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**Objective.** This pilot study investigated the effectiveness of a team based sport/psychosocial intervention (Back of the Net, BTN) with an individual exercise (IE) and a control condition for the mental health of young men.

**Design.** 10 week randomized control trial and 8 week post-intervention follow-up.

**Methods.** 104 sedentary males aged between 18 and 40 years were recruited and randomly assigned to the BTN, IE or a control condition. The BTN programme integrated team-sport (i.e. football) and cognitive-behavioral techniques. IE sessions included aerobic and resistance training. The control group refrained from exercise. Participants completed the Beck Depression Inventory-2<sup>nd</sup> Edition (BDI-II), the Social Provisions Scale (SPS) and a short qualitative questionnaire at pre-intervention, week 5, post-intervention and at 8 week follow up.

**Results** Participants in both the BTN and the IE condition demonstrated a significant decrease in BDI-II scores compared to the control condition at post-intervention and at 8 week follow-up. The IE condition demonstrated significantly greater perceived social support than the BTN condition at week 5 and the control group at 8 week follow-up. Qualitative data supports the main empirical findings.

Conclusion. Exercise based interventions were effective in reducing symptoms of depression in a non-clinical community sample of young men. The BTN programme demonstrated potential for improving the mental health of young men however larger scale community based research is warranted to further examine the effectiveness of this type of intervention.

## Exploring the Effectiveness of an Integrated Exercise/CBT Intervention for Young Men's Mental Health

Early experiences of subdiagnostic and diagnostic levels of depression increase the risk of mood disorders over the long-term (Smith & Blackwood, 2004). Yet, research indicates that young men are among those least likely to access professional help for mental health difficulties (Biddle, Gunnell, Sharp & Donovan, 2004; Russell, Gaffney, Collins, Bergin & Bedford, 2004). Some of the main reasons cited for men's reluctance to seek help include a need for self-reliance and a dislike of talking to strangers about emotional problems (Begley, Chambers, Corcoran & Gallagher, 2003; Burke & McKeon, 2007). Other barriers to help seeking include anticipated embarrassment and the stigma associated with mental health difficulties. Ironically the stigma associated with help-seeking is thought to be more pronounced for less severe psychological problems. Voluntarily seeking professional help for psychological distress is viewed by males as a sign of weakness (Tedstone Doherty & Kartalova-O'Doherty, 2010; Vogel, Wade, & Haake, 2006). Unfortunately the reluctance of males to avail of formal channels of support when experiencing psychological problems can lead to an escalation in distress levels and a need for more intensive treatment (Tedstone-Doherty & Kartalova-O'Doherty, 2010). It is clear that there is a need for mental health promotion and prevention strategies that are 'attractive and accessible' to young men in an effort to increase the uptake of support in this difficult to reach target group (Tedstone-Doherty & Kartalova-O'Doherty, 2010; Pringle & Sayers, 2004). In line with this recommendation, the present pilot study explored the effectiveness of a ten week team based sport/psychosocial intervention, BACK OF THE NET (BTN), for men's mental health.

To address men's need for self-reliance and control, psychotherapeutic interventions such as Cognitive Behavioural Therapy (CBT) may be particularly suitable for this population group. Cognitive-Behavioural Therapy (CBT) places emphasis on identifying and changing maladaptive cognitions and behaviours that contribute to emotional distress (Reinecke & Didie, 2005). CBT techniques aim to enhance self-control, rational problem-solving abilities and social skills with a view to fostering long-term coping capability (Reinecke, Ryan & DuBois, 1998). Both individual and group CBT has proven to be beneficial in addressing indices of mental health such as depression and perceived social isolation (Brown et al., 2005; Gaffney, Cosgrove & Collins, 2007). Research has also shown that compared to treatment as usual, CBT based interventions comprised of communication and social-skills building significantly improve participants' perceptions of social support (Reinecke & Didie, 2005).

It has been suggested that approaching young men about mental health issues in contexts which are viewed by males as 'acceptable' is critical to their engagement (Pringle & Sayers, 2004). Using a group psychoeducational approach and football as a metaphor, the 'It's a Goal' community project in the Northeast of England successfully engaged young men in a six week mental health promotion programme in a community football club. Post programme evaluation demonstrated the effectiveness of sport as 'both motive and method' for engaging young men (Pringle & Sayers, 2004).

Similar to Pringle and Sayers' (2004) 'It's a Goal' project, the current study used the context of sport (i.e. football) to deliver a mental health intervention targeted at men. However, in this instance, unlike the 'It's a Goal' project, participants were required to physically participate in playing football. Studies have shown that physical activity is as effective as CBT for symptoms of depression (Mead et al., 2008). Systematic reviews of the effectiveness of exercise interventions for symptoms of depression have indicated

significant positive findings for various types of exercise (i.e. aerobic, mixed and resistance) and for exercise conducted at different intensities (Mead et al., 2008). A number of mechanisms by which exercise benefits symptoms of depression have been proposed. For example, in terms of psychological mechanisms, it is suggested that exercise can positively influence perceived self-worth and mood via increased skill mastery and physical fitness (McNeil, LeBlanc & Joyner, 1991). Research also demonstrates that social support and other aspects of team sport involvement enhance perceived social inclusion and partially mediate risk for depressive symptoms (Boone & Leadbeater, 2006). With respect to physiological mechanisms, changes in endorphin and monoamine levels induced through exercise may also play a role in the regulation of mood (Duclos, Gouarne & Bonnemaïson, 2003).

To date, the value of integrated exercise/CBT interventions for mental health has been largely unexplored (Mead et al., 2008). Further, we are unaware of any intervention research that has specifically focused on the mental health of young men. As such, this pilot randomized controlled trial compared the effectiveness of an integrated team sport/psychosocial intervention BACK OF THE NET (BTN) with an individual exercise (IE) condition and control condition for symptoms of depression and perceived social support in young men. A team based exercise condition facilitated the delivery of CBT strategies through group discussion and various other group activities. The group context also allowed for the purposeful facilitation of social support. In contrast, an individual exercise condition was chosen as a comparison group because it afforded relatively fewer opportunities for social interaction. It was hypothesised that participants in the team sport/psychosocial intervention would have significantly lower scores on a self report measure of depression and significantly higher scores on measures of perceived social

support compared to the individual exercise condition and controls at the end of the ten week intervention and at two month follow-up.

## Method

### *Participants*

With institutional ethical approval 104 men aged 18-40 years were recruited for this study via advertisements placed locally in newspapers, health centres, pubs, restaurants and local businesses. Eligibility criteria included being aged between 18 and 40 years, sedentary (i.e. currently exercising once per week or less) and not currently receiving any psychiatric treatment. Exclusion criteria included major physical health problems that would prevent participation in exercise for the duration of the study; current drug or alcohol abuse problems and current use of antidepressants. Study eligibility was assessed via self-report measures and physician assessment.

### *Design & Protocol*

This study was a 10 week randomised control trial of differential exercise-based interventions for mental health. Participants were allocated to either an individual exercise condition (IE,  $n = 36$ ), a team sport/CBT- guided intervention (BTN,  $n = 38$ ) or a control group (C,  $n = 30$ ) using a random number table.

Given that no research has exclusively examined an all male population or employed a similar type of integrated sport/CBT guided intervention, sample size calculations were based on related review studies of exercise for symptoms of depression (Mead et al., 2008). Specifically, the size required was calculated by using depression as the primary outcome (predicted effect size of 0.6, providing 80% power,  $p < .05$ ). It was



estimated that a minimum of 30 participants per condition were required to detect a difference between the intervention groups and control.

For exercise studies blinding participants to condition allocation is not possible. Immediately prior to commencement of the intervention the main investigator informed participants of condition allocation. At this time, with written informed consent, all participants were asked to provide demographic details and to complete a baseline questionnaire which included quantitative measures and qualitative questions. Participants also completed a medical screening form which included a number of commonly used pre-exercise screening questions from the Physical Activity Readiness Questionnaire (PAR-Q; Thomas, Reading & Shephard, 1992). Individuals in the IE and BTN condition underwent a physical examination by the study physician. If any participant was found to have a medical condition that would put him at risk during exercise he was excluded from participation in the study.

### *Intervention*

Participants in the IE and BTN conditions were invited to an initial familiarisation session during which a researcher explained the differences between different heart rate intensities and demonstrated how to wear a heart rate monitor. In accordance with recommendations made by Dunn, Trivedi, Kampert, Clark and Chambliss (2005), participants were asked to exercise to moderate exercise intensity which was calculated based on age predicted heart rate. Individuals in the IE condition were shown how to use the gym equipment and were given the opportunity to familiarise themselves with the equipment and exercising to moderate intensity. Individuals in the BTN condition were shown the artificial football pitch and were given the opportunity to participate in a few drills to familiarise themselves with exercising to moderate intensity.

Participants in the IE and BTN conditions were asked to attend a maximum of 20 exercise sessions over the 10 week intervention period. Each session lasted 55 minutes and was supervised by one of the researchers. Participants in the IE condition engaged in independent aerobic and resistance training in the university gym. Each session consisted of a 10 minute warm-up, 40 minutes of intermittent exercise and a 5 minute warm-down. With the aid of the Polar heart rate monitor watch, participants were asked to maintain their heart rate within the assigned range for no less than 35 minutes. A researcher checked that participants were exercising to moderate intensity at 15 minute intervals.

Each BTN session consisted of 5 to 12 men and was facilitated by a football coach and one of the researchers. Participants began each session with a 10 minute warm-up, 5 minute drills, and a 10 minute conditioned game, followed by a 25 minute game and a 5 minute warm-down. The 25 minute game was divided into two 10 minute halves with approximately a 5 minute half time interval. In football, conditioned games are instances where the coach imposes a 'condition' on the game with the aim to encourage players to focus on one particular aspect of the game. For example, to encourage teamwork and communication, a condition can be set whereby every player on the team must touch the ball before a goal can be scored. This condition emphasises the importance of communication and working together as a coherent team in achieving goals.

The BTN intervention employed CBT techniques to address a weekly theme which was integrated throughout the entire training session. These themes were relaxation, teamwork, identifying personal positive strengths, goal-setting, problem solving, resilience, avoiding harmful situations, self-care behaviour and communication. Each theme influenced how sessions in that given week were structured. Drills and conditioned games were designed to reinforce the theme topic and key words (e.g. fun,

teamwork, bounce back) were introduced to reiterate the central objective of each theme. Core features of CBT such as guided discovery, psychoeducation, skill building and homework were incorporated into each session. For example, a central feature of the BTN intervention was the use of football metaphors in the designated half-time team-talk to facilitate guided discovery and group discussion around the session theme. The use of football metaphors encouraged players to make links between sport and life and to discuss life issues in an acceptable context by sharing their experiences and opinions. Points made in the 'team talk' were reiterated by the coach and researcher through the remainder of the session. In terms of homework, each week players were asked to either reflect on the weekly theme in some way or carry out a behavioural task. For example, for the theme of relaxation, players were asked to incorporate relaxation techniques (i.e. progressive muscular relaxation and diaphragmatic breathing) into their daily lives. Participants discussed whether or not they found the homework tasks beneficial at subsequent sessions, however adherence to homework tasks was not explicitly monitored. Social skill building was facilitated both during and after each session at which time a light snack was offered to players in an effort to encourage players to spend a few minutes socialising post session.

A team heart rate monitor system recorded the exercise intensity for each individual. Similar to the IE condition, the aim was to maintain targeted heart rate range for no less than 35 minutes. Weekly protocol for each theme was documented by the researcher and changes to the original session plans were noted. To confirm study integrity, a checklist completed by the researcher following each session assessed that each session objectives were met. The checklist was used to ensure that the warm-up, drills, conditioned games and five-a-side games including the team talk were designed to incorporate the CBT intervention and that these interventions were implemented as

planned. The checklist was also used to verify that post-session socialisation had been encouraged. At various time-points an independent observer completed an integrity check.

Participants assigned to the control condition were advised that they could avail of the gym facilities after the 10 week study period. During the 10 week duration of the study participants in the control group were asked to refrain from exercise. All participants were asked to respond to the same quantitative measures and qualitative questions again at weeks 5 and 10 and once more at 8 weeks post-intervention as part of follow-up data collection.

### *Measures*

#### *Beck Depression Inventory-2<sup>nd</sup> Edition (BDI-II)*

The BDI-II (Beck, Steer & Brown, 1996) is a 21-item self-report instrument that measures the presence and severity of somatic and affective symptoms of depression. Responses to each item are rated on a 4-point scale ranging from 0 to 3 in terms of symptom severity. A total BDI-II score of 13 or less is within the minimal range of symptom severity, a total score ranging between 14 and 28 is considered mild/moderate and between 29 and 63 is considered indicative of severe depression. The BDI-II has been validated with both psychiatric and normative populations and has been shown to have good reliability (Beck, Epstein, Brown & Steer, 1988). In this study, the Cronbach alpha coefficient for the BDI-II was .85.

#### *Social Provisions Scale (SPS)*

The SPS (Cutrona & Russell, 1987) assesses the extent to which one perceives their social relationships to be supportive and nurturing. This 24-item scale assesses the

presence and absence of social attachment, social integration, reassurance of worth, reliable alliance, guidance and opportunity for nurturance. Responses to each item are rated on a 4-point scale ranging from 1 to 4. Total SPS scores range from 24 to 96 with higher scores indicating a greater degree of perceived support. The SPS has demonstrated good reliability and validity with a number of populations including psychiatric, low income and all male samples. (Caron, Tempier, Mercier & Leouffre, 1998; Cutrona & Russell, 1987; Wester, Christianson, Vogel & Wei, 2007). In this study, the Cronbach alpha coefficient for the SPS was .91.

#### *Short Qualitative Questionnaire*

The researchers devised a short qualitative questionnaire which included a number of open-ended questions related to psychological health and exercise. Participants were asked “How would you describe your life at the moment?”, “What do you think about sports and exercise?” and “Why do you think it is beneficial for people to exercise?”

#### *Alcohol consumption*

A short questionnaire was devised to indicate the units of alcohol consumed by participants. Participants were asked to report the number of days in a week they typically consumed alcohol and the number of units they would typically consume on average in one day. As a guide, participants were told that 1 unit of alcohol is equivalent to half a pint of beer, a pub measure of fortified wine or a small glass of wine; 1½ units is equivalent to a pub measure of spirits and 2 units is equivalent to a pint of beer or a large glass of wine.

### *Heart Rate*

Two types of heart rate monitors were used in this study, the Polar Team System and the Polar RS400. The Polar Team System consists of 10 individual transmitter belts. Participants in the BTN condition each wore a transmitter belt throughout each football session. The Polar RS400 individual heart rate monitors consisted of a transmitter belt and a watch which allowed participants to monitor their own heart rate. Participants in the IE condition wore both the transmitter belt and the RS400 watch throughout each gym session. Heart rate data was analysed using the Polar ProTrainer 5 software.

## Results

### *Data Analysis*

Descriptive statistics, internal reliability and correlation analyses were initially run on all the variables of interest. One-way Analysis of Variance (ANOVA) and Fisher Exact Tests were employed to compare baseline measures across the three groups. To evaluate group differences across time on depression and social support, mixed effects regression analyses were used. This type of analysis is optimal for examining repeated measures in the absence of missing data ensuring an intent to treat analysis as randomised (Brown & Prescott, 1999; Gueorguieva & Krystal, 2004). In all models the participant was assumed to be random and the intervention condition, time and condition by time interaction were included as fixed effects. In the event of significant main or interaction effects, post hoc planned comparisons were employed. The effect size of the exercise based interventions on levels of depression and perceived social support was calculated employing Hedge *g*. An alpha level of .05 was used for all statistical tests.

Of the 104 men enrolled in the study, 18% did not begin the intervention and therefore were excluded from the final analysis. The remaining 85 participants did not

deviate from random allocation and therefore were analysed in the conditions to which they were randomly assigned (see Figure 1). Preliminary diagnostic statistical analysis resulted in the elimination of one participant. The final sample size of 84 participants represented 81% of the original sample.

**Insert Figure 1 about here**

### *Descriptive Statistics*

In terms of correlation, a small negative non significant association was observed between the two variables of interest at baseline ( $r = -.20, n = 73, p > .05$ ). The mean (*SD*) age of the sample was 27.99 (4.93) years; 93% were white, 4% were Asian; 1% were African and 2% described themselves as mixed ethnicity. 73% were sedentary at study entry and 27% reported exercising once per week. At pre-intervention 21% of the overall sample reported mild to severe depression as measured by the BDI-II. No statistically significant differences between the three groups on any baseline characteristic were noted (Table 1). Analysis of HR intensities over the course of the 10 week intervention indicated that on average, participants in both exercise conditions maintained targeted heart rate range for no less than 35 minutes.

There was no significant difference in the number of sessions attended at week 5 between the IE ( $M = 7.11, SD = 1.53$ ) and the BTN ( $M = 7.07, SD = 2.52$ ) condition,  $t(47) = .08, p > .05$ . Similarly, there was no significant difference for number of sessions attended at week 10 between the IE ( $M = 15.65, SD = 3.89$ ) and the BTN ( $M = 14.82, SD = 4.19$ ) condition,  $t(43) = .69, p > .05$ .

There was a 39% return rate for questionnaires administered at 8 weeks follow-up. An assessment of exercise behaviour at this time indicated that for those participants who completed the follow-up measures, 33% of participants (i.e. 3 out of 9) in the

control condition were exercising compared to 90% of participants in the IE (i.e. 9 out of 10) and 86% of participants in the BTN condition (i.e. 12 out of 14). 96% of individuals (i.e. 23 out of 24) in the IE and BTN conditions indicated that participating in the study encouraged them to continue to exercise.

### *Rates of Change*

The percentage change in BDI-II scores from pre- to post-intervention for the control condition was a 1% increase. The mean BDI-II score for the IE condition decreased by 52% from pre- to post-intervention. For the BTN condition mean BDI-II decreased by 45% over the 10 week intervention period. Higher scorers on the BDI-II were identified as those who reported total scores of 14 or more at baseline. Within the control condition the mean BDI-II score for these participants decreased by 9% from pre- to post-intervention. Mean BDI-II decreased by 46% for high scoring participants within the IE condition and by 60% for high scoring participants within the BTN condition from pre- to post-intervention.

The average SPS score for the control group decreased by 4% from pre- to post-intervention. The mean SPS score for the IE and BTN group increased by 3% and by 2% respectively.

**Insert Table 1 about here**

### *Intervention Outcomes*

#### *BDI-II*

With BDI-II as the dependent variable, results indicated a significant effect for time  $F(3, 53) = 7.07, p < .01$ , and condition by time interaction  $F(6, 53) = 3.38, p < .01$ . Planned comparisons on the BDI-II slope coefficients across the four time points were



examined to explore changes in BDI-II scores over time for each condition and to examine significant condition by time interactions. The results indicated a significant downward trend for the IE  $t(60) = -3.79, p < .01$  and BTN  $t(60) = -4.95, p < .01$  condition on depression scores over time. Time significant changes were observed for both the IE  $t(81) = 2.89, p < .01$  and BTN  $t(81) = 2.36, p < .05$  conditions between week 1 and week 5 and again for both the IE  $t(72) = 4.31, p < .01$ , and BTN  $t(76) = 3.86, p < .01$ , conditions between week 1 and week 10. Time significant changes were again observed for both the IE  $t(61) = 3.32, p < .01$  and BTN  $t(60) = 4.37, p < .01$  conditions between week 1 and 8 week follow-up. Unlike the IE condition there was also a significant change in depression scores for the BTN condition between week 5 and 8 week follow-up  $t(29) = 2.90, p < .01$ . No other statistically significant changes across time points were observed.

With respect to significant interaction effects, post-hoc planned comparisons showed significant condition differences in BDI-II scores at week 10 between the control and the IE condition  $t(69) = 2.81, p < .01$ , and between the control and the BTN condition  $t(71) = 2.23, p < .05$ . Significant group differences in BDI-II scores were again observed at 8 week follow-up between the control condition and the IE condition  $t(34) = 3.25, p < .01$  and between the control condition and the BTN condition  $t(33) = 3.68, p < .01$ . No significant differences were found between the IE and BTN condition over the four time points. The magnitude of effect size on the BDI-II was -0.81 for the IE (95% Confidence Interval [CI] 1.40 – 8.21) and -0.66 (95% CI 0.39 – 7.16) for the BTN condition at week 10. Effect size for IE was -1.58 (95% CI 1.94 – 8.44) and -1.42 (95% CI 2.48 – 8.62) for the BTN condition at 8 week follow-up. The adjusted mean total scores for each of the study conditions on the BDI-II over time are presented in Table 2 and depicted graphically in Figure 2.

### *SPS*

With SPS as the dependent variable, results indicated a non-significant effect of time  $F(3, 54) = 1.38, p >.05$ , and a significant condition by time interaction effect  $F(6, 53) = 3.13, p \leq .01$ . Planned comparisons on the SPS slope coefficients across the four time points were examined to explore significant condition by time interaction effects. Post-hoc planned comparisons showed significant condition differences in SPS scores at week 5 between the IE and the BTN condition  $t(81) = 3.10, p < .01$  and between the control and the IE condition  $t(55) = -2.45, p < .05$  at 8 week follow-up. No significant differences were found between the control and BTN condition over the four time points. The magnitude of effect size on the SPS score at week 5 for the IE group was 0.80 (95% CI 2.49 – 11.40) and 1.11 (95% CI -15.60 - -1.57) at week 8 follow-up. The adjusted mean total scores for the three conditions on the SPS over time are presented in Table 2 and depicted graphically in Figure 3.

**Insert Table 2 and Figures 2 and 3 about here**

### *Qualitative Data*

Responses were coded to reflect broad themes in participants' perceptions of their lives at that moment and their attitude towards sports and exercise. In subjectively describing their lives, the themes 'life is good or improving', 'room for improvement' and 'unhappy/stressed' emerged. At pre-intervention 44% of the control group described their lives as good or improving, this is comparable to 38% of those in the IE intervention group and 52% of those receiving the BTN intervention. At post-intervention 38% of the control group continued to view their lives in a positive manner compared to 82% and 80% of those in the IE and BTN conditions respectively. At follow-up 22% of the

control group continued to view their lives in a positive manner compared to 90% and 79% of those in the IE and BTN conditions respectively.

In analysing participant's attitudes towards sports and exercise the themes 'viewed positively', 'would like to do more' and 'boring/overrated' emerged. At pre-intervention 59% of the control group expressed positive attitudes towards sports and exercise, as did 59% of participants in the IE condition and 75% of participants in the BTN condition. At post-intervention, 65% of participants in the control condition, 90% in the IE group and 95% of participants in the BTN condition viewed sports and exercise positively at post-intervention. At 8 week follow-up 13 out of the 14 individuals in the BTN condition, all 10 individuals in the IE condition, and 5 out of 9 participants in the control condition reported positive attitudes towards sports and exercise.

The themes 'healthy body and mind', 'de-stress' and 'social interaction' emerged from the analysis of participants' responses to the question related to the benefits of exercise. At pre-intervention 9% of participants in the control group describe involvement in exercise as being socially beneficial, this is comparable to 8% and 11% of participants in the IE and BTN conditions respectively. At post-intervention only 12% of participants in the control condition and 9% of participants in the IE condition continued to discuss the benefits of exercise in terms of social interaction. On the other hand, the number of individuals who indicated that social interaction was a benefit of exercise increased to 21% in the BTN condition. At 8 week follow-up 20% and 21% of participants allude to the social benefits of exercise participation in the IE and BTN conditions respectively, compared to 11% of those in the control group.

## Discussion

The efficacy of exercise interventions for depressive symptoms in young men is a key finding from this study, with pre- to post depression scores decreasing by 52% in the IE condition and by 45% in the BTN condition. The finding that both exercise interventions resulted in significant decreases in depressive symptoms at five weeks also provides additional insight into the temporal relationship between the effects of exercise on well-being. Given that anti-depressants can have a latency of several weeks before taking effect (Knubben et al., 2007) the results from this study suggest that exercise is a viable complementary treatment to pharmacological interventions. In terms of duration of change, both quantitative and qualitative results suggest that the benefits of exercise for depressive symptoms have the potential to persist beyond the end of treatment. These findings support and extend previous research by showing the efficacy for different types of exercise based interventions on depressive symptoms in a non-clinical sample of young men.

Although both the individual exercise and BTN interventions demonstrate the value of exercise for depression, further exploration of the BTN programme is merited for several reasons. Mental health interventions targeted at males cannot make an impact unless young men are willing to engage and adhere to these programmes. The BTN programme was designed to address help-seeking barriers specific to men and consequently provide an avenue for men to avail of support without feeling embarrassed. A positive feature of the BTN programme was the delivery of a mental health intervention in a socially acceptable venue employing both cognitive behavioural strategies and the physical game of football to engage participants. In terms of clinical significance, because the BTN programme is a combined exercise/psychosocial intervention, it is plausible that the mechanisms through which it has an effect on

depression may be different to an exercise only intervention. Further research is needed to explore the mechanism of change in the BTN intervention. This should include both short term and longer term assessment of other clinically relevant variables such as perceived competence, problem solving and interpersonal skills.

Given that the BTN condition was designed to facilitate social support it was surprising that individuals in the BTN condition perceived less social support than the IE group at 5 weeks. Further, contrary to our expectations it was the IE condition and not the BTN condition that showed significantly greater perceived social support than the control group at 8 week follow-up. Because participants in the IE condition were wearing individual HR monitors, researchers had significant one to one interaction with participants to check heart rate intensity and safe use of equipment. On the other hand, one to one interaction between researchers and participants in the BTN condition was less frequent because participants were wearing HR monitors that were part of a team system. Therefore, it is possible that the treatment benefits (i.e. increased perceived social support) in the individual exercise condition could have been due to the non-specific effects of one-on-one staff attention and support. A main trial examining the effectiveness of the BTN programme should try to minimize the input of the researcher in the individual exercise condition. The effects of such tighter controls will also be interesting to examine from an adherence perspective.

In terms of future research, mental health reports highlight the importance of exploring the potential of cost effective and openly accessible initiatives to address psychological distress at both the clinical and general population level (National Office for Suicide Prevention, 2008; Russell et al., 2004; Tedstone-Doherty & Kartalova-O'Doherty, 2010). To date we are not aware of any studies that have explored the cost-effectiveness of exercise programmes (i.e. individual versus group) for mental health.

Nor have any studies compared exercise programmes with other interventions in terms of cost. Future evaluation of the BTN programme should also include a comparison of its cost-effectiveness relevant to other types of interventions targeted at men's mental health. This would help to further assess the feasibility of this type of intervention.

There were several limitations to this study. The final sample size was limited and confined to a small urban area. Similar larger scale studies incorporating multisite participant pools from both urban and rural areas would improve generalizability. In terms of the longer term benefits of exercise (i.e. at 8 week follow-up) these findings should be interpreted with caution due to the participant attrition rate. Further research is needed to explore the benefits of exercise programmes over extended periods of time (i.e. 4 month, 6 month and 12 month follow-up). In terms of design, the combination of the group exercise and cognitive behavioural intervention makes it difficult to detect the relative effects of each. A main trial should include a cognitive behavioural only intervention as an additional comparative condition. This would allow for the examination of the adjunctive value of exercise along with the cognitive behavioural intervention.

It is argued that distress should be seen a continuum with individuals needing more or less support at various stages in their lives (Tedstone-Doherty & Kartalova-O'Doherty, 2010). Failure to seek help for mental health distress can lead to an escalation in problems necessitating more intensive treatment in the long-term (Tedstone-Doherty & Kartalova-O'Doherty, 2010). Because exercise based interventions have the potential to reach young men, further research is warranted to examine the effectiveness, feasibility, sustainability and cost of this type of intervention as a first line source of support for this difficult target group.

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Table 1.

## Baseline values by study condition

Variable	Control n = 28	IE n = 27	BTN n = 29	Total n = 84	<i>P</i> Value
Age, mean years (SD)	27.00 (4.40)	27.67 (5.47)	29.24 (4.80)	27.99 (4.93)	.21 <sub>b</sub>
Range, years	18 – 35	18 – 36	22 – 40	18 – 40	
Ethnicity					.15 <sub>c</sub>
White, n (%)	27 (96)	27 (100)	24 (83)	78 (93)	
Asian, n (%)	1 (4)	0 (0)	2 (7)	3 (4)	
African, n (%)	0 (0)	0 (0)	1 (3)	1 (1)	
Other ethnicity, n (%)	0 (0)	0 (0)	2 (7)	2 (2)	
Employed, n (%)	24 (86)	20 (74)	25 (86)	69 (82)	.46 <sub>c</sub>
Marital Status					.45 <sub>c</sub>
Single, n (%)	24 (86)	21 (78)	20 (69)	65 (77)	
Married, n (%)	4 (14)	6 (22)	8 (28)	18 (22)	
Divorced, n (%)	0 (0)	0 (0)	1 (3)	1 (1)	
Currently Smoking, n (%)	11 (39)	5 (19)	8 (28)	24 (29)	.24 <sub>c</sub>
Consume Alcohol, n (%)	23 (82)	22 (81)	28 (97)	74 (88)	.14 <sub>c</sub>
Units of Alcohol per week, (SD)	17.50 (9.01)	19.41 (15.61)	19.34 (15.48)	18.78 (13.67)	.87 <sub>b</sub>
Exercising					.25 <sub>c</sub>
Not Exercising, n (%)	23 (82)	19 (70)	19 (66)	61 (73)	
Exercising once per week	5 (18)	8 (30)	10 (34)	23 (27)	
BDI-II <sub>d</sub>	8.93 (6.97)	8.94 (6.98)	9.45 (7.00)	9.11 (6.98)	.95 <sub>b</sub>
SPS <sub>d</sub>	82.49 (9.20)	81.61 (9.31)	77.31 (8.58)	80.47 (9.71)	.33 <sub>b</sub>

Abbreviations: BDI-II, Beck Depression Inventory-2<sup>nd</sup> Edition; SPS, Social Provisions Scale.

<sub>b</sub> One-way ANOVA, <sub>c</sub> Fisher Exact Test, <sub>d</sub> Adjusted mean (SD) score

Table 2.

## Changes in Total Scores across Time

		Adjusted Mean (SD)			
		Range			
		Week 1	Week 5	Week 10	8 Week Follow-Up
Control	BDI-II	8.93 (6.97)	8.93 (5.86)	9.04 (5.85)	10.94 (4.42)
		0 - 24	1 - 20	0 - 25	1 - 15
	SPS	82.49 (9.20)	81.39 (8.54)	79.15 (8.92)	76.27 (7.41)
		70 - 96	66 - 96	62 - 93	62 - 94
IE	BDI-II	8.94 (6.98)	5.74 (5.86)	4.27 (5.91)	3.81 (4.54)
		0 - 30	0 - 17	0 - 14	0 - 10
	SPS	81.61 (9.31)	85.19 (8.70)	83.89 (9.01)	84.62 (7.59)
		52 - 96	61 - 95	58 - 96	56 - 93
BTN	BDI-II	9.45 (7.00)	6.93 (5.85)	5.22 (5.74)	4.32 (4.82)
		0 - 25	0 - 31	0 - 15	0 - 7
	SPS	77.31 (8.58)	78.24 (8.70)	78.67 (8.73)	80.04 (8.03)
		59 - 91	59 - 96	57 - 96	67 - 96

Figure 1. Flow of Participants through the study

Figure 2. Adjusted mean scores for BDI-II across time

Figure 3. Adjusted mean scores for SPS across time

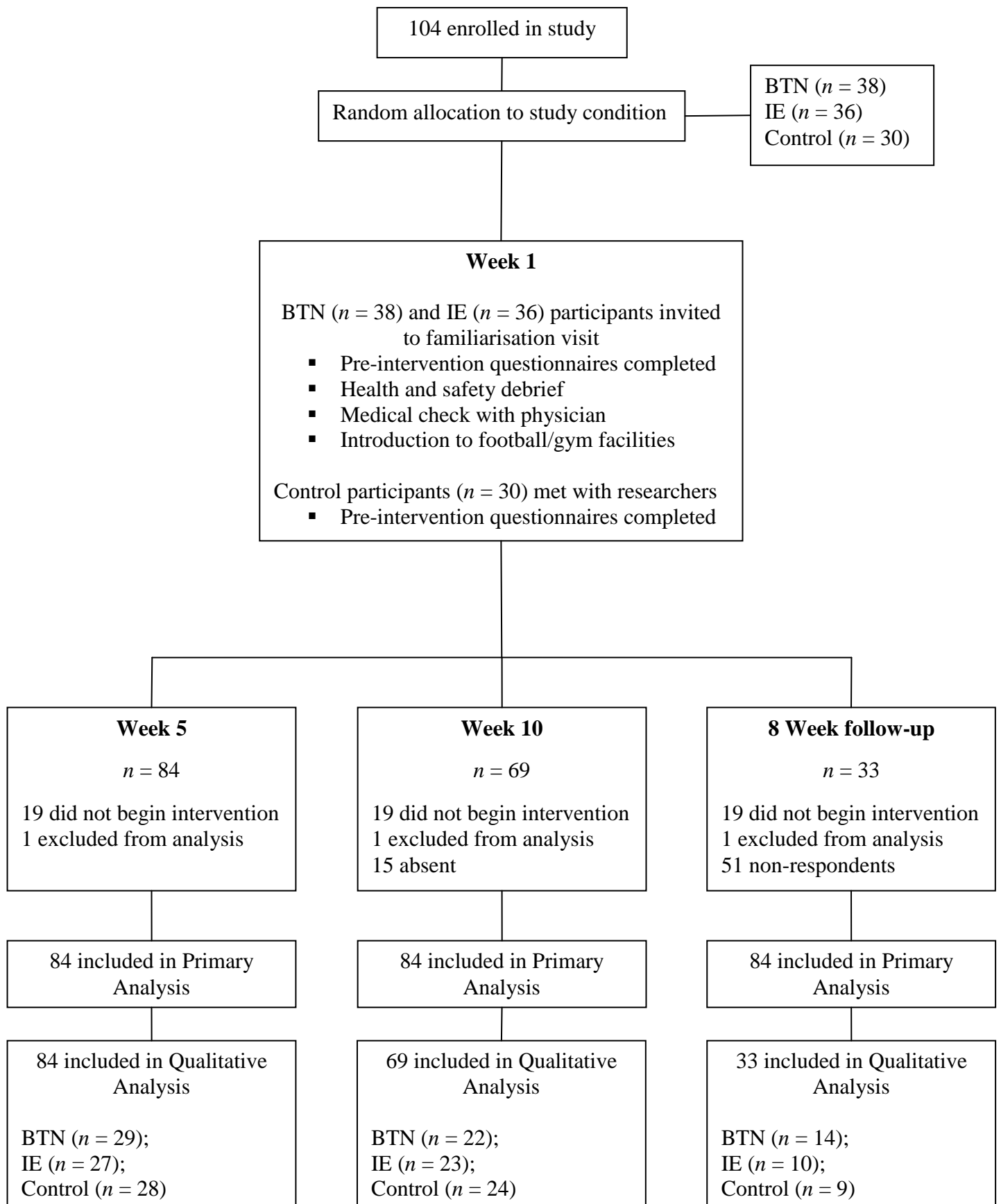


Figure 1. Flow of Participants through the study

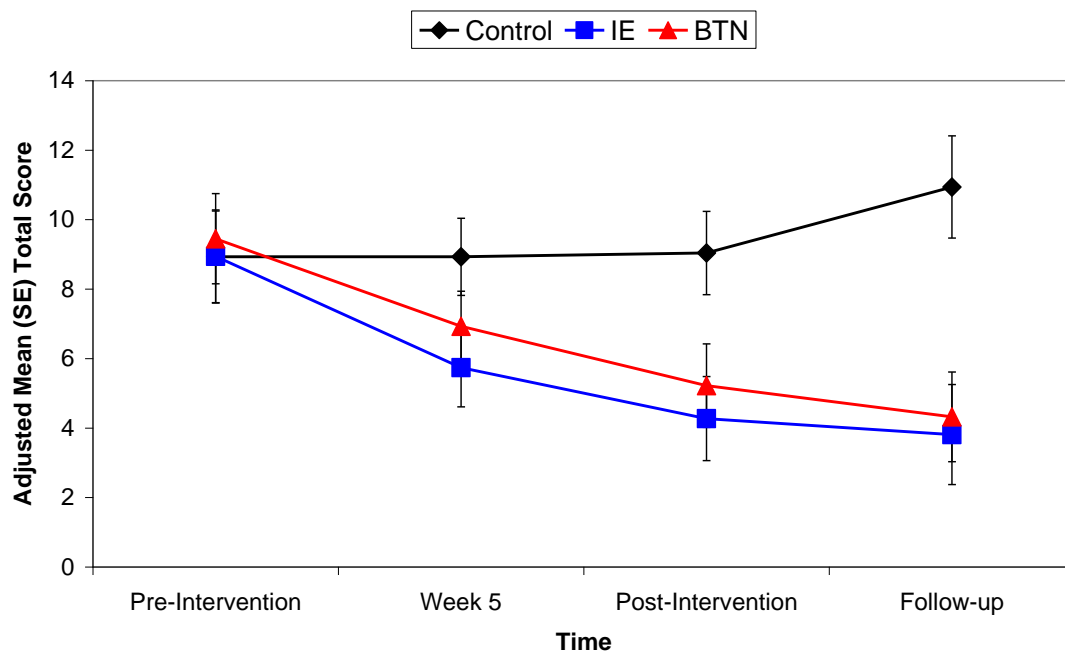


Figure 2. Adjusted mean scores for BDI-II across time



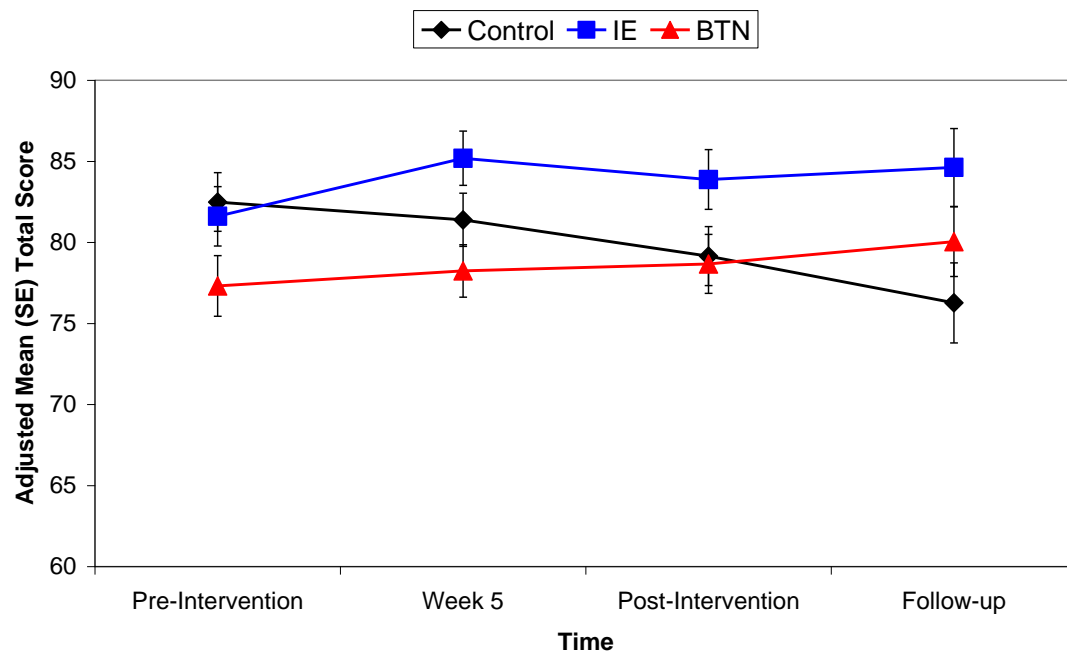


Figure 3. Adjusted mean scores for SPS across time