Telephone coaching can increase activity levels for people with non-chronic low back pain: a randomised trial

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Question: Does the addition of telephone coaching to usual physiotherapy care improve activity for people with non-chronic low back pain and low to moderate recovery expectations? **Design**: Randomised trial with concealed allocation and intention-to-treat analysis. **Participants**: People attending the physiotherapy department of a public hospital for treatment within eight weeks of onset of non-specific low back pain. Eligible participants had low to moderate recovery expectations, defined as a response of 7 or less to the question 'How certain are you that you will return to all of your usual activities one month from today?' on a scale from 0 (not certain at all) to 10 (completely certain). **Intervention**: Five sessions of telephone coaching by a physiotherapist trained in health coaching techniques in addition to usual physiotherapy compared to usual physiotherapy alone. **Outcome measures**: The Patient Specific Functional Scale, Oswestry Disability Index, Pain Self Efficacy Questionnaire, and recovery expectation were measured at baseline, 4, and 12 weeks. **Results**: 30 participants were recruited, with 26 completing all measures at 12 weeks. There were no significant differences between groups at 4 weeks. After 12 weeks the coaching group improved significantly more than the control group on two 10-point scales: the Patient Specific Functional Scale (mean difference 3.0 points, 95% CI 0.7 to 5.4) and recovery expectation (mean difference 3.4 points, 95% CI 1.1 to 5.7). Estimates of effect sizes were moderate to large in favour of the intervention. **Conclusion**: The addition of telephone health coaching to usual physiotherapy care for people with non-chronic non-specific low back pain led to clinically important improvements in activity and recovery expectation. **Trial registration**: ACTRN12607000458437 **[Iles R, Taylor NF, Davidson M, O'Halloran P (2011) Telephone coaching can increase activity levels for people with non-chronic low back pain: a randomised trial.** *Journal of Physiotherapy* **57: 231–238]**

Key words: Low back pain, Physiotherapy, Randomised controlled trial, Telephone, counselling, Physiotherapy

Introduction

Non-specific low back pain is common, with up to 90% of adults experiencing low back pain at some stage in their lives (Waddell 2004, Walker et al 2004). Psychosocial factors are thought to play a large role in developing continuing problems (Loisel et al 2001, Waddell 2004) and the most consistent psychosocial predictor of poor outcome in non-specific low back pain is a person's own recovery expectation (Iles et al 2008, Iles et al 2009). Early identification of individuals with lower recovery expectations may provide an opportunity for intervention.

Health coaching is one method of increasing the level of physical activity and improving outcomes in people with some chronic diseases (Castro and King 2002, McLean et al 2010, Vale et al 2002). Health coaching has been defined as an interactive role undertaken by a peer or a professional to support a person to be an active participant in the management of their illness or injury (Lindner et al 2003). Based on the transtheoretical model of change (Prochaska et al 1992), health coaching represents an intervention that addresses psychosocial aspects of greatest importance to the individual. Utilising techniques including motivational interviewing, cognitive behavioural strategies, and effective goal setting, health coaching has the added benefit of being able to be applied via the telephone. As a result, coaching does not require the patient to travel to a specific location and can be scheduled at a time that is convenient for the patient, reducing potential barriers to accessing treatment.

Return to usual activity levels is acknowledged as an important step in recovery from non-specific low back pain (van Tulder et al 2006). Coaching via the telephone improves activity levels in people with diabetes (Mortimer and Kelly 2006) and asthma (McLean et al 2010), as well as in healthy adults (Castro and King 2002). Health coaching is therefore a promising intervention that may be useful for people with non-specific low back pain who are at risk of ongoing activity limitation. However a search of the PubMed database before the trial commenced and repeated in September, 2011, did not locate any evidence regarding the efficacy of health coaching for people with non-specific low back pain.

Therefore the research question was:

Does the addition of telephone coaching to usual physiotherapy care improve activity levels in people with non-chronic non-specific low back pain and low to moderate recovery expectations?

> **What is already known on this topic**: Low expectation of recovery is a predictor of poor outcome in people with non-specific low back pain. Health coaching increases activity and improves outcomes in several chronic diseases.
>
> **What this study adds**: In people with non-chronic non-specific low back pain and low to moderate expectation of recovery, health coaching improves both recovery expectation and activity-related functional status.

Method

Design

The study was a randomised trial of telephone coaching plus usual physiotherapy care versus usual physiotherapy care alone for people with non-chronic (within 8 weeks of onset) non-specific low back pain and low to moderate recovery expectations. Outcomes were measured at baseline, 4, and 12 weeks via posted questionnaire. The coaching intervention was applied once per week for the first four weeks, with one further session three weeks later. Usual physiotherapy care was at the discretion of the treating therapists.

Recruitment was performed by RI, who was also the health coach. After baseline testing participants were allocated to the treatment or the control group according to a randomly generated sequence of numbers from a random number generator in permuted blocks of eight sealed in opaque envelopes previously prepared by an independent researcher. This process was performed away from the recruitment site, with participants informed of their group allocation the following day. The health coach was blinded to the baseline measures; however, the health coach was aware of unscored activities listed on the Patient Specific Functional Scale since these activities were used during the coaching sessions. Treating physiotherapists were blinded to group allocation and the self-reported outcome measures were entered into a database by a researcher blind to group allocation.

Participants, therapists, centres

People attending a public hospital physiotherapy outpatient department for treatment of low back pain were screened for eligibility by the treating physiotherapist. Eligible participants were those aged between 18 and 64 years, who had non-specific low back pain as diagnosed by the physiotherapist, an onset of pain within the previous 8 weeks (in the case of recurrent pain, an onset was defined as an increase in symptoms after an 8-week period of stability), and a low to moderate expectation of recovery. Recovery expectation was measured as the response to the question 'How certain are you that you will return to all of your usual activities one month from today?' on a scale from 0 (not certain at all) to 10 (completely certain), with a score of 7 or less classified as low to moderate recovery expectation. During our pilot testing this score represented the 33rd percentile of the first 20 people screened (ie, the lowest third of recovery expectation responses). Exclusion criteria were suspected neural compromise, a history of back surgery, or pain due to a specific cause (such as tumour, fracture, or recent pregnancy). The therapists who delivered outpatient physiotherapy were those allocated to the study participants as part of usual clinical care. Patients with non-specific low back pain accounted for approximately 15% of the workload of the outpatient department.

Intervention

All participants received usual physiotherapy care. The physiotherapy management provided was at the discretion of the treating therapist, including treatment type, frequency, referral, and discharge according to usual practice. In an attempt to ensure physiotherapy treatment reflected usual physiotherapy care, no directives were provided regarding the nature of physiotherapy treatment during the study. Treatments applied included manual techniques and exercise therapy at the discretion of the therapist. To ensure appropriate care was provided to participants with potential psychological problems, every participant was screened for high levels of non-specific psychological distress using the Kessler 10 Questionnaire (Kessler et al 2002). In the event of a participant scoring above 30, which is associated with a high probability of serious psychological distress (Victorian Public Health Survey 2006), the treating physiotherapist was notified and requested to refer the participant to an appropriately trained professional within the health service.

Participants in the experimental group also received health coaching via telephone. The telephone coaching involved the application of health coaching principles by a physiotherapist with three years of clinical experience and three years of tertiary level teaching experience who had received three days of training in health coaching. A coaching protocol was developed to guide each coaching session. The first coaching session aimed to develop rapport and identify which of the three activities the participant had identified on the Patient Specific Functional Scale was most important for them to focus on. The first step in the coaching process was to identify whether the participant was not contemplating return, considering return, attempting to return, or maintaining return to the nominated activity (Prochaska et al 1992). Consistent with this stage-based approach to behaviour change, information was used by the coach to help determine which coaching techniques were likely to be more useful during coaching.

The second step was to ask the participant to rate the importance of returning to the activity in one month's time on a scale from 0 to 10, where 0 was *not important at all* and 10 was *as important as it could be*. Where the participant reported a score below 7, the coach applied techniques such as motivational interviewing to increase the perceived importance of the activity. Once the score was 7 or higher, the coach moved on to establish the participant's confidence about returning to the activity. This third step required participants to rate their confidence to return to the activity in one month's time from 0 to 10, where 0 was *not confident at all* and 10 was *as confident as they could be*. Where the score was below 7, the coach applied cognitive behavioural strategies to increase confidence. When the score was 7 or higher, the coach then went through goal setting and planning for any potential setbacks in order to improve the likelihood of successful return to the activity.

Not all steps in the process were part of each coaching session. The anticipated length of each coaching session was approximately 30 minutes, with the actual duration of each coaching session dependent on the rate of progress through the protocol. The coach did not offer any treatment advice or comment on the treatment provided by the treating physiotherapist or any other treating health practitioner. If the participant had specific questions regarding their treatment, the coach encouraged the participant to discuss the concerns with the relevant practitioner.

Coaching was applied via telephone once per week for 4 weeks after baseline, and once more 3 weeks later. In order to provide support throughout return to usual activity, coaching continued for a total of 5 sessions even if the participant reported returning to full activities. Coaching also continued for 5 sessions if the participant reported being discharged from physiotherapy or decided to pursue alternative forms of treatment.
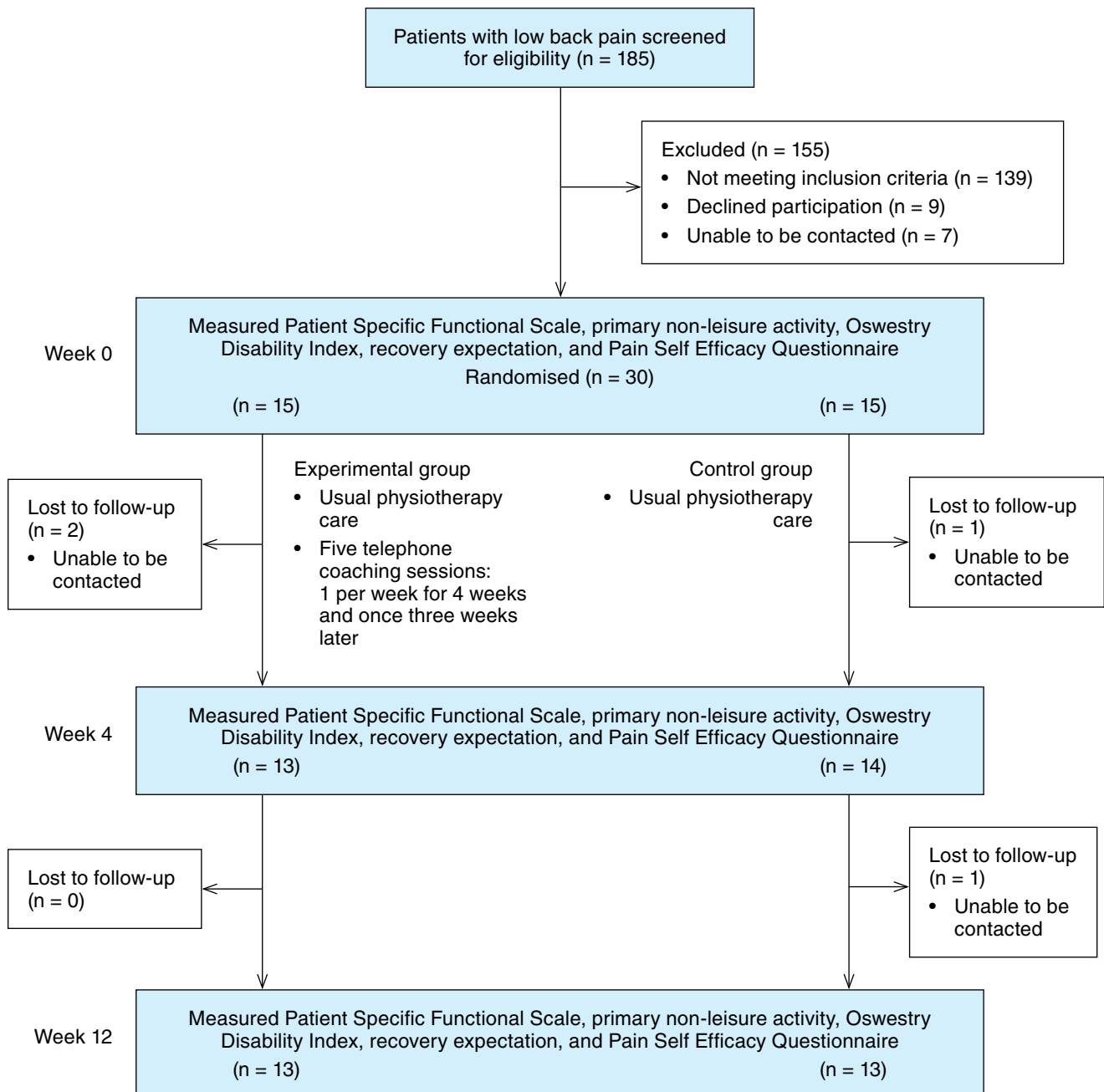
Figure 1. Design and flow of participants through the trial.

Coaching was applied independently to physiotherapy and there was no correspondence between the treating therapist and the coach. The treating physiotherapists were blind to group allocation in order to ensure knowledge of the coaching intervention did not influence their management of the patient.

Outcome measures

Primary outcome: The primary outcome was activity limitation measured by the Patient Specific Functional Scale (Stratford et al 1995). For this scale, participants identified their primary non-leisure activity and two other activities they were unable to perform to the same level as they could before the problem. The item ratings were

averaged to yield a total score between 0 and 10 where a higher score indicates better functioning. The score for the single-item primary non-leisure activity was also analysed separately. The Patient Specific Functional Scale has high test-retest reliability (ICC = 0.97) (Stratford et al 1995), concurrent validity with other measures of back-specific activity limitation (r = 0.55 to 0.74) (Donnelly and Carswell 2002), and responsiveness to change in low back pain populations (Pengel et al 2004). The minimum clinically important difference established in previous studies was 2 points on the average Patient Specific Functional Scale score (Maughan and Lewis 2010), and 3 points on the primary non-leisure activity (Stratford et al 1995).

Table 1. Characteristics of all participants, the experimental group and the control group at baseline.

Characteristic	Groups		
	All (n = 30)	Exp (n = 15)	Con (n = 15)
Age *(years)*	39.5 (12.0)	39.5 (11.7)	39.5 (12.7)
Gender, n male (%)	18 (60)	8 (53)	10 (67)
Recovery expectation at screening *(0–10)*	4.6 (2.2)	4.8 (2.2)	4.4 (2.3)
Time from injury to baseline *(days)*	25.3 (16.5)	25.5 (17.9)	25.1 (15.5)

Exp = experimental group, Con = control group

Secondary outcomes: The modified Oswestry Disability Index (Fritz and Irrgang 2001) was also used as a region-specific measure of activity limitation. The Oswestry Index is scored as a percentage, with a higher percentage indicating a higher level of back-related disability. It has demonstrated evidence of reliability and validity (Davidson and Keating 2002, Jolles et al 2005, Ostelo and de Vet 2005, Roland and Fairbank 2000). The minimum clinically important difference for the Oswestry has previously been established as 10 points (Ostelo and de Vet 2005).

Further secondary outcomes were recovery expectation and pain self efficacy. Recovery expectation was measured using the same question used to determine eligibility, scored from 0 to 10 with a higher score indicating more positive expectations (Iles et al 2009). The minimum clinically important difference for this measure has not been established. Pain self efficacy was measured using the Pain Self Efficacy Questionnaire, a measure of a person's confidence to complete specific activities despite their current level of pain (Nicholas 2007). The Pain Self Efficacy Questionnaire is scored out of a total of 60 points, with a higher score indicating a higher level of pain self efficacy. The Pain Self Efficacy Questionnaire has good test-retest reliability over a 3-month period ($r = 0.73$) (Nicholas 2007) and sensitivity to change in patients with chronic low back pain (Maughan and Lewis 2010). The minimum clinically important difference for this measure is 11 points (Maughan and Lewis 2010).

Data analysis

To achieve a power of 80% with 95% confidence to detect a clinically important difference of 2.0 points on the Patient Specific Functional Scale (Maughan and Lewis 2010), assuming a standard deviation of 1.6 points similar to that found in other studies of non-specific low back pain (Stratford et al 1995), 24 participants were required (Buchner et al 2007). A target sample size of 30 was set to allow for some loss to follow up.

Outcomes were analysed on an intention-to-treat basis for all available data. To compare the two groups on the primary and secondary outcomes, analysis of covariance (ANCOVA) was applied comparing the means at 4 and 12 weeks using the baseline scores as covariates (Vickers and Altman 2001). To evaluate the impact of the intervention,

effect sizes (standardised mean differences) were calculated by dividing the difference in post intervention means by the pooled standard deviation (Hedges *g*) (Hedges and Olkin 1985). An effect size of 0.2 was considered small, 0.5 a medium sized effect, and 0.8 or greater a large effect size (Cohen 1992).

The primary non-leisure activity score from the Patient Specific Functional Scale was also analysed by calculating the absolute risk reduction and number needed to treat statistic by comparing the proportion in each group achieving a successful return to the specified activity (determined *a priori* as a score of 7 or higher out of 10 on the Patient Specific Functional Scale) at 12 weeks.

Results

Flow of participants and therapists through the study

Thirty participants were recruited from 185 people screened between January 2008 and March 2010. Four participants (2 from each group) could not be contacted to complete final outcome measures at 12 weeks. The final analysis consisted of 26 participants, 13 from each group. The flow of participants through the trial and reasons for loss to follow-up are illustrated in Figure 1. Five different physiotherapists treated patients from the intervention group and seven different therapists treated patients from the usual care group. The therapists had a mean of 4.6 (SD 4.0) years of clinical experience.

The baseline characteristics of the participants are presented in Table 1 and the first two columns of Table 2. The two groups appeared well matched for demographic factors and baseline measures. The primary non-leisure activity for 25 of the 30 participants was work and the majority (18 of 30) worked full time. Other activities forming part of the Patient Specific Functional Scale included gardening (7 participants), playing with children (5 participants), and walking for longer than half an hour (5 participants).

Compliance with trial method

The mean duration of each coaching session was 19 min (SD 5, range 9 to 30), with a mean total coaching time of 84 min (SD 26, range 52 to 120). There was no difference in the number of physiotherapy treatments received by the coaching group (mean 6.3, SD 5.1) and the usual care group (mean 5.4, SD 3.7) ($p > 0.05$). The effectiveness of therapist blinding was assessed at the end of the trial, with therapists identifying the correct group allocation in 57% of cases, marginally higher than the 50% expected due to chance alone. The Kessler 10 screening questionnaire identified 5 participants (4 usual care, 1 coaching group) with high levels of non-specific psychological stress. In all cases the treating therapist was notified and advised of the score, leaving referral to a psychologist up to the therapist's judgement as per usual practice.

Effect of intervention

Group data for all outcomes are presented in Table 2. Individual data are presented in Table 3 (see eAddenda for Table 3). After four weeks there were no statistically significant differences between the groups on any of the outcomes.

Table 2. Mean (SD) for all outcomes for each group, mean (SD) difference within groups, and mean (95% CI) difference between groups.

Outcome	Groups						Difference within groups				Difference between groups[a]	
	Baseline		Week 4		Week 12		Week 4 minus baseline		Week 12 minus baseline		Week 4	Week 12
	Exp (n = 15)	Con (n = 15)	Exp (n = 13)	Con (n = 14)	Exp (n = 13)	Con (n = 13)	Exp	Con	Exp	Con	Exp minus Con	Exp minus Con
Patient Specific Functional Scale *(0–10)*	3.7 (2.3)	3.1 (2.3)	6.5 (2.7)	5.1 (1.8)	8.3 (2.1)	5.2 (3.4)	2.7 (2.7)	2.4 (2.5)	4.5 (2.5)	2.2 (3.9)	1.0 (−0.8 to 2.9)	3.0 (0.7 to 5.4)
Primary non-leisure activity *(0–10)*	4.7 (2.5)	3.3 (2.7)	7.5 (2.3)	5.3 (2.8)	8.5 (2.2)	5.2 (4.0)	2.6 (2.7)	2.5 (2.9)	3.6 (2.6)	2.2 (3.5)	1.5 (−0.9 to 3.8)	2.2 (−0.6 to 5.0)
Oswestry Disability Index *(0–100)*[b]	40 (20)	41 (13)	22 (17)	30 (9)	14 (17)	30 (26)	−17 (19)	−12 (12)	−23 (21)	−12 (26)	−7 (−17 to 3)	−14 (−32 to 4)
Recovery expectation *(0–10)*	5.8 (3.0)	5.5 (2.5)	6.9 (3.1)	5.8 (2.3)	8.5 (1.9)	5.2 (3.5)	0.9 (2.5)	0.2 (3.3)	3.0 (2.9)	−0.5 (4.2)	1.0 (−1.1 to 3.0)	3.4 (1.1 to 5.7)
Pain Self Efficacy Questionnaire *(0–60)*	33 (15)	32 (10)	48 (11)	41 (9)	52 (13)	42 (18)	12 (19)	10 (11)	17 (20)	10 (17)	6 (−2 to 14)	10 (−3 to 23)

Exp = experimental group, Con = control group; Shaded row = primary outcome; [a]mean difference calculated using baseline scores as a covariate, [b]smaller number indicates better outcome (reduced activity limitation)

After 12 weeks the coaching group had significantly better scores on the Patient Specific Functional Scale compared with the usual care group (mean difference of 3.0 points, 95% CI 0.7 to 5.4). This mean difference was larger than the minimum clinically important difference of 2.0 points and the corresponding standardised effect size ($g = 1.1$) was large.

At 12 weeks there was no significant difference between the groups on the primary non-leisure activity item from the Patient Specific Functional Scale, despite the large standardised effect size of $g = 1.0$. Two of the 13 participants (15%) in the coaching group did not return to their primary non-leisure activity compared to 7 out of 13 (54%) in the usual care group. The absolute risk reduction (ARR) was 38% (95% CI 2 to 64). The corresponding number needed to treat was 3 (95% CI 2 to 51). That is, for every three people who received the coaching intervention, one more successful return to primary non-leisure activity was achieved than would have been with usual care alone.

The between-group difference on the Oswestry Disability Index did not reach significance, but the point estimate of the mean difference at 12 weeks (14.1 points) in favour of the coaching group was larger than the minimum clinically important difference of 10 points. The standardised effect size of the intervention on this outcome ($g = 0.7$) was moderate to large.

At 12 weeks the coaching group had significantly higher recovery expectation (mean difference of 3.4 points, 95% CI 1.1 to 5.7) than the usual care group, and the standardised effect size for this outcome was large ($g = 1.2$).

There was no significant difference between groups on the Pain Self Efficacy Questionnaire with a medium standardised effect size ($g = 0.6$) in favour of the coaching group.

Discussion

Telephone coaching added to usual physiotherapy care resulted in clinically significantly increased levels of self-reported activity and improved recovery expectation at 12 weeks in people with non-chronic non-specific low back pain and low to moderate recovery expectation. The intervention had a large effect on both patient-specific and region-specific measures of activity limitation. The mean difference on the Patient Specific Functional Scale was larger than the minimum clinically important difference (Maughan and Lewis 2010) and the mean difference on the Oswestry, although not statistically significant, was 14.1 – larger than the minimum clinically important difference of 10 points (Ostelo and de Vet 2005). Participants in this study were at risk of developing chronic activity limitation and effective interventions in this population are particularly important, as the majority of resources devoted to non-specific low back pain are consumed by the small proportion of people experiencing ongoing disability (Shaw et al 2001, Truchon and Fillion 2000). For the addition of an average of less than 90 minutes of therapy time, health coaching via the telephone may represent a cost-effective addition to usual physiotherapy care. For every 3 people who received the coaching intervention, 1 more successful return to primary non-leisure activity was achieved than would have been with usual care alone. Furthermore, the

indication that the intervention may be able to change expectations regarding return to usual activities may be important, since low recovery expectations have been found to be a strong predictor of poor outcome in non-specific low back pain (Iles et al 2008).

The mechanism behind the impact of coaching on return to activity is likely to be a result of the increased emphasis on self management and empowerment of the participant. Increased self management is seen as a goal for those with chronic conditions, but this is traditionally not a focus of health care during the earlier stages of a condition (Lawn and Schoo 2010). Coaching has been identified as a means to help patients take greater responsibility for the achievement and maintenance of treatment goals (Vale et al 2002) and this seems to be the case for return to activity. The use of the transtheoretical model of change to tailor coaching techniques to the appropriate level for the individual may also lead to an increased adherence to rehabilitation strategies (Lindner et al 2003, Prochaska et al 1992). A greater understanding of these mechanisms and in particular of how they relate to recovery from non-specific low back pain may lead to the development of even more effective coaching models, not only for low back pain but also for other musculoskeletal conditions.

Since the coaching model utilised the activities within the Patient Specific Functional Scale, improvements on this measure could be expected. Despite not achieving statistical significance, the size of the treatment effect on the Oswestry Index supports the notion that the intervention had a clinically important effect on region-specific activity limitation as well as patient-specific limitation. Interestingly, the effects observed on the measures of activity and recovery expectation were not matched on the measure of self efficacy. This result was unexpected given that an increase in self efficacy could be expected due to the nature of the intervention. A possible explanation was the difference in focus of the self-efficacy measure (pain) and the focus of the coaching intervention (activity).

Previous psychosocial interventions in the non-chronic phase of non-specific low back pain have shown little success in the prevention of chronic disability (George et al 2003, Heymans et al 2004, Jellema et al 2005). However, previous interventions have focused on patient education with no psychotherapeutic content (George et al 2003, Heymans et al 2004) or consisted of a single discussion with a doctor regarding potential psychosocial barriers to recovery (Jellema et al 2005). The treatment effects obtained in this study suggest the coaching intervention could be an effective addition to usual physiotherapy care.

This trial was performed with individuals at risk of poor outcome due to low recovery expectations and the coaching intervention could represent large savings in terms of financial and human costs if the results are replicated in a larger trial. The trial was designed in order to satisfy the CONSORT requirements for reporting of clinical trials (Schulz et al 2010).

As a result of the small sample 95% CIs were large; however, the trial was sufficiently powered to detect a clinically important difference in the primary outcome. A larger sample, assuming effects are maintained, would increase the precision of the results and would be likely to

provide sufficient power to detect significant differences in secondary outcomes, namely the Oswestry and primary non-leisure activity. A larger, fully powered trial would require recruitment from multiple sites given that only a small proportion of people screened were eligible for this study. In the current study participants were recruited from a single metropolitan hospital, so a larger study including a wider range of referral sources would also enhance the generalisability of results to the wider non-chronic non-specific back pain population.

It should be considered whether the results would be strengthened by the addition of a placebo coaching group. It may be possible that the extra attention resulting from regular telephone contact rather than the coaching content of the phone call contributed to the favourable outcome. It is also possible that the results of the study are strongly influenced by the individual providing the coaching, and other coaches may achieve different results. These issues could be addressed in future trials through the use of multiple coaches, complete with measures to ensure a consistent approach to coaching is employed by all coaches, and the inclusion of a sham coaching group receiving equivalent non-therapeutic telephone contact. However, the last coaching contact in our trial occurred one month before the final measures, and this was likely to reduce the effect of any expectation bias in the self-reported outcomes. Another aspect that should be considered in future trials is the effect of any co-interventions, such as analgesia use, during the trial. Measurement of such co-interventions could increase the confidence that any difference found between groups was a true reflection of the coaching intervention and not due to differences in other treatments.

The 12-week follow up utilised in this trial was not long enough to determine maintenance of these behaviour changes or gather information about recurrence of symptoms, nor was it long enough to determine whether coaching would reduce the risk of progressing to persistent chronic non-specific low back pain. Measures of participation restriction such as return to work would also provide a useful indication of longer-term outcomes. A future trial should include these factors with at least a 12-month follow up, and include measures of cost benefit, such as more detailed information on health care utilisation. Future trials could also investigate the effectiveness of coaching alone, as well as the impact of coaching on conditions other than low back pain.

In conclusion, this trial provides preliminary evidence that the addition of telephone coaching to usual physiotherapy care for people with non-chronic non-specific low back pain and low to moderate recovery expectations leads to increased activity levels when compared to usual physiotherapy care alone. Health coaching via the telephone has the potential to prevent the progression of non-specific low back pain to chronic activity limitation. ■

eAddenda: Table 3 available at jop.physiotherapy.asn.au

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