughout New Zealand. Recruitment and delivery of the intervention occurred from August 2009 to May 2011.

All 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

Baseline, three, six and 12 month assessments

Detailed information regarding the baseline, three, six and 12 month assessments has previously been described in the initial report for this study (Abbott et al., 2013). The 36 month assessment is described below. As the majority of the measures are repeated from previous assessments, they are only described briefly here.

Assessment at 36 months

Participants were contacted by an AUT researcher to complete a telephone follow-up assessment at 36 months post-intervention.

Gambling/problem gambling history

A detailed timeline of gambling frequency and money spent gambling during the previous two years[8] 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.

Significant life events

Participants were asked to report significant life events experienced in the prior two years and to comment on whether or how those life events had influenced any gambling behaviour.

Treatment goal and additional treatment or help

Participants were asked whether, in the past six months, they had met their treatment 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').

They were also asked what other treatment or help, if any, they received for their problem gambling during the past two years. These forms of treatment/help were listed and, for each

[8] For the six months prior to the assessment, participants were asked to think about their gambling in each of those six months. For the prior 18 months, participants were asked to think about their gambling in that time period as a whole.

for the first six months, 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').

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).

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.

The Kessler-10 (K-10) questionnaire was included to provide a continuous measure of general psychological distress that is responsive to change over time. It also produces a summary measure indicating probability of currently experiencing an anxiety or depressive disorder (Kessler & Mroczek, 1994).

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.

A brief version (10-item scale) of the Drug Abuse Screening Test (DAST; Skinner, 1982) was administered to assess drug abuse.

Participants were also asked about current tobacco use.

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).

Socio-demographics

Marital status, highest educational level, employment status, annual household income, and area of residence data were collected[9].

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

3.2.7 Data analyses

Outcome profiles

Follow-up data from the three, six, 12 and 36 month assessments have been presented descriptively and have been used to examine the changes between baseline (intervention delivery) and each time point. Appropriate central tendency measures and dispersion measures have been provided in detail.

[9] Age, gender and ethnicity data were collected at the baseline assessment.

Data for profiles by time point (baseline, three, six, 12 and 36 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 successful problem gambling outcomes through helpline standard care

Successful problem gambling outcome measures were derived from the gambling measures and correspond with those detailed in the 36 month report for the main RCT (Abbott et al., in press).

Statistical analyses were conducted in the same manner as described in the previous report for the outcome study covering the first 12 months after intervention delivery (Abbott et al., 2013). The following factors were examined to identify any significant associations with the positive problem gambling outcomes:

- 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
    - Gambling impact
    - Kessler-10, Primary Care Evaluation of Mental Disorders (Prime-MD)
    - WHOQoL-8 scores, individual deprivation scores,
    - AUDIT-C, Drug Abuse Screening Test (DAST), tobacco use
- Treatment assistance
    - Utilisation of referral to face-to-face services
    - Any problem gambling intervention services
    - Any other services
    - Any assistance from family or friends.

4 RESULTS

This chapter details the results of data analyses from the 36 month follow up assessments of participants from the original outcome study who received the helpline's standard care intervention.

Section 4.1 contains the descriptive statistics for socio-demographic characteristics at each assessment point and outcome data showing time trends over the assessment points.

Sections 4.2 to 4.6 detail predictors of successful problem gambling outcomes at 36 months focusing on change in PGSI-12 scores, change in number of days gambling per month, change in money lost gambling per day, change in 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. At the 36 month assessment, 60 participants were re-interviewed representing a 40% retention rate from the baseline sample (Table 1).

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

	Assessment point				
	Baseline	**3 months**	**6 months**	**12 months**	**36 months**
Number	150	129	119	99	60
Percentage of baseline	100%	86%	79%	66%	40%

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 Time trends

Tabulated data of changes over time are presented in Appendix 2, Table 2.2. For each variable examined, the greatest change was in the first three months[10]. Thereafter, changes were generally maintained or improved further by the 36 month assessment.

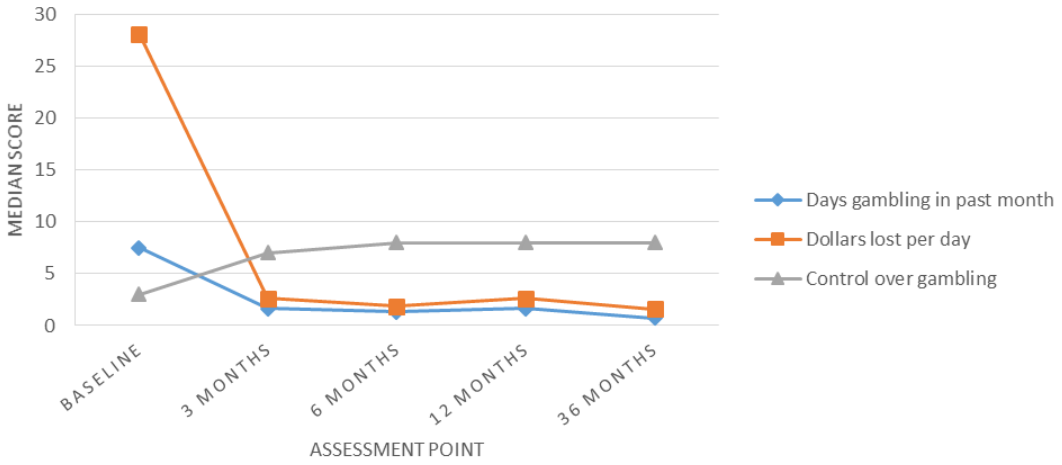
Days gambling per month, expenditure per day and control over gambling

Figure 1 presents median values for self-reported number of days gambling per month, gambling expenditure per day, and control over gambling (10-point scale from 0 'no control' to 10 'total control) across the five assessment points. Median number of days gambling and expenditure were both substantially lower at the three-month assessment compared to the baseline assessment, with the improvement subsequently maintained. Self-reported control over gambling median value increased from 3 at the baseline assessment to 7 at the three-month

[10] These data are not adjusted for attrition.

assessment. A further improvement (median score 8) was noted at the six month assessment, and this was sustained at the 12 and 36 month assessments.

Figure 1: Days gambled, money lost and control over gambling by assessment point



Gambling goal

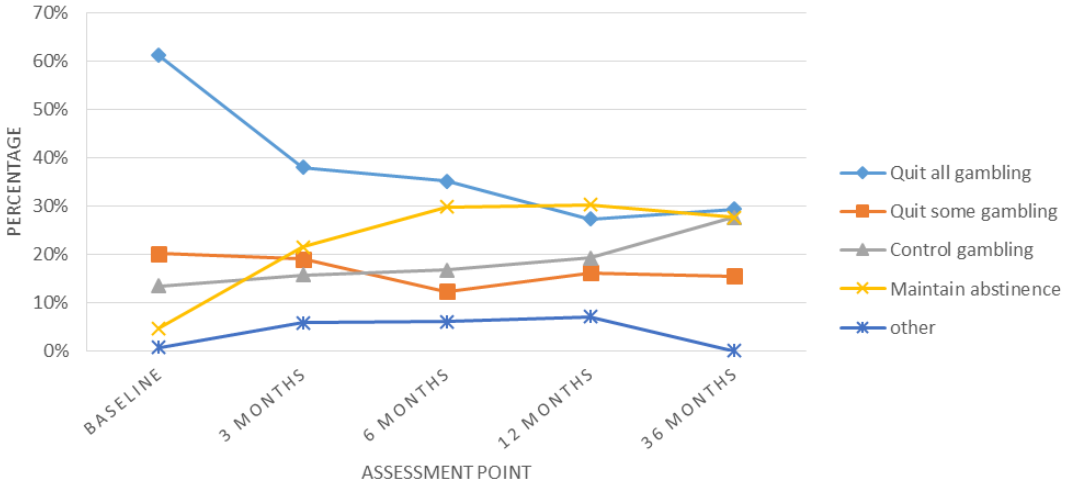
At each assessment point, participants were asked to state their current goal. Goals were to quit all modes of gambling, quit some modes of gambling (problematic modes), gamble in a controlled manner, maintain gambling abstinence, or some other goal. Figure 2 details the findings.

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 reduction continuing at the six- (35%) and 12-month (27%) assessments; the 12 month percentage was maintained at the 36 month assessment (29%).

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 to 30% at the six- month assessment; this level then stabilised at the 12 month (30%) and 36 month assessments (28%).

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, and a substantial increase at the 36 month assessment (28%). Overall, across time, the percentage of participants reporting their goal to be to quit some modes of gambling decreased slightly from 20% at baseline to 15.5% at 36 months.

Figure 2: Treatment goal by assessment point

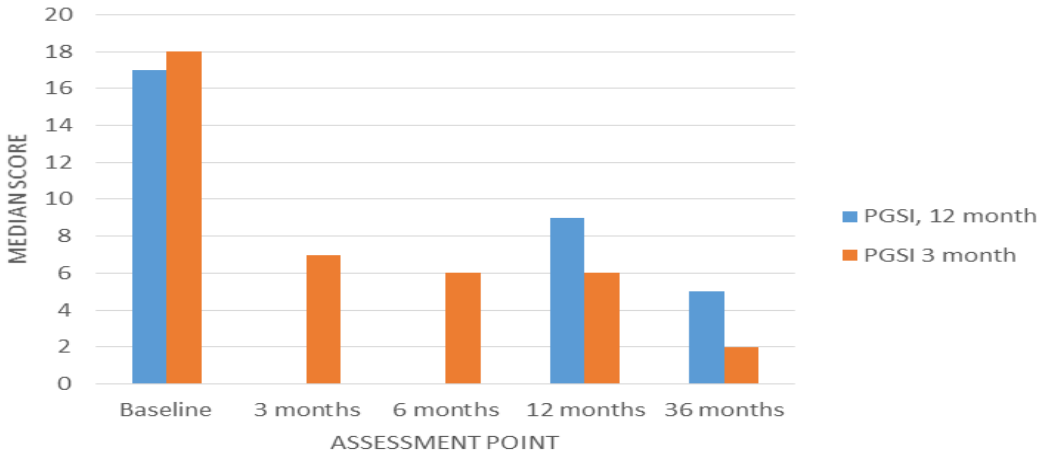


Problem gambling severity index

Participants' PGSI scores improved over time (Figure 3). 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); this reduced even further at the 36 month assessment to 5. This finding indicates that participants were problem gamblers at commencement of treatment (baseline) and after 12 months (though at a lower severity). It also indicates that their recovery was sustained as after 36 months, they were classified as moderate-risk gamblers[11].

The PGSI-3 (past three-month time frame) median scores show that the largest decrease was noted at the three month assessment and that this was maintained at the six and 12 month assessments. A further substantial decrease was noted at the 36 month assessment with the median score being 2 (low-risk gambler).

Figure 3: PGSI by assessment point

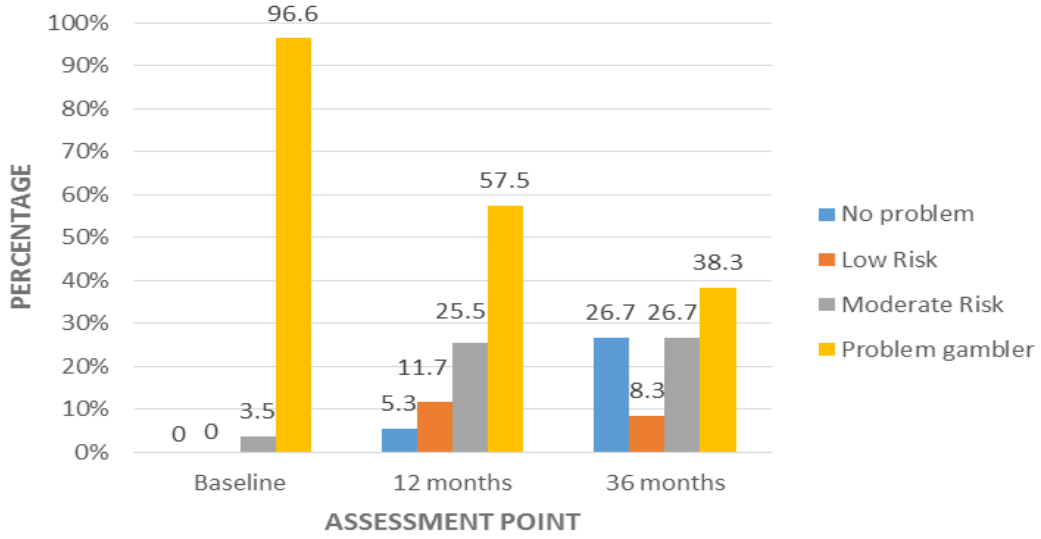


[11] PGSI scoring: 8+ = problem gambler, 3-7 = moderate-risk gambler, 1-2 = low-risk gambler, 0 = non-problem gambler.

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 (25.5%) in the moderate-risk group, 12% in the low-risk group, and five percent categorised as non-problem gamblers. By the 36 month assessment, the percentage of problem gamblers had reduced further to 38%. Moderate-risk and non-problem gamblers each comprised 27% of the sample and eight percent were low-risk gamblers (Figure 4).

Thus, there was an overall decrease in PGSI-12 score over time and improvement was made in gambling outcome. Although two-thirds (65%) of the participants remained problem gamblers or moderate-risk gamblers at the 36 month assessment (albeit at lower severity), one-third (35%) had improved significantly to a low-risk or non-problem gambling level.

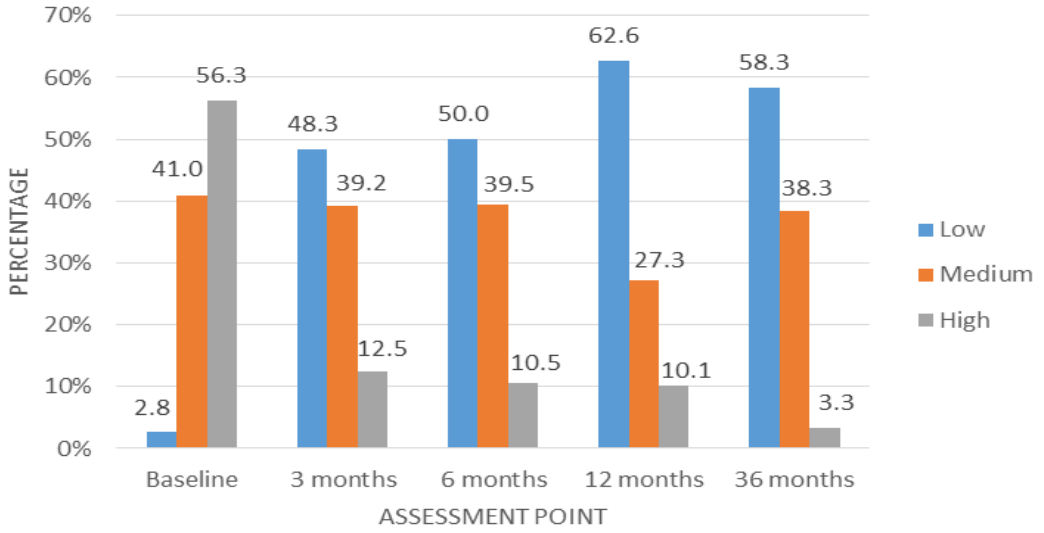
Figure 4: PGSI-12 categorisation by assessment point



Psychological distress

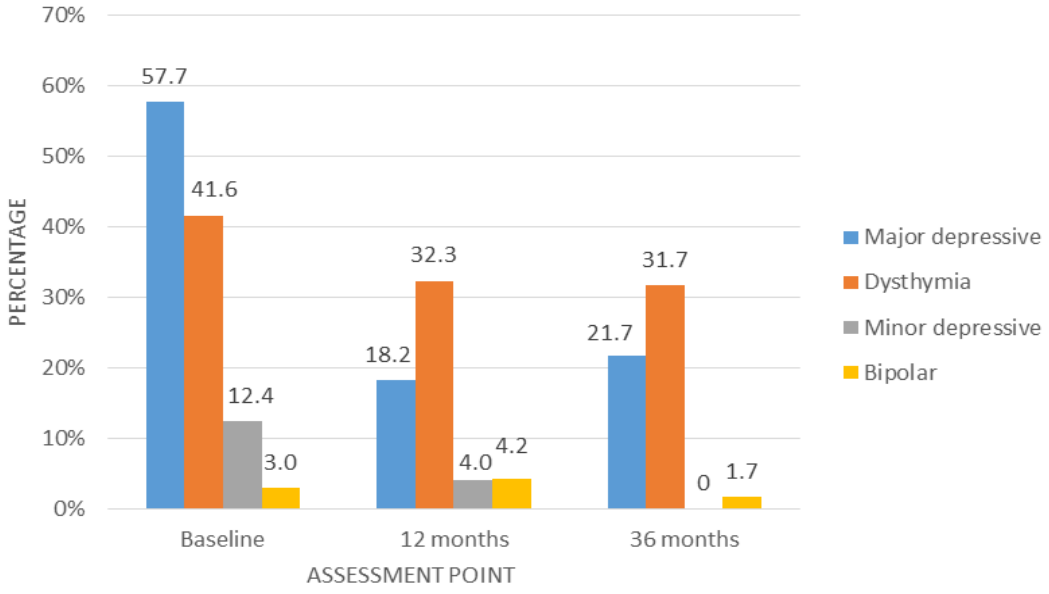
Over time, the percentage of participants with a high level of psychological distress (measured via Kessler-10) decreased from the baseline assessment (56%) to the 36 month assessment (3%) although the greatest decrease was noted at the three month assessment. Conversely, a minority of participants reported psychological distress at a low level at the baseline assessment (3%), which increased to approximately 50% at the three and six month assessments, and stabilised at about 60% at the 12 and 36 month assessments. 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; this increased again to 38% at the 36 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 36-month assessment in comparison with the baseline assessment. Over half of the participants (58%) reported major depressive disorder at the baseline assessment with less than one-quarter (22%) reporting it at the 36-month assessment; just less than one-fifth of participants (18%) reported depression at the 12-month assessment. A similar finding was noted for minor depression (12% at baseline, 4% at 12-months and 0% at 36-months). A smaller percentage decrease occurred for dysthymia over time (42% to 32%). Results were less clear for bipolar disorder whereby three percent reported the disorder at the baseline assessment, four percent at the 12 month assessment and two percent at the 36-month assessment; due to the small number of participants with bipolar disorder (n=4 at baseline and 12-months and n=1 at the 36-month time point) this finding is likely to be due to attrition and should be treated with caution (Figure 6).

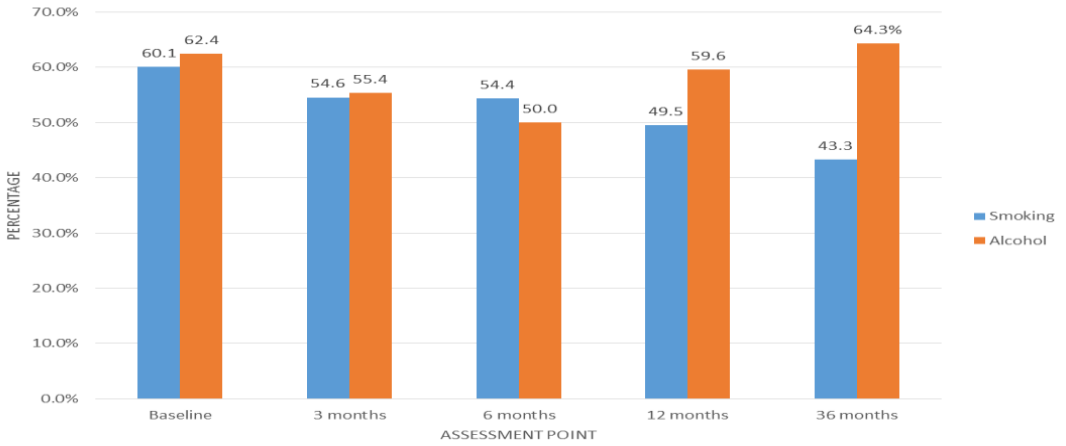
Figure 6: Major and minor depressive disorder, dysthymia and bipolar disorder by assessment point



Substance abuse/dependence

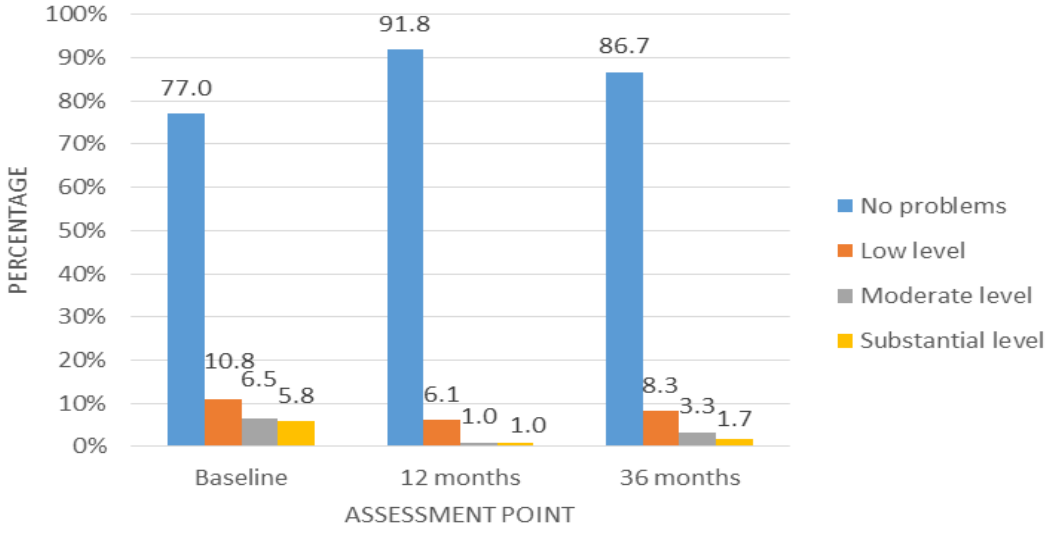
Over time, there was a slightly decreasing trend for participants who smoked tobacco, with 60% reporting smoking at the baseline assessment, half (50%) reporting smoking at the 12 month assessment and 43% at the 36-month assessment. A similar trend was not noted for participants reporting alcohol abuse 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%), and at the 36-month assessment had increased slightly to 64% (Figure 7).

Figure 7: Alcohol abuse/dependence and smoking by assessment point



Three-quarters of participants (77%) reported 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, before decreasing slightly (87%) at the 36 month assessment. The percentage of participants reporting low, moderate or substantial drug problems at the baseline assessment decreased at the 12 month assessment and then increased slightly at the 36 month assessment (Figure 8).

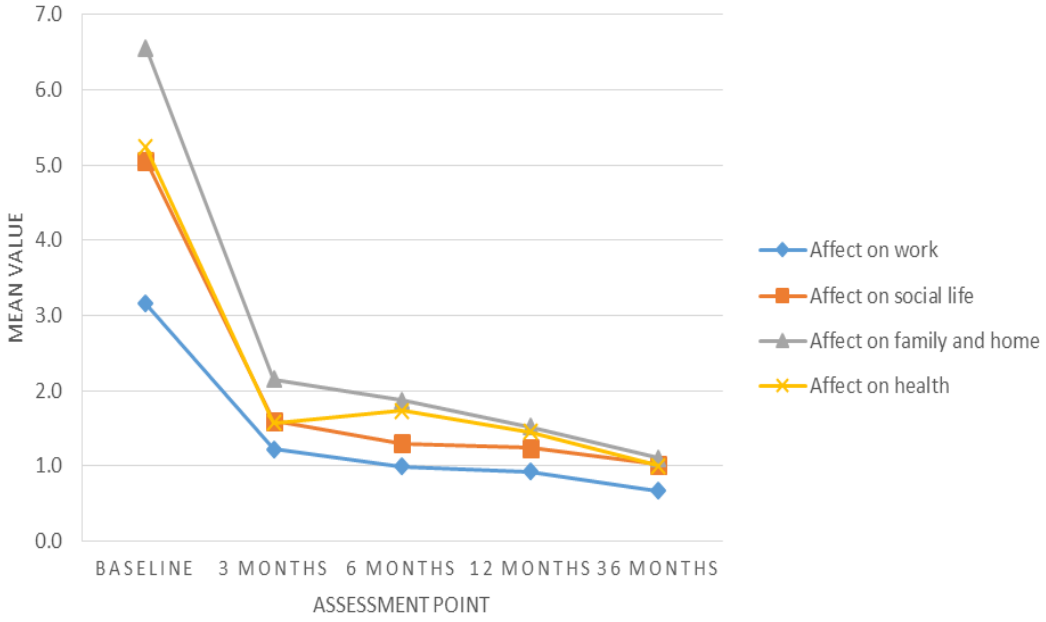
Figure 8: Drug abuse by assessment point



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) showed marked improvement from the baseline assessment to the three month assessment. Slight improvement continued to be noted at each of the six, 12 and 36 month assessments for the self-rated mean scores for gambling affecting past month work, social life and family life/home responsibilities. There was a slight increase in mean scores for gambling affecting physical health at the six month assessment, which then decreased again at both the 12 and 36 month assessments (Figure 9).

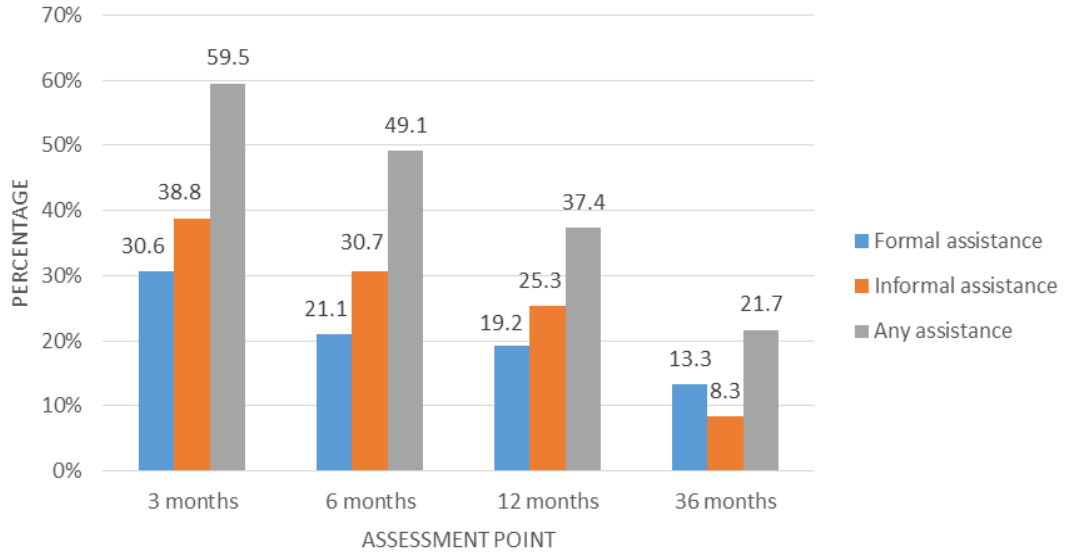
Figure 9: Aspects of life affected by gambling by assessment point



Additional assistance

At the three-month assessment, 59.5% 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 slightly greater percentage reported receiving assistance from informal (e.g. family and friends) sources (39%) than formal (i.e. professional) services (31%). The percentage seeking assistance decreased at each subsequent assessment to 13% and eight percent in the past six months for formal and informal assistance respectively, at the 36 month assessment (overall percentage seeking assistance, 22%) (Figure 10).

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 in the past three months, with this percentage, although fluctuating, remaining similar at the six and 12 month assessment points. By the 36 month assessment, five percent or less of respondents reported accessing any individual formal treatment service in the past six months. 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 2). Overall, 31% of respondents had accessed any formal service in the past three months at the three month assessment, reducing over time to 13% in the past six months at the 36 month assessment.

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 in the past three months. Generally, the percentage of respondents reporting informal assistance from any single source decreased at subsequent assessments. By the 36 month assessment, three percent or less of respondents reported accessing any individual informal assistance in the past six months. 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 at the three month assessment but by the 36 month assessment there was no noticeable difference in preference. Overall, 39% of respondents had accessed any informal assistance (from a partner, family member or friend) in the past three months at the three month assessment, reducing over time to eight percent in the past six months at the 36 month assessment (Table 2).

Very few respondents sought assistance from more than one formal source. For example, at the three-month assessment, 31% of participants reported receiving assistance from formal sources compared with 33% overall seeking assistance from individual organisations. This finding continued to be apparent at the six and 12 month assessments but not at the 36 month assessment (Table 2).

Table 2: Individual additional assistance access

	Assessment point								At any time point	
	3 months		6 months		12 months		36 months			
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Formal treatment service										
Gambling Helpline										
No	117		112		97		60		125	
Yes	4	(3.3)	2	(1.8)	2	(2.0)	0	-	7	(5.3)
Problem Gambling Foundation										
No	109		110		94		59		117	
Yes	12	(9.9)	4	(3.5)	5	(5.1)	1	(1.7)	15	(11.4)
Salvation Army Oasis Centres										
No	114		107		97		58		120	
Yes	7	(5.8)	7	(6.1)	2	(2.0)	2	(3.3)	12	(9.1)
Gamblers Anonymous										
No	114		109		95		57		122	
Yes	7	(5.8)	5	(4.4)	4	(4.0)	3	(5.0)	10	(7.6)
Other problem gambling service										
No	112		107		91		58		111	
Yes	9	(7.4)	7	(6.1)	8	(8.1)	2	(3.3)	21	(15.9)
Online/internet service										
No	120		114		99		60		131	
Yes	1	(0.8)	0	-	0	-	0	-	1	(0.8)
Any of above formal services										
No	*84*		*90*		*80*		*52*		*84*	
Yes	*37*	*(30.6)*	*24*	*(21.1)*	*19*	*(19.2)*	*8*	*(13.3)*	*48*	*(36.4)*
Informal assistance										
Partner										
No	98		99		88		58		101	
Yes	23	(19.0)	15	(13.2)	11	(11.1)	2	(3.3)	31	(23.5)
Family member										
No	94		90		86		58		86	
Yes	27	(22.3)	24	(21.1)	13	(13.1)	2	(3.3)	48	(36.4)
Friend										
No	105		106		94		58		104	
Yes	16	(13.2)	8	(7.0)	5	(5.1)	2	(3.3)	28	(21.2)
Any of above informal assistance										
No	*74*		*79*		*74*		*55*		*63*	
Yes	*47*	*(38.8)*	*35*	*(30.7)*	*25*	*(25.3)*	*5*	*(8.3)*	*69*	*(52.3)*
Other support person										
No	108		104		93		59		109	
Yes	13	(10.7)	10	(8.8)	6	(6.1)	1	(1.7)	23	(17.4)
Any formal/informal assistance										
No	49		58		62		47		39	
Yes	72	(59.5)	56	(49.1)	37	(37.4)	13	(21.7)	93	(70.5)
Total N	*121*		*114*		*99*		*60*		*132*	
N Missing	*29*		*36*		*51*		*90*		*18*	

The median number of sessions, for any treatment services accessed by respondents, was six at the three- and 12-month assessments, 12 at the 12-month assessment and five at the 36-month assessment. The three- and six-month assessments covered a previous three-month period while the 12-month and 36-month assessments each covered a period of six months. The

maximum number of sessions attended by any respondent was 13 or 12 at the three- and six-month assessments respectively, 29 at the 12-month assessment and 26 at the 36-month assessment, which represents approximately weekly attendance at a service (Table 3).

Table 3: Formal service access by assessment point - number of respondents, median, minimum and maximum number of sessions

	Assessment point							
	3 months		6 months		12 months		36 months	
Formal service	No.	Median (min, max)	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)	1	3 (3, 3)
Salvation Army Oasis Centres	7	6 (2, 12)	7	7 (1, 12)	2	13.5 (3, 24)	2	26 (26, 26)
Gamblers Anonymous	7	3 (1, 12)	5	12 (3, 12)	4	24 (20, 24)	3	2 (1, 24)
Other problem gambling support service	9[#]	6 (2, 12)	7	6 (2, 12)	8	3 (1, 12)	2	3.5 (1, 6)
Online/internet service	1	2 (2, 2)	-		-		-	
Any formal service	*37[#]*	*6 (1, 13)*	*24*	*6 (1, 12)*	*19*	*12 (1, 29)*	*8*	*5 (1, 26)*

[#] One respondent did not report number of sessions

4.2 Predictors of successful problem gambling outcomes - PGSI

This section presents data relating to change in PGSI-12 over time. Also presented are data pertaining to associations between change in PGSI-12 score by assessment point and uptake of formal gambling treatment services, socio-demographic characteristics, baseline gambling and related behaviours, and other baseline covariates. Univariate analyses are detailed in section 4.2.1 and multivariate analyses in section 4.2.2.

As the difference in PGSI scores between the time points gives an indication of change in problem gambling severity/risk level, these analyses indicate the variables which are associated with likelihood of improved problem gambling severity outcomes 36-months after initial helpline contact and treatment.

4.2.1 PGSI-12 change - univariate analyses

By assessment point

A statistically significant difference was noted between assessment points for average change in PGSI-12 score from baseline, with a greater decrease in score noted at 36 months in comparison to at 12 months (Table 4). The significance was retained in the multivariate analyses (section 4.2.2).

Table 4: Change in PGSI-12 by assessment point - unadjusted values

	Unadjusted values		
Assessment point	**Est. least squares mean diff.**	**Standard Error**	**p-value**
12 months	-7.29	0.60	
36 months	-9.71	0.85	0.02

At 36 month assessment by uptake of formal services

Table 5 details mean PGSI-12 score change at the 36 month assessment from the baseline score and associations with uptake of formal gambling treatment services in the first three months or in any of the follow-up assessments (three, six, 12 or 36 months). There was no significant difference (Table 5).

Table 5: Change in PGSI-12 by uptake of formal services - unadjusted values

		Unadjusted values		
Uptake of formal services	**Category**	**Est. least squares mean diff.**	**Standard Error**	**p-value**
By 3 months	No	-9.09	1.16	
	Yes	-10.49	1.52	0.47
By 3, 6, 12 or 36 months	No	-9.90	1.14	
	Yes	-9.65	1.40	0.89

At 36 month assessment by socio-demographic characteristics

Although employment status was statistically significantly associated with mean PGSI-12 score change (Table 6), this significance was not retained in the multivariate analyses; thus this finding is likely to be due to confounding from other variables and is of little importance.

Table 6: Change in PGSI-12 at 36 months by employment status - unadjusted values

		Unadjusted values		
	Category	**Est. least squares mean diff.**	**Standard Error**	**p-value**
Employment status	Full time	-11.51	1.11	
	Part time	-8.45	2.58	
	Homemaker/student/retired	-6.91	2.39	
	Unemployed	-11.83	2.54	
	Disabled/illness/sick leave	-0.23	3.65	
	Other	-6.41	3.16	0.04

There were no other statistically significant associations between socio-demographic variables and mean PGSI-12 score at the 36 month assessment from the baseline score (Appendix 3, Table 3.1).

At 36 month assessment by baseline gambling and related behaviours

Table 7 details change in mean PGSI-12 score at the 36 month assessment from the baseline score and associations with baseline gambling and related behaviours which attained a level of statistical significance.

Statistically significant associations were noted between mean change in PGSI-12 score and number of days since the last gamble, and ever receiving any problem gambling assistance prior to the initial assessment. Participants who had not gambled in the past two to four days showed the smallest change in PGSI-12 score at 36 months compared to participants who had not gambled in the past day or for more than five days. Participants who had not received any assistance for their gambling prior to the initial baseline assessment showed a greater change in PGSI-12 score at 36 months than participants who had received assistance.

A statistically significant association between ever receiving any problem gambling assistance prior to the baseline assessment and mean PGSI-12 score change was retained in the multivariate analyses (section 4.2.2). Number of days since the last gamble did not retain a level of statistical significance in the multivariate analyses and thus the finding is likely to be due to confounding from one or more other variables.

Table 7: Change in PGSI-12 at 36 months by baseline gambling and related behaviours - unadjusted values

		Unadjusted values		
	Category	**Est. least squares mean diff.**	**Standard Error**	**p-value**
Number of days since last gamble	0 - 1	-10.30	1.04	
	2 - 4	-5.12	1.82	
	5+	-13.21	1.90	0.01
Previously received assistance	No	-11.54	1.16	
	Yes	-6.75	1.54	0.02

Variables which did not achieve a level of statistical significance are presented in Appendix 3, Table 3.2. These related to baseline: self-reported number of days gambling per month and gambling expenditure per day; primary mode of problem gambling and EGMs as primary gambling mode; self-rated control over gambling; length of problem duration; level of motivation to overcome gambling problem; current goal (dichotomised 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 at the baseline assessment.

At 36 month assessment by other baseline covariates

Although regression analyses indicated that receiving treatment for drug or alcohol issues in the past 12 months when assessed at baseline, rated impact of gambling on family or home life in the last month and level of deprivation (NZDI) were statistically significantly associated with mean PGSI-12 score change (unadjusted values) (Table 8), this significance was not retained in the multivariate analyses; thus these findings are likely to be due to confounding from other variables and are of little importance.

Variables which did not achieve a level of statistical significance are presented in Appendix 3, Table 3.3. These were 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); major and minor depressive disorders and dysthymia (PRIME-MD); current tobacco use; quality of life (WHOQoL-8); treatment or prescription for mental health in the past 12 months; how work, social life, and health were affected in the past month; and legal problems in the past 12 months.

Table 8: Change in PGSI-12 at 36 months by other baseline covariates - unadjusted values

		Unadjusted values		
Baseline covariate	**Category**	**Est. least squares mean diff.**	**Standard Error**	**p-value**
Treatment for drugs/alcohol in last year	No	-10.62	0.86	
	Yes	1.61	3.66	<0.01
How was family/home affected in past month (10 point scale) (quartiles)	0 - 4	-13.19	1.98	
	5 - 7	-11.55	1.46	
	8 - 9	-9.18	1.54	
	10	-3.53	2.20	0.02
NZDI (quartiles)	0 - 0.58	-11.55	1.68	
	0.59 - 1.23	-12.69	1.32	
	1.24 - 2.37	-7.55	1.52	
	2.38+	-4.76	2.08	0.01

4.2.2 PGSI-12 change - multivariate analyses

The statistically significant difference in PGSI-12 change by assessment point was maintained in the multivariate model ($p<0.01$), indicating that overall, a greater reduction in PGSI-12 score was noted at the 36 month assessment (-9.06) than at the 12 month assessment (-6.06) and that improvement in PGSI score continued over time (Table 9).

The statistically significant association between ever receiving any problem gambling assistance prior to the baseline assessment and mean PGSI-12 score change was also retained in the multivariate analyses ($p=0.01$). Overall, participants who previously had ever received any assistance for their gambling problem showed a smaller improvement in mean PGSI-12 score (-6.25) at the 36 month assessment than participants who had not received any assistance (-8.88) (Table 9).

Additionally, the multivariate analyses showed that people who were partnered had a greater improvement in mean PGSI-12 score at 36 months (-9.30) than people who were not partnered (-5.83) ($p <0.001$). Similarly, people who had not received treatment for mental health issues at baseline showed a greater improvement (-9.26) than people who had received treatment for a mental health issue (-5.87) ($p <0.01$). These findings failed to attain a level of statistical significance in the univariate analyses ($p=0.14$ and $p=0.18$ respectively), though the same trends were apparent (Appendix 3, Tables 3.1 and 3.3).

Table 9: Change in PGSI-12 - adjusted values

		Adjusted values†		
Variable	**Category**	**Est. least squares mean diff.**	**Standard Error**	**p-value**
Assessment point	12 months	-6.06	0.69	
	36 months	-9.06	0.82	<0.01
Marital status, dichotomised	Partnered	-9.30	0.81	
	Not partnered	-5.83	0.69	<0.001
Treatment received for mental health	No	-9.26	0.59	
	Yes	-5.87	0.95	<0.01
Previously received assistance	No	-8.88	0.64	
	Yes	-6.25	0.88	0.01

† Adjusted for all other effects in the model

4.3 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 at 36 months from the baseline values as well as change in days gambled from baseline values by assessment point. Associations between change in time-averaged number of days gambled per month at 36 months from the baseline values and uptake of formal gambling treatment services are also presented. Additionally, data pertaining to associations between change in time-averaged number of days gambled per month at 36 months from the baseline values and socio-demographic characteristics, baseline gambling and related behaviours and other baseline covariates are detailed. Univariate analyses are detailed in section 4.3.1 and multivariate analyses in section 4.3.2.

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 improved outcomes 36 months after initial helpline contact and intervention delivery. Assessment point was the only predictor of successful outcome for a reduction in the number of days gambled per month.

4.3.1 Days gambled - univariate analyses

By assessment point

A statistically significant difference was noted between assessment points for mean change in number of days gambled per month from baseline values (Table 10). Participants assessed at 36 months reported, on average, a marginally greater reduction in days gambled per month (-7.13) than was reported at other time points. The significance was retained in the multivariate analyses (section 4.3.2).

Table 10: Change in number of days gambled by assessment point - unadjusted values

	Unadjusted values		
Assessment point	**Est. least squares mean diff.**	**Standard Error**	**p-value**
3 months	-5.87	0.52	
6 months	-6.45	0.37	
12 months	-6.26	0.31	
36 months	-7.13	0.37	0.03

At 36 month assessment by uptake of formal services

Uptake of formal services either within the first three months or at any of the follow-up assessments (three, six, 12 or 36 months) was not associated with time-averaged mean change in number of days gambled per month at the 36 month assessment (Table 11). This finding was retained in the multivariate analyses (section 4.3.2).

Table 11: Change in number of days gambled at 36 months by uptake of formal services - unadjusted values

		Unadjusted values		
Uptake of formal services	**Category**	**Est. least squares mean diff.**	**Standard Error**	**p-value**
By 3 months	No	-5.89	0.35	
	Yes	-6.94	0.53	0.10
By 3, 6, 12 or 36 months	No	-6.22	0.35	
	Yes	-6.85	0.47	0.29

At 36 month assessment by socio-demographic characteristics

There were no statistically significant associations between mean change in time-averaged number of days gambled per month from the baseline score and socio-demographic characteristics at 36 months (Appendix 4, Table 4.1). Socio-demographic characteristics examined included: gender, age, ethnicity, marital status, employment status, highest educational qualification, gross annual family income and area of residence.

At 36 month assessment 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 at 36 months from baseline values and baseline gambling (dichotomised to EGM vs. other) and related behaviours, or any other baseline covariates examined (Appendix 4, Tables 4.2 and 4.3).

4.3.2 Days gambled - multivariate analyses

When other variables were included in the model, assessment point was the only variable which appeared in the multivariate analysis; thus exactly the same results were obtained as for the univariate analyses (cf: Table 11).

4.4 Predictors of successful gambling outcomes - money lost

This section presents data pertaining to change in time-averaged money (dollars) lost gambling per month at 36 months from the baseline values. Findings include change in money lost per month from baseline values by assessment point and associations between change in time-averaged money lost gambling per month at 36 months from the baseline values and uptake of formal gambling treatment services. Also presented are data pertaining to associations between change in time-averaged money lost gambling per month at 36 months from the baseline values and socio-demographic characteristics, baseline gambling and related behaviours, and other baseline covariates. Univariate analyses are detailed in section 4.4.1 and multivariate analyses in section 4.4.2.

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 improved outcomes 36 months after initial helpline contact and treatment.

4.4.1 Money lost - univariate analyses

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 12).

Table 12: Change in money lost by assessment point - unadjusted values

	Unadjusted values		
Assessment point	**Est. least squares mean diff.**	**Standard Error**	**p-value**
3 months	-37.30	2.20	
6 months	-38.60	1.56	
12 months	-37.05	1.28	
36 months	-39.66	1.54	0.25

At 36 month assessment by uptake of formal services

A level of statistical significance for time-averaged mean change in money lost gambling per month (unadjusted values) at the 36 month assessment was not attained when uptake of formal services in the first three months, or by any of the follow-up assessments (three, six, 12 or 36 months) was examined (Table 13).

Table 13: Change in money lost at 36 months by uptake of formal services - unadjusted values

		Unadjusted values		
Uptake of formal services	**Category**	**Est. least squares mean diff.**	**Standard Error**	**p-value**
By 3 months	No	-36.70	1.40	
	Yes	-40.38	2.08	0.15
By 3, 6, 12 or 36 months	No	-37.00	1.46	
	Yes	-39.63	1.94	0.28

At 36 month assessment by socio-demographic characteristics

No statistically significant differences were noted for time-averaged mean change in money lost gambling per month at 36 months and any socio-demographic characteristics examined (Appendix 5, Table 5.1).

At 36 month assessment by baseline gambling and related behaviours

This section details change in time-averaged mean money lost gambling per month at 36 months from the baseline score and associations with baseline gambling and related behaviours which attained a level of statistical significance.

A statistically significantly association between change in time-averaged mean money lost gambling per month at 36 months and baseline PGSI-12 score was noted. Participants who scored 18 or more (upper two quartiles) on the PGSI-12 at baseline showed a smaller reduction in time-averaged mean money lost gambling per month (approximately $33 reduction) than participants who scored 17 or less at baseline (approximately $40/$42 reduction) (Table 14). This finding was retained in the multivariate analyses (section 4.4.2).

Table 14: Change in money lost at 36 months by baseline PGSI-12 - unadjusted values

	Unadjusted values		
PGSI-12 score (quartiles)	Est. least squares mean diff.	Standard Error	p-value
0 - 14	-39.62	2.10	
15 - 17	-41.97	2.02	
18 - 20	-33.51	2.32	
21+	-33.87	2.58	0.01

Variables which did not achieve a level of statistical significance are presented in Appendix 5, Table 5.2. 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 (dichotomised 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.

At 36 months by other baseline covariates

Table 15 details mean change in time-averaged money lost gambling per month at 36 months from the baseline score and associations with other baseline covariates which attained a level of statistical significance.

Participants who had lower quality of life at baseline (WHOQoL-8 scores in the lower two quartiles) reported a statistically significant lower mean change in time-averaged money lost gambling per month at 36 months than participants who had a higher quality of life (in the upper two quartiles) at baseline (Table 15). 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 15: Change in money lost at 36 months by baseline quality of life - unadjusted values

	Unadjusted values		
WHOQoL-8 (quartiles)	Est. least squares mean diff.	Standard Error	p-value
0 - 20	-31.40	2.59	
21 - 25	-36.72	2.33	
26 - 29	-41.26	2.29	
30+	-41.14	2.30	0.02

Variables which did not achieve a level of statistical significance are presented in Appendix 5 Table 5.3. 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); major depressive disorder, minor depressive disorder and dysthymia (PRIME-MD); current tobacco use; 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.

4.4.2 Money lost - multivariate analyses

When other variables were included in the model, PGSI-12 was the only variable which appeared in the multivariate analysis; thus exactly the same results were obtained as for the univariate analyses (cf: Table 14).

4.5 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. It includes change in control over gambling by assessment point and associations between change in time-averaged control over gambling at 36 months from the baseline values and uptake of formal gambling treatment services. Also presented are data pertaining to associations between change in time-averaged control over gambling at 36 months from the baseline values and socio-demographic characteristics, baseline gambling and related behaviours, and other baseline covariates. Univariate analyses are detailed in section 4.5.1 and multivariate analyses in section 4.5.2.

These analyses indicate which variables are associated with likelihood of improved outcomes after initial helpline contact and treatment.

4.5.1 Control over gambling - univariate analyses

By assessment point

No statistically significant difference was noted between assessment points for mean change in control over gambling from baseline values (Table 16).

Table 16: Change in control over gambling by assessment point - unadjusted values

	Unadjusted values		
Assessment point	**Est. least squares mean diff.**	**Standard Error**	**p-value**
3 months	3.54	0.42	
6 months	3.89	0.29	
12 months	3.98	0.24	
36 months	4.31	0.28	0.29

At 36 month assessment by uptake of formal services

No statistically significant difference in mean change in time-averaged control over gambling at the 36 month assessment was noted when uptake of formal services in the first three months, or by any of the follow-up assessments (three, six, 12 or 36 months) was examined (Table 17).

Table 17: Change in control over gambling at 36 months by uptake of formal services - unadjusted values

		Unadjusted values		
Uptake of formal services	**Category**	**Est. least squares mean diff.**	**Standard Error**	**p-value**
By 3 months	No	3.95	0.27	
	Yes	4.18	0.38	0.63
By 3, 6, 12 or 36 months	No	3.86	0.27	
	Yes	4.24	0.35	0.39

At 36 months by socio-demographic characteristics

Table 18 details mean change in time-averaged control over gambling at 36 months from the baseline score and associations with socio-demographic characteristics which attained a level of statistical significance.

Marital status (both dichotomised and by category) was statistically significantly associated with change in time-averaged mean control over gambling at 36 months. 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 18: Change in control over gambling at 36 months by marital status - unadjusted values

		Unadjusted values		
Variable	**Category**	**Est. least squares mean diff.**	**Standard Error**	**p-value**
Marital status (Dichotomised)	Partnered	4.61	0.30	
	Not partnered	3.46	0.28	0.01
Marital status	Never married	3.22	0.41	
	Married	5.06	0.41	
	De-facto	4.11	0.44	
	Separated	3.61	0.57	
	Divorced	3.98	0.64	
	Widowed	3.14	1.04	0.05

Variables which did not achieve a level of statistical significance are presented in Appendix 6, Table 6.1. These related to baseline gender, age, ethnicity, employment status, highest educational qualification, gross annual family income, and area of residence.

At 36 months by baseline gambling and related behaviours

Table 19 details mean change in time-averaged control over gambling at 36 months 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 at 36 months was noted. The significance was retained in the multivariate analyses (section 4.5.2).

A statistically significant association between baseline perceived level of difficulty in overcoming the gambling problem and mean change in time-averaged control over gambling at 36 months was also noted. However, this finding was not retained in the multivariate analyses when confounding factors were controlled.

Table 19: Change in control over gambling at 36 months by baseline gambling and related behaviours - unadjusted values

Variable	Category	Unadjusted values		
		Est. least squares mean diff.	Standard Error	p-value
Belief in treatment success, dichotomised	Lower than median	3.51	0.29	
	Higher than median	4.60	0.30	0.01
Perceived level of difficulty in overcoming problem (scale 1-10) (quartiles)	0 - 5	5.15	0.41	
	6 - 7	4.26	0.48	
	8 - 9	3.44	0.39	
	10	3.27	0.38	<0.01

Variables which did not achieve a level of statistical significance are presented in Appendix 6, Table 6.2. These related to baseline: primary problem gambling mode (dichotomised to EGM vs. other); PGSI-12; self-reported number of days gambling per month and gambling expenditure per day; length of problem duration; level of motivation to overcome gambling problem; current goal (dichotomised 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.

At 36 months by other baseline covariates

Table 20 details mean change in time-averaged control over gambling at 36 months from the baseline value and associations with other baseline covariates which attained a level of statistical significance.

Statistically significant lower change in control over gambling at 36 months was noted for participants who at baseline had suicidal thoughts in the previous 12 months, had major depressive disorder or dysthymia (measured by PRIME-MD), had the lowest quality of life (lowest quartile on WHOQoL-8), had received treatment for a mental health issue in the past year and who had higher levels of deprivation (upper two quartiles on NZDI). However, the

statistically significant differences were not retained (apart from for deprivation level and quality of life; section 4.5.2) in multivariate analyses (section 4.5.2) and are likely to be explained by confounding by other variables.

Table 20: Change in control over gambling at 36 months by other baseline covariates - unadjusted values

		Unadjusted values		
Variable	**Category**	**Est. least squares mean diff.**	**Standard Error**	**p-value**
Suicide ideation	No	4.30	0.26	
	Yes	3.36	0.38	0.04
Prime MD - Major depressive disorder	No	4.56	0.33	
	Yes	3.62	0.29	0.04
Prime MD - Dysthymia	No	4.56	0.27	
	Yes	3.29	0.33	<0.01
WHOQoL-8 (quartiles)	0 - 20	2.24	0.45	
	21 - 25	4.29	0.41	
	26 - 29	4.37	0.39	
	30+	4.89	0.40	<0.001
NZDI (quartiles)	0 - 0.58	5.16	0.36	
	0.59 - 1.23	4.41	0.40	
	1.24 - 2.37	3.22	0.40	
	2.38+	3.16	0.44	<0.001
Treatment, mental health last year	No	4.27	0.24	
	Yes	3.12	0.44	0.02

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); 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.

4.5.2 Control over gambling - multivariate analyses

The statistically significant difference in association between higher average level of deprivation (NZDI) at baseline and less change in control over gambling at 36 months was maintained in the multivariate model (p=0.03), indicating that overall, participants who were in the upper two quartiles for deprivation had less change in control over gambling (3.66 or less) than participants in the lower two quartiles for deprivation (4.42 or more) (Table 21).

The statistically significant association between quality of life at the baseline assessment and change in control over gambling at 36 months was also retained in the multivariate analyses (p=0.001). Overall, participants who had the lowest quality of life (lowest quartile) had less change in control over gambling (2.56) than participants who had a higher quality of life (4.50 or more) (Table 21).

Additionally, the multivariate analyses showed that people who had lower than median belief in treatment success at baseline showed less change in control over gambling (3.60) at 36 months than people who had higher median belief in treatment success (4.52) (p=0.02).

Table 21: Change in control over gambling at 36 months by New Zealand Deprivation Index - adjusted values

		Adjusted values†		
		Est. least squares mean diff.	Standard Error	p-value
NZDI (quartiles)	0 - 0.58	4.85	0.35	
	0.59 - 1.23	4.42	0.38	
	1.24 - 2.37	3.31	0.38	
	2.38+	3.66	0.45	0.03
WHOQoL-8 (quartiles)	0 - 20	2.56	0.43	
	21 - 25	4.52	0.38	
	26 - 29	4.50	0.38	
	30+	4.66	0.39	0.001
Belief in treatment success, dichotomised	Lower than median	3.60	0.26	
	Higher than median	4.52	0.28	0.02

†Adjusted for all other effects in the model

4.6 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). It details treatment success by assessment point and association between time-averaged treatment success and uptake of formal gambling treatment services. Also presented are data pertaining to associations between time-averaged treatment success at 36 months and socio-demographic characteristics, baseline gambling and related behaviours and other baseline covariates. Univariate analyses are detailed in section 4.6.1. As there were no statistically significant differences, multivariate analyses were not undertaken.

4.6.1 Treatment success - univariate analyses

By assessment point

No statistically significant difference was noted between assessment points for treatment success (Table 22)

Table 22: Univariate logistic regression for treatment success by assessment point

	Univariate odds ratio		
Assessment point	Odds Ratio	(95% CI)	p-value
3 months	0.81	(0.07, 9.24)	
6 months	0.74	(0.13, 4.07)	
12 months	0.58	(0.15, 2.29)	
36 months	1.00		0.89

At 36 months by uptake of formal services

There was no difference in time-averaged treatment success at the 36 month assessment when examined by uptake of formal services in the first three months, or by any of the follow-up assessments (three, six, 12 or 36 months) (Table 23).

Table 23: Univariate logistic regression for treatment success by uptake of formal services

		Univariate odds ratio		
Uptake of formal services	**Category**	**Odds Ratio**	**(95% CI)**	**p-value**
By 3 months	No	0.77	(0.27, 2.23)	
	Yes	1.00		0.63
By 3, 6, 12 or 36 months	No	0.70	(0.26, 1.88)	
	Yes	1.00		0.48

At 36 months 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 7, Tables 7.1 to 7.3).

5 OVERVIEW, DISCUSSION AND CONCLUSIONS

Overview

A major purpose of the report on the initial 12 months of this study was to see whether there were differences in treatment outcomes between clients who only accessed the gambling helpline and those who subsequently obtained additional formal assistance for problem gambling. A further purpose was to identify client characteristics associated with treatment outcome. The present report assesses the durability of treatment outcomes 36 months after clients received helpline treatment. This includes examination of potential 36 month outcome differences between those who did and those who did not receive additional formal treatment. It also examines participant characteristics in relation to 36 month outcomes.

A notable finding at 12 months was that participants improved substantially, with statistically and clinically significant changes in gambling, problem gambling and a number of associated mental health problems. For most gambling measures and psychological distress these improvements occurred during the initial three months and were sustained throughout subsequent assessments. With regard to gambling, this included participant-assessed control over gambling, days gambled, money lost gambling, problem gambling severity (PGSI-3; three month time frame) and impacts on work, social life, family/home life and physical health. At 12 months there was also a substantial reduction in problem gambling severity (PGSI-12, 12 month time frame), major and minor depression, and drug misuse. There was a modest reduction in tobacco use. Initially, alcohol misuse reduced somewhat but returned to just below baseline levels at 12 months.

These results are impressive, particularly given the severity of client gambling problems, high levels of psychological distress and other morbidities. The changes were of large magnitude and mostly sustained throughout the 12 month follow-up. Additionally, they were achieved even though most participants received only one helpline counselling session and did not subsequently access other, more intensive, gambling counselling. As previously indicated, the 36 month follow-up was largely conducted to determine whether or not these outcomes were sustained longer-term.

Participants chose their own treatment goal. At baseline, somewhat less than two-thirds wanted to quit all forms of gambling, a fifth wanted to quit one or more forms and just over a tenth sought to control their gambling. At baseline, a few participants reported that they wanted to maintain gambling abstinence. Goals changed over time. Most notable was a reduction in the proportion who sought to quit all forms of gambling and an increase in the proportion who wanted to maintain abstinence. At 12 months, the proportion wanting to quit more than halved and was slightly exceeded by those who wanted to maintain abstinence. There was much less change over time in the proportions seeking to quit some forms or to control their gambling.

From 12 to 36 months there was little or no change in the proportions wanting to quit all forms of gambling, to quit some forms or to maintain gambling abstinence. However, the proportion wanting to control their gambling increased and was similar to the proportions who sought to quit all forms of gambling or maintain abstinence. It is likely that treatment goals are strongly influenced by treatment outcomes. For example, the reduction in the percentage of clients wanting to quit all forms of gambling was probably largely attributable to the rise in the number who attained this goal. Many of these people probably changed their goal to maintaining abstinence. The reason for the 12 month to 36 month rise in the percentage seeking to control their gambling is less clear. Changes in treatment goals, per se and in relation to treatment outcomes, can be only partially assessed by using aggregate data. Examination of these

relationships requires consideration of individual participant trajectories over time. Secondary analyses, using data from the present study and the associated clinical trial, will subsequently be conducted to examine changes in treatment goals including factors that influence them and consequences of change.

With respect to the gambling and problem gambling measures, 36 month outcomes were either similar to the outcomes at 12 months, or better. For money lost, control over gambling and treatment success, 12 month improvements were sustained at 36 months. Further improvement from 12 months to 36 months was found for number of days gambled. There were also further reductions in the median PGSI-3 and PGSI-12 scores from 12 months to 36 months. The PGSI-3 median score decreased from six to two; the PGSI-12 median from nine to five. A score of two is in the low-risk gambling category and a score of five is the mid-point in the moderate-risk category. At baseline, the PGSI-3 and PGSI-12 median scores were respectively 18 and 17.

At baseline, the great majority of clients (96.5%) were classified as PGSI-12 problem gamblers. The remainder were moderate-risk gamblers. At 12 months, 57.5% remained in the problem gambling category and there was an increase in the other groups (25.5% moderate-risk, 11.7% low-risk and 5.3% non-problem gambling). Thus, while there was a marked reduction in client median problem gambling severity during the 12 month follow-up, over a half remained problem gamblers and a quarter remained sub-clinical moderate-risk gamblers. At 36 months, the proportion of problem gamblers reduced further (38.3%), the moderate-risk and low-risk proportions remained much the same, and the non-problem group increased to over a quarter (26.7%). Thus, as with the changes in median scores, improvement continued over time.

In discussing the 12 month results, Abbott et al. (2013) noted that a number of the PGSI items refer to gambling experiences and consequences that can be expected to persist for some time, even when people stop gambling completely or moderate their gambling at a lower level. Research is required to examine change in responses to the various PGSI questions over time, both in treatment seeking and non-treatment seeking problem gamblers. It is probable that responses to some questions change quite rapidly after treatment engagement, whereas others change more slowly. This research could assist in advancing understanding of the problem gambling construct, its measurement, recovery processes and the impacts of gambling cessation and moderation.

At baseline, a majority of clients reported high levels of psychological distress. Almost all of the remainder reported medium distress levels. This is consistent with previous studies which found that most people seek help for gambling problems when they have reached a crisis point and are experiencing serious adverse personal and family consequences (Hing, Nuske & Gainsbury, 2011; Pulford et al., 2009; Suurvali, Hodgins, Toneatto & Cunningham, 2008). At three months, the proportion reporting high distress was less than a quarter of that at baseline and just under a half were in the low distress category. There was no change in medium distress proportions from baseline at either three or six months. At 12 months, there was a moderate reduction in medium distress proportions, and a further increase in low distress to somewhat less than two-thirds of all participants. The proportion reporting high distress remained at around one in ten at the three, six and 12 month assessments. However, at 36 months it reduced to less than one in twenty. In contrast, there was an increase in moderate distress participants, returning to the three and six month proportions. Low distress proportions were much the same at 12 and 36 months.

At baseline over a half of the participants were assessed as suffering from major depression, over a third from dysthymia and somewhat more than one in ten from minor depression. At 12 months there were substantial reductions in major and minor depression. Both reduced by

over two-thirds. Less change was evident for dysthymia, which reduced by around a quarter. These reductions were sustained at 36 months. Throughout the study there was a gradual reduction in tobacco smoking. Commencing at 60% at baseline, prevalence reduced slightly at each assessment point. At 36 months the rate had reduced by just under a third. Alcohol abuse or dependence showed a somewhat different pattern. It decreased slightly from baseline to six months but then increased at 12 months and again at 36 months to a level slightly above that at the outset. Nearly a quarter were assessed as having another form of drug abuse, around a half at a low level. This reduced by around two-thirds at 12 months. At 36 months, the proportion increased to somewhat over half the baseline prevalence.

In summary, most of the gambling and other 12 month changes, including reduced psychological distress and lower rates of depressive disorders, were sustained at 36 months. On some measures there were further improvements. This included number of days gambled, median problem gambling severity and the proportion of problem gamblers. There was a further slight reduction in tobacco use. Alcohol and other drug abuse, in contrast, increased somewhat at 36 months. However, as mentioned, for drug abuse it was still lower than at baseline.

Discussion

The great majority of problem gambling outcome studies and clinical trials have been of short duration with follow-ups often extending to only 12 months and rarely exceeding two years (Abbott et al., 2013, in press; Carlbring, Jonsson, Josephson & Forsberg, 2010; Diskin & Hodgins, 2009; Hodgins, Currie, el-Guebaly & Peden, 2004; Robson, Edwards, Smith & Colman, 2002; Toneatto & Dragonetti, 2008). They also typically have small samples and high, non-random attrition. These features, along with a raft of other methodological deficiencies, reduce confidence in their results. The current study and associated clinical trial have relatively large samples of participants who sought help from a national gambling service and who were similar to helpline clients generally. Additionally, retention was high at the three, six and 12 month assessments and those who were lost to the study did not differ in any systematic way from those who were retained. This increases our confidence that the findings are robust and can be generalised to the helpline population and, to a lesser extent, to help seeking problem gamblers elsewhere. Attrition was higher at 36 months. The reduced sample size precluded some analyses. However, those retained in the study were again similar to those who were lost to it. It is not known whether participants who were contacted at 36 months differed in ways that were not measured or whether such differences, if present, influenced treatment outcomes. This uncertainty warrants a degree of caution. The study also relies heavily on client self-report and such reports are unlikely to be entirely valid and reliable. Efforts were made to secure independent accounts of gambling from collateral sources nominated by study participants. Unfortunately, there were insufficient collateral reports at 36 months to allow meaningful analysis. However, reasonable agreement was found at earlier assessment points (Abbott et al., 2012).

While likely that the study outcomes are similar to those for helpline clients generally, it cannot be concluded that they are attributable to the helpline intervention per se. This cannot be ascertained from an uncontrolled outcome study. Randomised controlled trials (RCT) that include interventions of known effectiveness and/or placebo or wait-list control groups are required to assess therapy effectiveness. However, the helpline standard care intervention used in the present study was included in a RCT that involved comparison with three other interventions (Abbott et al., 2012, in press). Two of these interventions had previously been included in efficacy trials that enabled comparison with wait-list control group outcomes (Hodgins et al., 2001, 2004, 2009). It was found that participants in the intervention groups did

significantly better than the waitlist controls. Given that standard care participants obtained similar outcomes to participants in these intervention groups in the New Zealand trial, it is highly likely that the helpline intervention contributed to the outcomes reported in the present study.

The high levels of co-occurrence of problem gambling with alcohol and substance misuse are consistent with findings from previous clinical studies and general population prevalence studies including the New Zealand National Gambling Study (Abbott, Bellringer, Garrett & Mundy-McPherson 2014a, 2014b; Barns et al., 2015; Lorains et al., 2011). These findings are part of the reason why problem gambling has recently been reclassified in the DSM5 as gambling disorder within the addictive disorders category. There is also very high co-occurrence of problem gambling and affective and anxiety disorders. The present study results are of interest in that substantial, sustained improvements were found for overall psychological distress and major and minor depression. The outcomes for major depression are of similar magnitude to outcomes following psychological and pharmacological treatments specifically indicated for this disorder (Carlbring et al., 2010; Łabuzek, Beil, Beil-Gawełczyk, Gabryel, Franik, & Okopień, 2014). It is likely that stopping or controlling gambling and reducing gambling-related problems played a role in decreasing depressive symptomatology and psychological distress. Further research is required, including the examination of additional help-seeking for anxiety and depressive disorders and the natural histories and linkages between gambling and commonly associated disorders.

Although there were reductions in tobacco use and drug misuse, at 36 months these reductions were less than for gambling, problem gambling, psychological distress and depression. As mentioned, there was no reduction in alcohol misuse at 36 months. Given the high co-occurrence of these disorders with problem gambling and their relatively low levels of improvement, it would appear prudent for specialist problem gambling services to assess them and either provide additional treatment or referral to other service providers. However, this requires further consideration and research. It is not known how acceptable this would be to clients who are approaching a gambling-specific treatment provider to help them stop or moderate their gambling. In some cases it might compromise attaining their gambling treatment goals. However, it is probable that co-occurring disorders play a role in longer-term recovery. Nower et al. (2013) are of the view that co-morbid addictive behaviours may provide 'relapse triggers' for gambling. These matters have been little investigated but are important going forward and finding ways to enhance client outcomes by better matching clients and interventions.

It is important to note that many participants received additional specialist assistance for problem gambling. Many also reported receiving informal support. An important aspect of the helpline intervention was to increase callers' awareness of other avenues for assistance. In New Zealand, specialist face-to-face problem gambling treatment services are widely available nation-wide and uptake is relatively high. This means that it is likely that these services and supports contributed substantially to client outcomes. It cannot be assumed that outcomes would be similar in jurisdictions that are less well-served in this regard. More specifically, over two-thirds of study participants, at one or more of the assessment points, reported that they had received assistance for their gambling problem that was additional to the helpline session. Around a half reported informal assistance; a third formal assistance. Participants more often reported receiving formal and informal assistance during the first three months and the median number of formal therapy sessions during this period was six. At subsequent assessments the proportions reporting additional help-seeking progressively reduced. At 36 months, 13% reported receiving formal assistance during the past six months. Eight percent reported receiving informal assistance during this period.

Receiving additional formal assistance for problem gambling by three months, or by three, six, 12 or 36 months, was not found to be associated with 36 month PGSI-12 scores, time-averaged mean change in number of days gambled per month, money lost gambling per month, control over gambling, and treatment success. As noted in Abbott et al. (2013) where the 12 month study findings were discussed, this does not mean that receiving additional formal assistance did not contribute to treatment outcome. This cannot be determined from the present study because participants chose whether or not to obtain additional assistance. They were not randomly assigned. It is possible, indeed probable, that most sought additional help because they felt they needed it, and that they did better than they would have had they not done so. Additionally, many of the two-thirds of clients who did not seek additional assistance may have made this choice because they had made progress or met their treatment goal. Secondary analyses of relevant study data could shed some light on these matters.

The present study and related clinical trials (Hodgins et al., 2001, 2004, 2009) included similar follow-up assessments; for this study they were at three, six, 12 and 36 months. It is possible that researcher contact and repeated assessments contributed to the maintenance of outcomes from three to 12 months. The assessment at 12 months may also have had some impact; however, it is unlikely to have been a factor in the sustained or improved outcomes at the 36 month assessment.

One purpose of the study was to see if some participant groups had better outcomes than others. With regard to problem gambling outcomes, the PGSI-12 is the most clinically relevant measure. On this measure, people who had an illness, were on sick leave or were widowed had worse outcomes than other employment groups, especially those in paid employment. People without a partner also had worse outcomes than those who were partnered, although the significance of this relationship was not sustained in the multivariate analysis probably, at least in part, because of its overlap with the illness/sick leave/widowed category. Pub EGM participation, especially in comparison to casino EGM or table game participation, also predicted worse outcomes at 12 months. Relative to people with other types of affective disorder, those with minor depression had better outcomes. So too did those who were resident in the two least deprived deprivation quartiles.

The relationships between the preceding baseline measures and PGSI-12 outcomes at 12 months applied only to that outcome, not the other gambling outcomes. A few additional baseline measures were identified that related to these other outcomes, namely high PGSI-12 severity, 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. In all cases, these factors predicted a worse outcome. These findings are discussed in Abbott et al. (2013). As with the baseline factors associated with PGSI-12 outcomes, at 12 months they applied to only a single outcome measure. This means that overall there were generally minimal or no differences between groups. In other words, for the most part, similar statistically and clinically significant improvements occurred irrespective of age, gender, ethnicity, and most of the other socio-demographic and other baseline client characteristics that were considered. This was also the case for the 36 month gambling and problem gambling outcomes outlined in this report.

With regard to the PGSI-12, as mentioned, participants generally showed greater improvement at 36 months than at 12 months. However, there was greater improvement for those who had partners compared with those who did not and there was also greater improvement for those who had not previously received treatment for a gambling (never received) or other mental health problem (in past 12 months). Being partnered was also associated with greater 12 month PGSI-12 improvement although, as mentioned, it was no longer significant when considered alongside other baseline measures in a multivariate analysis. In contrast to the 12 month

findings, having pub EGMs as the primary gambling mode did not predict longer term outcome differences. Neither did deprivation nor having an affective disorder other than minor depression. It is of interest that clients who had not previously received treatment for a gambling or other mental health problem had, on average, better outcomes at 36 months than those who had previously received treatment. Previous formal help-seeking could reflect more chronic or recurring gambling problems and/or co-morbid disorders. This might be a client group that would benefit further by receiving additional, more intensive support. Further research is required on this topic.

As for PGSI-12, there was also further improvement from 12 months to 36 months for the number of days gambled per month. None of the baseline measures were associated with this improvement. In contrast to PGSI-12 and number of days gambled per month, there were no further improvements from 12 months to 36 months in time-averaged money lost gambling, control over gambling and treatment success. For these outcome measures, as discussed earlier, 12 month improvements were sustained. For money lost gambling, participants with higher PGSI-12 scores at baseline had smaller reductions of money lost than participants with lower scores. This was also the case at 12 months. Participants with higher levels of deprivation at baseline experienced less increase in control over gambling than those with lower levels. Participants with low quality of life and lower belief in treatment success also improved less on this outcome measure than was the case for their counterparts with higher quality of life and belief in treatment success. Low quality of life and lower belief in treatment success were also predictive of less of improvement on this outcome at 12 months. Higher deprivation was associated at 12 months too, although this relationship failed to reach significance in a multivariate analysis including other baseline measures.

Conclusions

The primary purpose of the 36 month follow-up was to assess the durability of participant outcomes and to identify predictors of successful outcomes.

Although the findings relating to variation in 12 month and 36 month treatment outcomes have potential relevance to the matching of client sub-groups to interventions of varying types and intensities, a major conclusion of this study is that many factors had little or no association with treatment outcomes. None had an association with more than a single outcome. At 12 months is was noted that participants generally, irrespective of their socio-demographic or other characteristics, experienced clinically significant, sustained improvement for their gambling and some related problems. From the results presented in this report, it is evident that this was also the case at 36 months.

The other major conclusions are that the substantial treatment gains identified at 12 months were either sustained or showed further improvement at 36 months and that engagement in additional gambling treatment was not associated with better treatment outcomes. The two-thirds who did not receive additional therapy from predominantly face-to-face gambling treatment providers did as well as the third who did receive additional treatment. As discussed, this does not mean that this additional assistance was not of value. People who received it may have been people who, for any of a variety of reasons, required it. This might include having more serious problems and/or not making progress. Had they not received this help they might have had worse outcomes. If this is the case, it is of interest that those who obtained additional treatment were not found to have more serious gambling problems, greater psychopathology or less confidence in achieving their treatment goals at baseline (Abbott et al., 2013).

The treatment outcomes from this study appear to be similar to those achieved in clinical trials and outcome studies of multi-session face-to-face treatments (Carlbring et al., 2010; Toneatto & Dragonetti, 2008). This strongly suggests that many, perhaps most, people seeking formal help for a gambling problem do not require more intensive, longer duration face-to-face interventions. The challenge is to identify clients who do, and do not, require more intensive interventions from the outset. The present study provides some relevant information. However, uncontrolled outcome studies have limitations in this regard. Much more useful information can be provided by random allocation of clients to a brief intervention of the type used in this study and a longer duration, multi-session treatment programme or programmes. This type of investigation allows assessment of their relative efficacy. If the sample size is sufficient, it also enables identification of which clients do better with different types of intervention and which have similar outcomes in both. For policy and service planning purposes it is also important to assess the relative costs of programmes, alongside the treatment outcome and related benefits. Thus, further consideration of the findings from this and other studies, as well as additional research, is required to refine the stepped-care model presently in operation to optimally and cost-effectively match client need with interventions of various type and intensity.

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APPENDIX 1
Ethical approval

Health and Disability Ethics Committees

Health and Disability Ethics Committees
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hdecs@moh.govt.nz

22 August 2012

Professor Max Abbott
Auckland University of Technology
National Institute for Public Health & mental Health
Private Bag 92006
Auckland 1142

Dear Professor Abbott

Ethics ref:	**MEC/09/04/043** (please quote in all correspondence)
Study title:	Effectiveness study of problem gambling standard and brief interventions

I am pleased to advise that this amendment has been *approved* by the Northern B Health and Disability Ethics Committee. This decision was made through the expedited review pathway.

Please don't hesitate to contact the HDEC secretariat for further information.

Yours sincerely,

Mrs Raewyn Sporle
Chairperson
Northern B Health and Disability Ethics Committee

Encl: appendix A: documents submitted

APPENDIX 2
Descriptive statistics

Table 2.1: Socio-demographics by assessment point

	Assessment point									
	Baseline		3 months		6 months		12 months		36 months	
Variable	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**
Gender										
Male	64	(42.7)	56	(43.4)	51	(42.9)	42	(42.4)	29	(48.3)
Female	86	(57.3)	73	(56.6)	68	(57.1)	57	(57.6)	31	(51.7)
Marital status										
Never married	39	(26.2)	35	(27.1)	31	(26.1)	25	(25.3)	16	(26.7)
Married	34	(22.8)	32	(24.8)	30	(25.2)	25	(25.3)	14	(23.3)
De facto	39	(26.2)	30	(23.3)	28	(23.5)	21	(21.2)	11	(18.3)
Separated	19	(12.8)	16	(12.4)	13	(10.9)	12	(12.1)	9	(15.0)
Divorced	12	(8.1)	12	(9.3)	12	(10.1)	12	(12.1)	7	(11.7)
Widowed	6	(4.0)	4	(3.1)	5	(4.2)	4	(4.0)	3	(5.0)
Age group										
18 - 24 years	20	(13.7)	17	(13.3)	15	(12.7)	8	(8.1)	6	(10.2)
25 - 34 years	37	(25.3)	28	(21.9)	26	(22.0)	21	(21.2)	15	(25.4)
35 - 44 years	39	(26.7)	36	(28.1)	31	(26.3)	28	(28.3)	17	(28.8)
45 - 54 years	29	(19.9)	28	(21.9)	27	(22.9)	25	(25.3)	16	(27.1)
55+ years	21	(14.4)	19	(14.8)	19	(16.1)	17	(17.2)	5	(8.5)
Prioritised ethnicity										
Māori	65	(43.3)	56	(43.4)	51	(42.9)	40	(40.4)	26	(43.3)
Pacific	15	(10.0)	12	(9.3)	10	(8.4)	6	(6.1)	3	(5.0)
Asian & Other	7	(4.7)	4	(3.1)	4	(3.4)	4	(4.0)	3	(5.0)
European	63	(42.0)	57	(44.2)	54	(45.4)	49	(49.5)	28	(46.7)
Ethnicity - Any										
Māori	65	(43.3)	56	(43.4)	51	(42.9)	40	(40.4)	26	(43.3)
Pacific	18	(12.0)	14	(10.9)	12	(10.1)	7	(7.1)	4	(6.7)
Asian & Other	7	(4.7)	4	(3.1)	4	(3.4)	4	(4.0)	0	-
European	74	(49.3)	64	(49.6)	61	(51.3)	56	(56.6)	34	(56.7)
Employment status										
Full time	65	(43.6)	59	(45.7)	55	(46.2)	50	(50.5)	33	(55.0)
Part time	19	(12.8)	15	(11.6)	13	(10.9)	12	(12.1)	6	(10.0)
Homemaker/student/retired	23	(15.4)	17	(13.2)	15	(12.6)	9	(9.1)	7	(11.7)
Unemployed	20	(13.4)	18	(14.0)	18	(15.1)	14	(14.1)	7	(11.7)
Disabled/illness/sick leave	9	(6.0)	9	(7.0)	6	(5.0)	7	(7.1)	3	(5.0)
Other	13	(8.7)	11	(8.5)	12	(10.1)	7	(7.1)	4	(6.7)
Highest educational qualification achieved										
None	40	(26.7)	37	(28.7)	31	(26.1)	26	(26.3)	13	(21.7)
Secondary school qual.	48	(32.0)	40	(31.0)	39	(32.8)	32	(32.3)	18	(30.0)
Trade/technical certificate	27	(18.0)	24	(18.6)	22	(18.5)	18	(18.2)	13	(21.7)
Professional qualification	5	(3.3)	3	(2.3)	3	(2.5)	3	(3.0)	0	-
Undergrad. Dip. or Cert.	13	(8.7)	11	(8.5)	10	(8.4)	8	(8.1)	5	(8.3)
University degree & above	11	(7.3)	10	(7.8)	10	(8.4)	9	(9.1)	7	(11.7)
Other	6	(4.0)	4	(3.1)	4	(3.4)	3	(3.0)	4	(6.7)

	Assessment point									
	Baseline		3 months		6 months		12 months		36 months	
Variable	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**
Gross family income in last 12 months										
<$20,000	37	(28.0)	31	(27.0)	27	(25.2)	23	(25.8)	14	(25.9)
$20,001 - $30,000	24	(18.2)	21	(18.3)	17	(15.9)	14	(15.7)	7	(13.0)
$30,001 - $50,000	30	(22.7)	25	(21.7)	26	(24.3)	19	(21.4)	12	(22.2)
$50,001 - $100,000	27	(20.5)	25	(21.7)	25	(23.4)	22	(24.7)	14	(25.9)
$100,001 +	14	(10.6)	13	(11.3)	12	(11.2)	11	(12.4)	7	(13.0)
Area of residence										
Northland	5	(3.3)	5	(3.9)	5	(4.2)	5	(5.1)	3	(5.0)
Auckland	47	(31.3)	36	(27.9)	31	(26.1)	24	(24.2)	16	(26.7)
Waikato/Coromandel	8	(5.3)	8	(6.2)	8	(6.7)	7	(7.1)	3	(5.0)
East Coast (Bay of Plenty/ Lakes/Hawkes Bay)	25	(16.7)	23	(17.8)	21	(17.7)	18	(18.2)	11	(18.3)
Tarankai/Manawatu/ Wairarapa	18	(12.0)	15	(11.6)	15	(12.6)	14	(14.1)	9	(15.0)
Wellington	20	(13.3)	17	(13.2)	16	(13.5)	13	(13.1)	8	(13.3)
Canterbury	19	(12.7)	18	(14.0)	16	(13.5)	11	(11.1)	7	(11.7)
Southland	8	(5.3)	7	(5.4)	7	(5.9)	7	(7.1)	3	(5.0)
Primary problem gambling mode										
Card gambling	1	(0.7)	1	(0.8)	1	(0.9)	0	(0.0)	1	(1.7)
Casino gaming machines	5	(3.4)	5	(4.0)	4	(3.5)	2	(2.1)	2	(3.4)
Casino table games	5	(3.4)	3	(2.4)	3	(2.6)	3	(3.1)	2	(3.4)
Club gaming machines	13	(8.8)	11	(8.7)	9	(7.8)	9	(9.4)	5	(8.5)
Pub gaming machines	112	(76.2)	95	(75.4)	90	(77.6)	74	(77.1)	44	(74.6)
Keno	1	(0.7)	1	(0.8)	1	(0.9)	1	(1.0)	1	(1.7)
Sports betting	1	(0.7)	1	(0.8)	1	(0.9)	1	(1.0)	1	(1.7)
Track	6	(4.1)	6	(4.8)	5	(4.3)	4	(4.2)	2	(3.4)
Other	3	(2.0)	3	(2.4)	2	(1.7)	2	(2.1)	1	(1.7)
Primary mode - EGM										
No	17	(11.3)	15	(11.6)	13	(10.9)	11	(11.1)	8	(13.3)
Yes	133	(88.7)	114	(88.4)	106	(89.1)	88	(88.9)	52	(86.7)

Table 2.2: Changes over time

		Assessment point				
		Baseline	**3 months**	**6 months**	**12 months**	**36 months**
Self-reported days gambled per month	MEAN	8.9	3.3	2.7	3.1	2.1
	STD	7.0	4.2	3.7	4.1	2.7
	MIN	0.0	0.0	0.0	0.0	0.0
	Q1	3.5	0.3	0.0	0.3	0.0
	MEDIAN	7.5	1.7	1.3	1.7	0.8
	Q3	12.5	4.7	4.0	4.3	4.0
	MAX	30.0	25.3	18.3	25.3	12.5
	N	*141*	*129*	*119*	*99*	60.0
	N MISSING	*9*	*0*	*0*	*0*	0.0
Self-reported money lost per day ($)	MEAN	43.3	8.6	7.3	8.9	6.2
	STD	47.1	18.8	12.7	16.8	11.0
	MIN	0.0	0.0	0.0	0.0	0.0
	Q1	13.2	0.7	0.0	0.3	0.0
	MEDIAN	28.1	2.6	1.9	2.6	1.6
	Q3	55.8	7.8	6.6	7.4	5.9
	MAX	263.6	166.7	52.6	85.4	52.1
	N	*141*	*129*	*119*	*99*	60.0
	N MISSING	*9*	*0*	*0*	*0*	*0.0*
PGSI-12 (12 month time frame)	MEAN	16.8	-	-	9.2	7.0
	STD	4.7	-	-	6.2	7.3
	MIN	3	-	-	0	0
	Q1	14	-	-	4	0
	MEDIAN	17	-	-	9	5
	Q3	20	-	-	13	11.5
	MAX	27	-	-	23	27
	N	*145*	-	-	*94*	60
	N MISSING	*5*	-	-	*5*	*0*
PGSI-12 (12 month time frame)	Non-problem N (%)	0 (-)	-	-	5 (5.3)	16 (26.7)
	Low risk N (%)	0 (-)	-	-	11 (11.7)	5 (8.3)
	Moderate risk N (%)	5 (3.5)	-	-	24 (35.5)	16 (26.7)
	Problem gambler N (%)	140 (96.6)	-	-	54 (57.5)	23 (38.3)
	N	*145*	-	-	*94*	60
	N MISSING	*5*	-	-	*5*	*0*
PGSI-3 (3 month time frame)	MEAN	17.1	8.0	7.3	6.4	5.3
	STD	5.2	7.1	7.0	6.4	6.9
	MIN	0	0	0	0	0
	Q1	14	1	1	0	0
	MEDIAN	18	7	6	6	2
	Q3	21	13.5	12.5	11	8
	MAX	27	26	24	23	25
	N	*144*	*120*	*112*	*97*	58
	N MISSING	*6*	*9*	*7*	*2*	*2*
Control over gambling behaviour (scale 1 to 10)	MEAN	3.3	6.9	7.3	7.2	7.4
	STD	2.8	2.7	3.0	2.8	2.6
	MIN	0	0	0	0	0
	Q1	1	5	5	6	5.5
	MEDIAN	3	7	8	8	8
	Q3	5	9	10	10	10
	MAX	10	10	10	10	10
	N	*147*	*121*	*114*	*99*	60
	N MISSING	*3*	*8*	*5*	*0*	0

		Assessment point				
		Baseline	**3 months**	**6 months**	**12 months**	**36 months**
Work affected in past month (scale 1 to 10)	MEAN	3.2	1.2	1.0	0.9	0.7
	STD	3.5	2.6	2.4	2.0	1.7
	MIN	0	0	0	0	0.0
	Q1	0	0	0	0	0.0
	MEDIAN	2	0	0	0	0.0
	Q3	6	1	0	0	0.0
	MAX	10	10	10	8	8.0
	N	*129*	*111*	*103*	*90*	57.0
	N MISSING	*21*	*18*	*16*	*9*	*3.0*
Social life affected in past month (scale 1 to 10)	MEAN	5.1	1.6	1.3	1.2	1.0
	STD	3.4	2.9	2.8	2.4	1.8
	MIN	0	0	0	0	0.0
	Q1	1.5	0	0	0	0.0
	MEDIAN	5.5	0	0	0	0.0
	Q3	8	2	0	1	2.0
	MAX	10	10	10	9	8.0
	N	*148*	*121*	*113*	*99*	59.0
	N MISSING	*2*	*8*	*6*	*0*	*1.0*
Family/home affected in past month (scale 1 to 10)	MEAN	6.6	2.2	1.9	1.5	1.1
	STD	3.2	3.3	3.1	2.8	2.1
	MIN	0	0	0	0	0.0
	Q1	5	0	0	0	0.0
	MEDIAN	7	0	0	0	0.0
	Q3	9	4	4	2	1.5
	MAX	10	10	10	10	8.0
	N	*150*	*121*	*114*	*99*	60.0
	N MISSING	*0*	*8*	*5*	*0*	*0.0*
Physical health affected in past month (scale 1 to 10)	MEAN	5.2	1.6	1.7	1.5	1.0
	STD	3.1	2.8	2.9	2.6	2.2
	MIN	0	0	0	0	0.0
	Q1	3	0	0	0	0.0
	MEDIAN	6	0	0	0	0.0
	Q3	8	3	3	2.5	0.0
	MAX	10	10	10	10	8.0
	N	*148*	*121*	*114*	*98*	60.0
	N MISSING	*2*	*8*	*5*	*1*	*0.0*
Received assistance in past 3 months	Formal N (%)	-	38 (30.6)	24 (21.1)	19 (19.2)	8 (13.3)
	Informal N (%)	-	47 (38.8)	25 (30.7)	25 (25.3)	5 (8.3)
	Any (formal + informal) N (%)	-	73 (59.5)	56 (49.1)	37 (37.4)	13 (21.7)
	N	-	*121*	*114*	*99*	60
	N MISSING	-	*8*	*5*	*0*	*0*
Current gambling goal	Quit all forms N (%)	91 (61.1)	46 (38.0)	40 (35.1)	27 (27.3)	17 (29.3)
	Quit some forms N (%)	30 (20.1)	23 (19.0)	14 (12.3)	16 (16.2)	9 (15.5)
	Control gambling N (%)	20 (13.4)	19 (15.7)	19 (16.7)	19 (19.2)	16 (27.6)
	Maintain abstinence N (%)	7 (4.7)	26 (21.5)	34 (29.8)	30 (30.3)	16 (27.6)
	Other N (%)	1 (0.7)	7 (5.8)	7 (6.1)	7 (7.1)	0
	N	*149*	*121*	*114*	*99*	58
	N MISSING	*1*	*8*	*5*	*0*	*2*
Kessler-10	Low (score 10 - 15) N (%)	4 (2.8)	58 (48.3)	57 (50.0)	62 (62.6)	35 (58.3)
	Medium (score 16 - 29) N (%)	59 (41.0)	47 (39.2)	45 (39.5)	27 (27.3)	23 (38.3)
	High (score 30 - 50) N (%)	81 (56.3)	15 (12.5)	12 (10.5)	10 (10.1)	2 (3.3)
	N	*144*	*120*	*114*	*99*	60
	N MISSING	*6*	*9*	*5*	*0*	*0*
PRIME-MD Major depressive disorder	No N (%)	58 (42.3)	-	-	81 (81.8)	47 (78.3)
	Yes N (%)	79 (57.7)	-	-	18 (18.2)	13 (21.7)
	N	*137*	-	-	*99*	60
	N MISSING	*13*	-	-	*0*	0

		Assessment point				
		Baseline	**3 months**	**6 months**	**12 months**	**36 months**
PRIME-MD	No N (%)	120 (87.6)	-	-	95 (96.0)	60 (100.0)
Minor	Yes N (%)	17 12.4)	-	-	4 (4.0)	0 (0.0)
depressive	*N*	*137*	-	-	*99*	60
disorder	*N MISSING*	*13*	-	-	*0*	*0*
PRIME-MD	No N (%)	80 (58.4)	-	-	67 (67.7)	41 (68.3)
Dysthymia	Yes N (%)	57 (41.6)	-	-	32 (32.3)	19 (31.7)
	N	*137*	-	-	*99*	60
	N MISSING	*13*	-	-	*0*	*0*
PRIME-MD	No N (%)	129 (97.0)	-	-	91 (95.8)	59 (98.3)
Bipolar	Yes N (%)	4 (3.0)	-	-	4 (4.2)	1 (1.7)
disorder	*N*	*133*	-	-	*95*	60
	N MISSING	*17*	-	-	*4*	*0*
Alcohol use/	No N (%)	53 (37.6)	54 (44.6)	57 (50.0)	40 (40.4)	20 (35.7)
misuse	Yes N (%)	88 (62.4)	67 (55.4)	57 (50.0)	59 (59.6)	36 (64.3)
(AUDIT-C)	*N*	*141*	*121*	*114*	*99*	56
	N MISSING	*9*	*8*	*5*	*0*	*4*
Current	No N (%)	57 (39.9)	55 (45.5)	52 (45.6)	50 (50.5)	34 (56.7)
tobacco	Yes N (%)	86 (60.1)	66 (54.6)	62 (54.4)	49 (49.5)	26 (43.3)
smoking	*N*	*143*	*121*	*114*	*99*	60
	N MISSING	*7*	*8*	*5*	*0*	*0*
Drug use/	No problem N (%)	107 (77.0)	-	-	90 (91.8)	52 (86.7)
misuse (DAST)	Low N (%)	15 (10.8)	-	-	6 (6.1)	86.67
	Moderate N (%)	9 (6.5)	-	-	1 (1.0)	5 (8.3)
	Substantial N (%)	8 (5.8)	-	-	1 (1.0)	2 (3.3)
	N	*139*	-	-	*98*	1 (1.7)
	N MISSING	*11*	-	-	*1*	60

APPENDIX 3
Predictors of successful problem gambling outcomes: PGSI

Table 3.1: Change in PGSI-12 at 36 months by socio-demographic variables - non-significant variables

Socio-demographic variable	Category	Est. least squares mean diff.	Standard Error	p-value
Gender	Female	-8.45	1.23	
	Male	-11.24	1.27	0.13
Age group	18 - 24 years	-8.67	2.82	
	25 - 34 years	-11.10	1.80	
	35 - 44 years	-9.08	1.69	
	45 - 54 years	-9.90	1.73	
	55+ years	-7.94	3.14	0.87
Prioritised ethnicity	Māori	-9.77	1.35	
	Pacific	-12.95	3.90	
	European	-8.94	1.29	
	Asian & Other	-14.92	3.94	0.42
European	No	-10.35	1.37	
	Yes	-9.38	1.19	0.61
Māori	No	-9.81	1.18	
	Yes	-9.79	1.35	0.99
Pacific	No	-9.49	0.89	
	Yes	-14.16	3.35	0.18
Asian & Other	No	-9.53	0.88	
	Yes	-15.02	3.90	0.18
Marital status	Never married	-8.83	1.71	
	Married	-12.21	1.86	
	De facto	-10.22	2.07	
	Separated	-9.13	2.39	
	Divorced	-9.33	2.58	
	Widowed	-5.25	3.98	0.62
Marital status, dichotomised	Partnered	-11.39	1.36	
	Not partnered	-8.67	1.14	0.14
Highest educational qualification	None	-9.18	1.89	
	Secondary school qual.	-9.47	1.61	
	Trade/technical certificate	-11.68	1.89	
	Undergrad. Deg./Dip./Cert.	-10.80	3.06	
	University degree & above	-10.39	2.67	
	Other	-4.91	3.43	0.65
Gross family income in last 12 months	<$20,000	-5.32	1.91	
	$20,000 - $30,000	-9.82	2.51	
	$30,001 - $50,000	-13.38	1.90	
	$50,001 - $100,000	-10.66	1.78	
	$100,001 +	-11.71	2.54	0.07
Area of residence	Northland	-12.72	3.98	
	Auckland	-10.78	1.73	
	Waikato/Coromandel	-7.50	4.08	
	East Coast	-7.65	2.08	
	Taranaki/Manawatu/Wairarapa	-11.92	2.33	
	Wellington	-8.05	2.44	
	Canterbury	-10.87	2.62	
	Southland	-7.63	4.05	0.77

Table 3.2: Change in PGSI-12 at 36-months by baseline gambling and related behaviours - non-significant variables

Variable	Category	Est. least squares mean diff.	Standard Error	p-value
Self-reported days gambled per month in past 2 months (quartiles)	0 - 3	-10.42	1.92	
	4 - 7	-8.72	2.07	
	8 - 12	-10.09	1.57	
	13+	-9.19	1.73	0.92
Self-reported amount of money lost per day ($) in past 2 months (quartiles)	0 - 13	-9.41	2.01	
	14 - 28	-9.90	1.78	
	29 - 55	-7.47	1.57	
	56+	-12.09	1.66	0.26
Primary mode of problem gambling	Cards	-15.24	6.75	
	Casino EGMs	-6.40	4.82	
	Casino table games	-11.14	4.75	
	Club EGMs	-7.14	3.02	
	Keno	-15.24	6.75	
	Other	-15.24	6.75	
	Pub EGMs	-10.37	1.01	
	Sports betting	-12.42	6.94	
	Track betting	0.67	4.79	0.42
EGMs as primary mode	No	-9.71	2.42	
	Yes	-9.81	0.94	0.97
Control over gambling	0 - 1	-9.33	1.49	
	2 - 3	-7.47	1.61	
	4 - 5	-11.85	2.20	
	6+	-12.21	1.92	0.23
Level of motivation to overcome problem (scale 1-10)	0 - 7	-6.93	2.55	
	8 - 9	-9.26	2.15	
	10	-10.39	1.03	0.44
Current goal, dichotomised	Quit	-9.93	0.91	
	Control	-8.38	3.04	0.63
Belief in treatment success dichotomised	Lower than median	-10.51	1.24	
	Higher than median	-10.27	1.18	0.89
Perceived level of difficulty in overcoming problem (scale 1-10) (quartiles)	0 - 5	-11.09	1.77	
	6 - 7	-8.36	2.00	
	8 - 9	-10.37	1.66	
	10	-9.07	1.72	0.72
Length of problem duration (months) (quartiles)	0 - 12	-11.72	1.90	
	13 - 36	-8.96	1.88	
	37 - 120	-10.05	1.48	
	121+	-7.74	2.09	0.52
Current assistance for gambling problem	No	-9.73	0.95	
	Yes	-10.18	2.27	0.86

Table 3.3: Change in PGSI-12 at 36 months by other baseline covariates - non-significant variables

Variable	Category	Est. least squares mean diff.	Standard Error	p-value
Kessler-10 (quartiles)	12 - 23	-9.42	1.69	
	24 - 31	-9.60	1.56	
	32 - 36	-13.15	2.09	
	37+	-8.49	2.37	0.41
Audit-C, dichotomised	Low risk	-8.58	1.54	
	High risk	-10.15	1.15	0.42
DAST, dichotomised	No	-9.88	1.00	
	Yes	-8.20	2.32	0.51
Suicide ideation	No	-10.40	1.03	
	Yes	-8.28	1.64	0.28
Prime MD - Major depressive disorder	No	-10.83	1.29	
	Yes	-8.60	1.22	0.22
Prime MD - Minor depressive disorder	No	-9.54	0.92	
	Yes	-10.98	3.03	0.65
Prime MD - Dysthymia	No	-10.79	1.14	
	Yes	-7.89	1.45	0.13
Tobacco - Current smoking	No	-8.12	1.30	
	Yes	-11.12	1.21	0.10
WHOQoL-8 (quartiles)	0 - 20	-7.13	2.53	
	21 - 25	-8.27	1.58	
	26 - 29	-10.44	1.72	
	30+	-12.45	1.80	0.29
Treatment - mental health in last year	No	-10.75	0.96	
	Yes	-8.14	1.67	0.18
Prescription - mental health in last year	No	-10.42	1.05	
	Yes	-8.30	1.77	0.31
How was work affected in past month? (10 point scale) (quartiles)	0	-10.86	1.37	
	1 - 2	-10.23	2.41	
	3 - 6	-8.45	2.05	
	7 - 10	-9.98	2.45	0.81
How was social life affected in past month? (10 point scale) (quartiles)	0 - 1	-11.04	2.19	
	2 - 5	-9.62	1.63	
	6 - 8	-9.07	1.44	
	9 - 10	-11.11	2.78	0.83
How was health affected in past month? (10 point scale) (quartiles)	0 - 3	-10.42	1.78	
	4 - 6	-8.10	1.65	
	7 - 8	-11.34	1.61	
	9 - 10	-7.88	2.91	0.46
Legal problems in past 12 months	No	-9.64	0.95	
	Yes	-10.81	2.54	0.67

APPENDIX 4
Predictors of successful problem gambling outcomes: Days gambled

Table 4.1: Change in days gambled at 36 months by socio-demographic characteristics - non-significant variables

Socio-demographic variable	Category	Est. least squares mean diff.	Standard Error	p-value
Gender	Female	-6.14	0.38	
	Male	-6.85	0.42	0.21
Age group	18 - 24 years	-6.60	0.86	
	25 - 34 years	-6.32	0.60	
	35 - 44 years	-6.86	0.56	
	45 - 54 years	-6.06	0.60	
	55+ years	-6.18	0.75	0.88
Prioritised ethnicity	Māori	-6.44	0.44	
	Pacific	-6.68	1.01	
	Asian & Other	-6.27	0.42	
	European	-8.25	1.39	0.59
European	No	-6.87	0.41	
	Yes	-6.08	0.39	0.17
Māori	No	-6.46	0.37	
	Yes	-6.44	0.44	0.97
Pacific	No	-6.41	0.30	
	Yes	-6.86	0.97	0.66
Asian & Other	No	-6.37	0.29	
	Yes	-8.25	1.38	0.18
Marital status	Never Married	-5.94	0.54	
	Married	-7.27	0.56	
	De facto	-6.13	0.57	
	Separated	-6.90	0.77	
	Divorced	-7.32	0.86	
	Widowed	-3.03	1.39	0.06
Marital status, dichotomised	Partnered	-6.71	0.41	
	Not partnered	-6.23	0.39	0.40
Employment status	Full time	-6.59	0.41	
	Part time	-5.11	0.82	
	Homemaker/student/retired	-6.96	0.82	
	Unemployed	-6.90	0.75	
	Disabled/illness/sick leave	-5.11	1.12	
	Other	-7.07	0.94	0.36
Highest educational qualification	None	-5.86	0.56	
	Secondary school qual.	-6.37	0.50	
	Trade/technical certificate	-6.93	0.65	
	Professional qualification	-8.70	1.81	
	Undergrad. Deg./Dip./Cert.	-7.13	0.99	
	University degree & above	-6.38	1.01	
	Other	-5.87	1.54	0.70
Gross family income in last 12 months	<$20,000	-6.52	0.60	
	$20,000 - $30,000	-6.03	0.77	
	$30,001 - $50,000	-7.10	0.65	
	$50,001 - $100,000	-7.18	0.64	
	$100,001 +	-7.22	0.88	0.73

Socio-demographic variable	Category	Est. least squares mean diff.	Standard Error	p-value
Area of residence	Northland	-8.10	1.35	
	Auckland	-6.41	0.54	
	Waikato/Coromandel	-3.83	1.11	
	East Coast	-6.40	0.66	
	Taranaki/Manawatu/Wairarapa	-6.93	0.81	
	Wellington	-6.40	0.75	
	Canterbury	-7.42	0.78	
	Southland	-5.52	1.15	0.22

Table 4.2: Change in days gambled at 36 months by baseline gambling and related behaviours - non-significant variables

Variable	Category	Est. least squares mean diff.	Standard Error	p-value
EGMs as gambling type, dichotomised	No	-6.17	0.83	
	Yes	-6.49	0.30	0.72
PGSI-12 (12 month time frame) (quartiles)	0 - 14	-6.18	0.53	
	15 - 17	-7.30	0.51	
	18 - 20	-6.03	0.59	
	21+	-6.11	0.65	0.29
Self-reported amount of money lost per day ($) in past 2 months (quartiles)	0 - 13	-6.21	0.61	
	14 - 28	-6.26	0.59	
	29 - 55	-6.03	0.56	
	56+	-7.22	0.57	0.46
Control over gambling	0 - 1	-6.86	0.49	
	2 - 3	-5.78	0.58	
	4 - 5	-6.15	0.62	
	6+	-7.07	0.62	0.35
Level of motivation to overcome problem (scale 1-10)	0 - 7	-6.77	0.79	
	8 - 9	-5.93	0.61	
	10	-6.57	0.35	0.61
Current goal, dichotomised	Quit	-6.57	0.31	
	Control	-5.81	0.71	0.33
Belief in treatment success, dichotomised	Lower than median	-6.08	0.40	
	Higher than median	-6.97	0.42	0.13
Perceived level of difficulty in overcoming problem (scale 1-10) (quartiles)	0 - 5	-7.14	0.56	
	6 - 7	-6.51	0.65	
	8 - 9	-5.80	0.55	
	10	-6.03	0.53	0.33
Length of problem duration (months) (quartiles)	0 - 12	-6.67	0.59	
	13 - 36	-6.08	0.60	
	37 - 120	-6.09	0.49	
	121+	-6.44	0.64	0.87
Number of days since last gamble	0 - 1	-6.30	0.38	
	2 - 4	-6.05	0.60	
	5+	-7.24	0.62	0.33
Current assistance for gambling problem	No	-6.47	0.32	
	Yes	-6.95	0.67	0.52
Previously received assistance for gambling problem	No	-6.21	0.37	
	Yes	-6.72	0.55	0.44

Table 4.3: Change in number of days gambled at 36 months by other baseline covariates - non-significant variables

Variable	Category	Est. least squares mean diff.	Standard Error	p-value
Kessler-10 (quartiles)	12 - 23	-6.64	0.57	
	24 - 31	-6.72	0.58	
	32 - 36	-7.40	0.59	
	37+	-5.87	0.61	0.36
Audit-C, dichotomised	Low risk	-6.41	0.37	
	High risk	-6.39	0.33	0.96
DAST, dichotomised	No	-6.45	0.34	
	Yes	-6.73	0.66	0.71
Suicide ideation	No	-6.31	0.34	
	Yes	-6.75	0.50	0.48
Prime MD - Major depressive disorder	No	-6.75	0.43	
	Yes	-6.25	0.38	0.38
Prime MD - Minor depressive disorder	No	-6.37	0.30	
	Yes	-7.22	0.82	0.34
Prime MD - Dysthymia	No	-6.58	0.37	
	Yes	-6.30	0.45	0.63
Tobacco - Current smoking	No	-6.03	0.45	
	Yes	-6.63	0.39	0.31
WHOQoL-8 (quartiles)	0 - 20	-4.89	0.63	
	21 - 25	-6.73	0.57	
	26 - 29	-6.69	0.56	
	30+	-6.70	0.56	0.09
NZDI (quartiles)	0 - 0.58	-6.30	0.56	
	0.59 - 1.23	-7.26	0.60	
	1.24 - 2.37	-5.86	0.61	
	2.38+	-6.78	0.66	0.40
Treatment, mental health last year	No	-6.55	0.32	
	Yes	-6.20	0.59	0.61
Prescription, mental health last year	No	-6.69	0.34	
	Yes	-6.39	0.63	0.67
Treatment - drugs/alcohol in last year	No	-6.49	0.30	
	Yes	-5.18	1.16	0.28
How was work affected in past month? (10 point scale) (quartiles)	0	-6.80	0.48	
	1 - 2	-6.52	0.84	
	3 - 6	-7.45	0.80	
	7 - 10	-6.15	0.67	0.65
How was social life affected in past month? (10 point scale) (quartiles)	0 - 1	-6.55	0.58	
	2 - 5	-6.40	0.58	
	6 - 8	-6.46	0.48	
	9 - 10	-5.62	0.72	0.75
How was family/home affected in past month? (10 point scale) (quartiles)	0 - 4	-6.46	0.61	
	5 - 7	-6.56	0.50	
	8 - 9	-6.56	0.57	
	10	-6.13	0.63	0.95
How was health affected in past month? (10 point scale) (quartiles)	0 - 3	-7.04	0.53	
	4 - 6	-6.24	0.56	
	7 - 8	-5.93	0.53	
	9 - 10	-5.93	0.73	0.43
Legal problems in past 12 months	No	-6.54	0.31	
	Yes	-7.10	0.85	0.53

APPENDIX 5
Predictors of successful problem gambling outcomes: Money lost

Table 5.1: Change in money lost at 36 months by socio-demographic characteristics - non-significant variables

Socio-demographic variable	Category	Est. least squares mean diff.	Standard Error	p-value
Gender	Female	-37.00	1.56	
	Male	-39.16	1.75	0.36
Marital status	Never Married	-35.91	2.28	
	Married	-41.14	2.39	
	De facto	-36.82	2.45	
	Separated	-38.09	3.28	
	Divorced	-40.36	3.66	
	Widowed	-32.19	5.88	0.53
Marital status, dichotomised	Partnered	-39.03	1.70	
	Not partnered	-37.02	1.59	0.39
Age group	18 - 24 years	-34.54	3.54	
	25 - 34 years	-37.04	2.46	
	35 - 44 years	-39.19	2.29	
	45 - 54 years	-38.13	2.46	
	55+ years	-38.39	3.00	0.85
Prioritised ethnicity	Māori	-37.72	1.82	
	Pacific	-39.71	4.17	
	Asian & Other	-37.26	1.71	
	European	-44.89	5.89	0.62
European	No	-39.12	1.70	
	Yes	-36.92	1.60	0.35
Māori	No	-38.11	1.52	
	Yes	-37.74	1.82	0.88
Pacific	No	-37.75	1.22	
	Yes	-40.19	4.02	0.56
Asian & Other	No	-37.66	1.19	
	Yes	-44.93	5.85	0.22
Employment status	Full time	-39.09	1.74	
	Part time	-39.28	3.43	
	Homemaker/student/retired	-36.26	3.42	
	Unemployed	-35.08	3.10	
	Disabled/illness/sick leave	-33.35	4.66	
	Other	-40.31	3.92	0.70
Highest educational qualification achieved	None	-38.44	2.37	
	Secondary school qual.	-36.65	2.09	
	Trade/technical certificate	-38.68	2.72	
	Professional qualification	-45.39	7.57	
	Undergrad. Deg./Dip./Cert.	-38.42	4.12	
	University degree & above	-37.92	4.24	
	Other	-36.27	6.40	0.96

Socio-demographic variable	Category	Est. least squares mean diff.	Standard Error	p-value
Gross family income in last 12 months	<$20,000	-37.16	2.25	
	$20,000 - $30,000	-36.44	2.81	
	$30,001 - $50,000	-40.22	2.35	
	$50,001 - $100,000	-37.13	2.31	
	$100,001 +	-40.95	3.27	0.70
Area of residence	Northland	-44.78	5.71	
	Auckland	-38.30	2.29	
	Waikato/Coromandel	-34.25	4.63	
	East Coast	-38.51	2.80	
	Taranaki/Manawatu/Wairarapa	-37.14	3.42	
	Wellington	-33.98	3.13	
	Canterbury	-40.04	3.30	
	Southland	-40.49	4.85	0.72

Table 5.2: Change in money lost at 36 months by baseline gambling and related behaviours - non-significant variables

Variable	Category	Est. least squares mean diff.	Standard Error	p-value
EGMs as gambling type, dichotomised	No	-39.71	3.49	
	Yes	-37.72	1.25	0.60
Self-reported days gambled per month in past 2 months (quartiles)	0 - 3	-41.45	2.31	
	4 - 7	-33.33	2.41	
	8 - 12	-38.50	2.21	
	13+	-37.89	2.45	0.11
Control over gambling	0 - 1	-37.97	2.03	
	2 - 3	-34.21	2.38	
	4 - 5	-41.18	2.55	
	6+	-40.07	2.56	0.20
Level of motivation to overcome problem (scale 1-10)	0 - 7	-36.64	3.30	
	8 - 9	-37.39	2.50	
	10	-38.41	1.45	0.86
Current goal, dichotomised	Quit	-37.60	1.27	
	Control	-39.89	2.94	0.48
Belief in treatment success, dichotomised	Lower than median	-38.79	1.68	
	Higher than median	-39.58	1.78	0.75
Perceived level of difficulty in overcoming problem (scale 1-10) (quartiles)	0 - 5	-41.18	2.34	
	6 - 7	-35.69	2.69	
	8 - 9	-35.77	2.28	
	10	-35.36	2.21	0.24
Length of problem duration (months) (quartiles)	0 - 12	-38.75	2.46	
	13 - 36	-37.28	2.51	
	37 - 120	-37.89	2.05	
	121+	-38.97	2.68	0.96
Number of days since last gamble	0 - 1	-37.39	1.54	
	2 - 4	-35.33	2.47	
	5+	-42.00	2.46	0.14
Current assistance for gambling problem	No	-38.19	1.34	
	Yes	-39.90	2.75	0.58
Previously received assistance for gambling problem	No	-39.50	1.61	
	Yes	-38.05	2.40	0.62

Table 5.3 Change in money lost at 36 months by other baseline covariates - non-significant variables

Variable	Category	Estimated least squares mean diff.	Standard Error	p-value
Kessler-10 (quartiles)	12 - 23	-38.00	2.42	
	24 - 31	-39.97	2.40	
	32 - 36	-41.20	2.50	
	37+	-36.46	2.55	0.57
Audit-C, dichotomised	Low risk	-38.72	1.52	
	High risk	-37.95	1.35	0.65
DAST, dichotomised	No	-39.05	1.40	
	Yes	-37.44	2.77	0.61
Suicide ideation	No	-38.93	1.41	
	Yes	-35.89	2.06	0.22
Prime MD - Major depressive disorder	No	-40.90	1.77	
	Yes	-36.44	1.58	0.06
Prime MD - Minor depressive disorder	No	-37.77	1.26	
	Yes	-43.07	3.41	0.15
Prime MD - Dysthymia	No	-40.09	1.52	
	Yes	-35.95	1.84	0.08
Tobacco - Current smoking	No	-37.27	1.86	
	Yes	-38.85	1.60	0.52
NZDI (quartiles)	0 - 0.58	-42.16	2.28	
	0.59 - 1.23	-40.73	2.37	
	1.24 - 2.37	-36.54	2.41	
	2.38+	-37.85	2.68	0.34
Treatment, mental health last year	No	-38.95	1.34	
	Yes	-35.99	2.44	0.29
Prescription, mental health last year	No	-38.13	1.42	
	Yes	-37.84	2.66	0.92
Treatment - drugs/ alcohol in last year	No	-39.55	1.26	
	Yes	-34.61	4.84	0.32
How was work affected in past month? (10 point scale) (quartiles)	0	-40.89	1.78	
	1 - 2	-43.80	3.09	
	3 - 6	-41.72	2.95	
	7 - 10	-38.02	2.47	0.51
How was social life affected in past month? (10 point scale) (quartiles)	0 - 1	-38.90	2.38	
	2 - 5	-39.90	2.42	
	6 - 8	-37.94	1.98	
	9 - 10	-33.22	2.96	0.34
How was family/home affected in past month? (10 point scale) (quartiles)	0 - 4	-39.48	2.50	
	5 - 7	-39.69	2.02	
	8 - 9	-37.75	2.32	
	10	-33.81	2.57	0.30
How was health affected in past month? (10 point scale) (quartiles)	0 - 3	-41.10	2.18	
	4 - 6	-37.06	2.32	
	7 - 8	-37.90	2.18	
	9 - 10	-35.59	3.00	0.43
Legal problems in past 12 months	No	-38.68	1.28	
	Yes	-39.51	3.51	0.82

APPENDIX 6
Predictors of successful problem gambling outcomes: Control over gambling

Table 6.1: Change in control over gambling at 36 months by socio-demographic characteristics - non-significant variables

Variable	Category	Est. least squares mean diff.	Standard Error	p-value
Gender	Female	3.80	0.29	
	Male	4.25	0.32	0.29
Age group	18 - 24 years	3.69	0.66	
	25 - 34 years	4.05	0.46	
	35 - 44 years	3.90	0.42	
	45 - 54 years	4.36	0.45	
	55+ years	4.00	0.55	0.93
Prioritised ethnicity	Māori	4.10	0.32	
	Pacific	5.30	0.77	
	Asian & Other	3.59	0.30	
	European	5.32	1.04	0.10
European	No	4.35	0.31	
	Yes	3.69	0.29	0.12
Māori	No	3.92	0.28	
	Yes	4.11	0.33	0.67
Pacific	No	3.92	0.22	
	Yes	4.84	0.72	0.22
Asian & Other	No	3.94	0.22	
	Yes	5.29	1.05	0.21
Employment status	Full time	4.39	0.30	
	Part time	2.96	0.62	
	Homemaker/student/retired	3.78	0.61	
	Unemployed	3.80	0.56	
	Disabled/illness/sick leave	2.56	0.83	
	Other	4.90	0.70	0.10
Highest educational qualification achieved	None	3.76	0.41	
	Secondary school qual.	3.81	0.37	
	Trade/technical certificate	4.71	0.48	
	Professional qualification	5.09	1.35	
	Undergrad. Deg./Dip./Cert.	3.41	0.77	
	University degree & above	4.72	0.72	
	Other	2.32	1.13	0.30
Gross family income in last 12 months	<$20,000	3.41	0.42	
	$20,000 - $30,000	3.96	0.56	
	$30,001 - $50,000	4.20	0.44	
	$50,001 - $100,000	4.68	0.44	
	$100,001 +	4.86	0.61	0.20
Area of residence	Northland	4.71	1.04	
	Auckland	4.50	0.41	
	Waikato/Coromandel	2.53	0.83	
	East Coast	3.70	0.50	
	Taranaki/Manawatu/Wairarapa	3.71	0.61	
	Wellington	3.60	0.56	
	Canterbury	4.13	0.60	
	Southland	5.02	0.87	0.38

Table 6.2: Change in control over gambling at 36 months by socio-demographic characteristics - non-significant variables

Variable	Category	Est. least squares mean diff.	Standard Error	p-value
EGMs as gambling type, dichotomised	No	4.10	0.61	
	Yes	3.99	0.23	0.86
PGSI-12 (12 month time frame) (quartiles)	0 - 14	4.54	0.40	
	15 - 17	4.42	0.38	
	18 - 20	3.33	0.44	
	21+	3.40	0.49	0.08
Self-reported days gambled per month in past 2 months (quartiles)	0 - 3	4.28	0.42	
	4 - 7	4.14	0.46	
	8 - 12	3.67	0.41	
	13+	4.02	0.44	0.77
Self-reported amount of money lost per day ($) in past 2 months (quartiles)	0 - 13	3.93	0.43	
	14 - 28	4.07	0.45	
	29 - 55	3.42	0.43	
	56+	4.60	0.40	0.25
Level of motivation to overcome problem (scale 1-10)	0 - 7	3.46	0.60	
	8 - 9	3.73	0.45	
	10	4.19	0.26	0.43
Current goal, dichotomised	Quit	3.89	0.23	
	Control	4.57	0.53	0.24
Length of problem duration (months) (quartiles)	0 - 12	4.05	0.46	
	13 - 36	3.76	0.44	
	37 - 120	4.06	0.37	
	121+	3.97	0.48	0.96
Number of days since last gamble	0 - 1	3.73	0.28	
	2 - 4	3.88	0.45	
	5+	4.76	0.44	0.14
Current assistance for gambling problem	No	3.92	0.24	
	Yes	4.39	0.51	0.40
Previously received assistance for gambling problem	No	4.04	0.28	
	Yes	3.32	0.43	0.17

Table 6.3: Change in control over gambling at 36 months by other baseline covariates - non-significant variables

Variable	Category	Est. least squares mean diff.	Standard Error	p-value
Kessler-10 (quartiles)	12 - 23	4.07	0.42	
	24 - 31	4.23	0.41	
	32 - 36	4.39	0.43	
	37+	2.84	0.46	0.06
Audit-C, dichotomised	Low risk	3.96	0.28	
	High risk	4.03	0.25	0.82
DAST, dichotomised	No	4.10	0.25	
	Yes	3.87	0.49	0.69
Prime MD - Minor depressive disorder	No	3.94	0.23	
	Yes	4.80	0.63	0.20
Tobacco - Current smoking	No	3.75	0.33	
	Yes	4.37	0.29	0.16
Prescription, mental health last year	No	4.05	0.26	
	Yes	3.40	0.47	0.22
Treatment - drugs/alcohol in last year	No	4.01	0.23	
	Yes	3.44	0.86	0.52
How was work affected in past month? (10 point scale) (quartiles)	0	4.13	0.34	
	1 - 2	4.58	0.59	
	3 - 6	3.42	0.54	
	7 - 10	3.90	0.47	0.52
How was social life affected in past month? (10 point scale) (quartiles)	0 - 1	4.52	0.44	
	2 - 5	3.89	0.44	
	6 - 8	4.09	0.35	
	9 - 10	3.69	0.54	0.64
How was family/home affected in past month? (10 point scale) (quartiles)	0 - 4	4.98	0.47	
	5 - 7	3.81	0.36	
	8 - 9	3.90	0.42	
	10	3.41	0.47	0.11
Legal problems in past 12 months	No	4.07	0.23	
	Yes	3.71	0.63	0.60

APPENDIX 7
Predictors of successful problem gambling outcomes: Treatment success

Table 7.1: Univariate logistic regression for treatment success by socio-demographic characteristics - non-significant variables

		Univariate odds ratios		
Socio-demographic variable	**Category**	**Odds Ratio**	**95% CI**	**p-value**
Gender	Female	0.46	(0.15, 1.43)	
	Male	1.00		0.18
Marital status	Never Married	0.95	(0.08, 11.86)	
	Married	2.54	(0.17, 37.17)	
	De facto	1.95	(0.13, 28.26)	
	Separated	0.73	(0.05, 10.55)	
	Divorced	1.39	(0.08, 23.15)	
	Widowed	1.00		0.75
Marital status, dichotomised	Partnered	0.43	(0.14, 1.33)	
	Not partnered	1.00		0.14
Age group	18 - 24 years	0.83	(0.06, 11.72)	
	25 - 34 years	0.37	(0.05, 2.81)	
	35 - 44 years	0.49	(0.07, 3.60)	
	45 - 54 years	0.41	(0.06, 3.02)	
	55+ years	1.00		0.85
Prioritised ethnicity	Māori	Number of observations too small		
	Pacific			
	Asian & Other			
	European			
European	No			
	Yes			
Māori	No			
	Yes			
Pacific	No			
	Yes			
Asian & Other	No			
	Yes			
Employment status	Full time	1.61	(0.17, 15.13)	
	Part time	0.68	(0.06, 8..38)	
	Homemaker/student/retired	0.67	(0.05, 8.56)	
	Unemployed	0.28	(0.03, 2.91)	
	Disabled/illness/sick leave	0.31	(0.02, 4.42)	
	Other	1.00		0.26
Highest educational qualification achieved	None	Number of observations too small		
	Secondary school qual.			
	Trade/technical certificate			
	Professional qualification			
	Undergrad. Deg./Dip./Cert.			
	University degree & above			
	Other			

Socio-demographic variable	Category	Univariate odds ratios		
		Odds Ratio	95% CI	p-value
Gross family income in last 12 months	<$20,000	0.15	(0.01, 2.05)	
	$20,000 - $30,000	0.26	(0.02, 4.43)	
	$30,001 - $50,000	0.35	(0.02, 5.59)	
	$50,001 - $100,000	0.85	(0.04, 16.73)	
	$100,001 +	0.15		0.30
Area of residence	Northland	Number of observations too small		
	Auckland			
	Waikato/Coromandel			
	East Coast			
	Taranaki/Manawatu/Wairarapa			
	Wellington			
	Canterbury			
	Southland			

Table 7.2: Univariate logistic regression for treatment success by baseline gambling and related behaviours - non-significant variables

		Univariate odds ratios		
Variable	**Category**	**Odds Ratio**	**95% CI**	**p-value**
EGMs as gambling type, dichotomised	No	3.25	(0.31, 33.76)	
	Yes	1.00		0.32
PGSI-12 (12 month time frame) (quartiles)	0 - 14	1.57	(0.37, 6.72)	
	15 - 17	9.72	(1.22, 77.48)	
	18 - 20	1.14	(0.27, 4.90)	
	21+	1.00		0.16
Control over gambling	0-1	2.10	(0.46, 9.50)	
	2-3	1.12	(0.26, 4.86)	
	4-5	1.05	(0.22, 4.94)	
	6+	1.00		0.74
Level of motivation to overcome problem (scale 1-10)	0 - 7	0.81	(0.18, 3.73)	
	8 - 9	1.27	(0.32, 5.06)	
	10	1.00		0.89
Current goal, dichotomised	Quit	0.58	(0.11, 3.09)	
	Control	1.00		0.52
Belief in treatment success, dichotomised	Lower than median	1.30	(0.44, 3.89)	
	Higher than median	1.00		0.63
Perceived level of difficulty in overcoming problem (scale 1-10) (quartiles)	0 - 5	1.17	(0.27, 5.12)	
	6 - 7	1.42	(0.27, 7.36)	
	8 - 9	0.80	(0.21, 3.03)	
	10	1.00		0.90
Length of problem duration (months) (quartiles)	0 - 12	1.69	(0.37, 7.71)	
	13 - 36	1.39	(0.32, 6.08)	
	37 - 120	2.25	(0.53, 9.63)	
	121+	1.00		0.73
Number of days since last gamble	0 - 1	1.07	(0.28, 4.01)	
	2 - 4	0.87	(0.18, 4.22)	
	5+	1.00		0.95
Current assistance for gambling problem	No	1.01	(0.26, 3.92)	
	Yes	1.00		0.98
Previously received assistance for gambling problem	No	1.47	(0.47, 4.60)	
	Yes	1.00		0.50

Table 7.3: Univariate logistic regression for treatment success by other baseline covariates - non-significant variables

		Univariate odds ratios		
Variable	**Category**	**Odds Ratio**	**95% CI**	**p-value**
Kessler-10 (quartiles)	12 - 23	0.86	(0.19, 3.90)	
	24 - 31	0.86	(0.19, 3.85)	
	32 - 36	1.63	(0.29, 9.26)	
	37+	1.00		0.86
Audit-C, dichotomised	Low risk	0.78	(0.26, 2.37)	
	High risk	1.00		0.65
DAST, dichotomised	No	1.41	(0.39, 5.19)	
	Yes	1.00		0.60
Suicide ideation	No	1.17	(0.38, 3.58)	
	Yes	1.00		0.79
Prime MD - Major depressive disorder	No	1.10	(0.38, 3.22)	
	Yes	1.00		0.86
Prime MD - Minor depressive disorder	No	1.08	(0.21, 5.57)	
	Yes	1.00		0.93
Prime MD - Dysthymia	No	1.53	(0.52, 4.46)	
	Yes	1.00		0.44
Tobacco - Current smoking	No	0.59	(0.21, 1.72)	
	Yes	1.00		0.33
WHOQoL (quartiles)	0 - 20	0.38	(0.09, 1.54)	
	21 - 25	1.88	(0.39, 8.93)	
	26 - 29	2.54	(0.47, 13.67)	
	30+	1.00		0.09
NZDI (quartiles)	0 - 0.58	5.03	(0.94, 27.00)	
	0.59 - 1.23	8.07	(1.11, 58.67)	
	1.24 - 2.37	1.27	(0.31, 5.17)	
	2.38+	1.00		0.07
Treatment, mental health last year	No	1.89	(0.60, 5.93)	
	Yes	1.00		0.27
Prescription, mental health last year	No	2.10	(0.66, 6.70)	
	Yes	1.00		0.21
Treatment - drugs/alcohol in last year	No	1.44	(0.17, 11.95)	
	Yes	1.00		0.74
How was work affected in past month? (10 point scale) (quartiles)	0	1.57	(0.40, 6.23)	
	1 - 2	4.11	(0.38, 44.31)	
	3 - 6	1.61	(0.28, 9.29)	
	7 - 10	1.00		0.69
How was social life affected in past month? (10 point scale) (quartiles)	0 - 1	1.26	(0.23, 6.89)	
	2 - 5	1.09	(0.21, 5.53)	
	6 - 8	1.53	(0.31, 7.45)	
	9 - 10	1.00		0.94
How was family/home affected in past month? (10 point scale) (quartiles)	0 - 4	1.40	(0.28, 6.89)	
	5 - 7	2.08	(0.48, 9.09)	
	8 - 9	1.38	(0.32, 5.99)	
	10	1.00		0.81

		Univariate odds ratios		
Variable	**Category**	**Odds Ratio**	**95% CI**	**p-value**
How was health affected in past month? (10 point scale) (quartiles)	0 - 3	1.47	(0.30, 7.31)	
	4 - 6	1.15	(0.24, 5.56)	
	7 - 8	2.84	(0.50, 16.15)	
	9 - 10	1.00		0.61
Legal problems in past 12 months	No	1.31	(0.28, 6.06)	
	Yes	1.00		0.73