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The effect of a self-determination theory-based communication skills training program on physiotherapists' psychological support for their patients with chronic low back pain: A randomized controlled trial

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Clinical Trials Registration Number: ISRCTN63723433

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Abstract

Objective: To examine communication skills training effects on physiotherapists' supportive behavior during clinical practice.

Design: Randomized trial.

Setting: Hospital outpatient physiotherapy clinics in Dublin, Ireland.

Participants: 24 physiotherapists and 24 patients with chronic low back pain.

Interventions: 2 hospital clinics were randomly assigned to the intervention arm. Physiotherapists (n = 12) received 8 hours of communication skills training focused on supporting patients' psychological needs. Physiotherapists (n = 12) from 2 other hospital clinics formed a waitlist control arm.

Main Outcome Measures: Verbal communication between each physiotherapist and a patient was audio recorded and independent, blinded raters used the the Health Care Climate Questionnaire (HCCQ) to assess physiotherapists' needs support behavior (primary outcome).

Results: Independent raters' HCCQ scores favored the intervention arm ($p < .01$, Cohen's $d = 2.27$).

Conclusions: Compared with controls, independent ratings demonstrated that physiotherapists who completed CONNECT were seen to provide greater support for patients' needs in a single assessed session. Long-term maintenance of this supportive behavior should be examined.

Key words: communication; physical therapists; patient compliance; motivation; fidelity

List of abbreviations:

HCCQ: Health Care Climate Questionnaire

HCP: Health Care Practitioner

SDT: Self-Determination Theory

CLBP: Chronc Low Back Pain

The CONNECT trial [1] involves evaluation of a communication skills training program, grounded in self-determination theory (SDT) [2], designed to enhance physiotherapists' support of their patients' psychological needs. The purpose of the current study was to examine intervention effects on physiotherapists' supportive behavior during clinical practice (i.e., intervention fidelity). Examination of intervention fidelity is an important component of effectiveness trials and knowledge translation into clinical practice [3], but until recently has received limited empirical attention [4, 5].

According to SDT [2], people have basic psychological needs for autonomy (feeling fully volitional or free to engage in an activity), competence (feeling effective and capable) and relatedness (feeling connected to and cared for by others). When a patient's psychological needs are supported, participation in treatment is likely to be more self-determined, meaning that it is driven by valued benefits and a willingness to participate, and long-term adherence is more likely than when a paternalistic model of care is adopted [6]. Unfortunately, there is evidence that health care practitioners (HCPs) often adopt this latter model of patient care [7, 8].

SDT-based healthcare interventions are designed to teach HCPs the skills needed to support patients' psychological needs, thereby promoting self-determined motivation and engagement in health-promoting behavior. Empirical support for these relationships has been demonstrated in a recent meta-analysis [6]. Drawing on this evidence, a communication skills training intervention, entitled CONNECT, was designed for physiotherapists working with individuals seeking treatment for chronic low back pain (CLBP). Specifically,

physiotherapists were taught 18 SDT-based strategies to enhance their needs supportive behaviors in clinical practice.

The primary aim of this study was to determine the effect of the CONNECT intervention on blinded observers' ratings of physiotherapists' needs supportive behavior. This is the first study to test the effectiveness of a SDT-based intervention for physiotherapists. It was hypothesized that physiotherapists who had completed CONNECT training would exhibit greater needs support compared with physiotherapists who had not completed this training.

Methods

Design

This study was a multi-center randomized controlled trial (Trial Registration Number ISRCTN63723433), comprising a cluster randomized design with intervention and control arms. A schematic view of the study is presented in Figure 1 and details of the protocol have been published elsewhere [1]. Briefly, 24 physiotherapists and 24 patients from 4 hospital-based physiotherapy clinics were recruited. All participants completed the study requirements. The Research Ethics Committees of the participating hospitals granted approval for this study and it was conducted in accordance with the Helsinki Declaration.

Randomization

Physiotherapists from each site volunteered to participate in the study prior to randomization TO the clinic to intervention or control. Randomization of cluster sites (i.e., 4 hospital clinics) to intervention and control arms (1:1) was carried out by an independent researcher using a computer-based algorithm. All 4 clinics were randomly allocated at the same time, and a researcher (CL) contacted each clinic to inform them of their allocation arm. Patients were informed of the purpose of the study, but were not informed whether or not their physiotherapists' clinic had been allocated to the treatment or control condition.

Participants

Physiotherapists: Physiotherapists (5 males, 19 females) working in 4 hospital outpatient physiotherapy departments were recruited. Physiotherapists had between 4 and 22 years clinical experience (M = 9.5 years, SD = 4.4 years). Physiotherapists provided informed written consent prior to participating in the study.

Patients**:** Patients referred by a medical practitioner for physiotherapy for CLBP to 1 of the 4 hospitals during the recruitment period were sent an information leaflet outlining the purpose of the study. Informed written consent was gained from 24 eligible participants (6 males, 18 females) prior to baseline assessment. The first author, a registered physiotherapist, screened potential participants via telephone, and then in person prior to their first physiotherapy session, to determine eligibility (see Table 1 for complete inclusion criteria). Exclusion criteria included suspected/confirmed serious spinal pathologies, nerve root involvement, and/or lack of fluency in written/spoken English.

Intervention Overview

Guided by previous SDT-based interventions with health care providers [9-11], 18 intervention-specific communication strategies were developed for use in the clinical setting by physiotherapists (see Table 2). To standardize delivery by the workshop leader (CL), and in turn to standardize physiotherapists' implementation of the intervention, the 18 SDT-based strategies were organized into five categories based on the 5A's Framework of Behavior Change [12] (see Table 2).

Intervention Implementation

To help standardize the quality of care provided to all patients, physiotherapists from both study arms attended a 1-hour education session. This session reviewed current best evidence-based care for CLBP management, in particular regarding advice for physical activity (e.g. as part of home-based rehabilitation) and exercise prescription [13, 14]. Physiotherapists from the intervention arm additionally participated in 8 hours of communication skills training, comprising 2 x 4-hour sessions separated by 1 week (in February 2011). The first training session incorporated an overview of the main SDT concepts, and covered strategies for implementing the communication skills during physiotherapy practice. Video recordings of simulated initial treatment sessions were shown. These vignettes first depicted a physiotherapist displaying controlling communication styles, which were then contrasted with depictions of needs supportive communication behaviors. Active role play and group discussion were also employed. At the end of the session, each

physiotherapist recorded 2 or 3 goals for strategy implementation during their treatment sessions in the upcoming week, along with likely obstacles and anticipated solutions. Physiotherapists were provided with choices regarding these goals; they were advised to choose strategies that they believed required most improvement or would have the most benefit for their patients.

The second training block consisted of group discussion regarding the facilitators and barriers to implementing the communication strategies during the previous week. Further simulated video recordings of follow-up physiotherapy sessions with a controlling versus needs supportive communication style were shown, followed by group discussion between the physiotherapists and workshop leader. At the end of the session, physiotherapists revised and set new goals regarding their implementation of the SDT-based strategies over the next 4 weeks. For example, one physiotherapist set a goal to help her CLBP patients set 'SMART' (simple, measureable, achieveable, recorded, and time-based) goals regarding their home-based rehabilitation exercises, and another set a goal to replace a common controlling phrase ("I want you to do this for me, ok?") with a more needs supportive suggestion ("If you do this, you'll give yourself the best chance for improvement"). As in the first session, physiotherapists were advised to choose goals related to strategies they believed required most improvement or would have the most benefit for their patients.

At 4 and 10 weeks following the second workshop, the workshop leader sent individualized emails to physiotherapists in the intervention arm. The purpose of these emails was to discuss progress towards the attainment of the implementation goals (examples provided earlier), and to provide assistance in resolving any problems physiotherapists were encountering when implementing needs-supportive communication in their clinical practice.

Recruitment and training of blinded raters

Three individuals were invited to participate in the study as blinded raters. Inclusion criteria were that raters held a PhD in psychology and had published research on motivation and physical activity in peer-reviewed journals, in the last 5 years. The raters participated in 2 hours of training delivered by 2 of the authors (AM & CL), during which they discussed the structure of a physiotherapy session and the principles of SDT-based communication strategies in physiotherapy. They also listened to audio recordings of sample physiotherapy sessions (involving physiotherapists and patients not drawn from this study's sample) and practised using the measurement tools employed in this study.

Patient and physiotherapist characteristics measures

Physiotherapists: All participating physiotherapists (n = 24) completed a baseline assessment package prior to attending the initial 1-hour workshop. In addition to demographics and educational history, data were collected using *The General Causality Orientation Scale (GCOS)* [15] to determine the physiotherapists' dispositional motivational orientation (autonomous, controlling, or impersonal). Previous research suggests that these orientations are related to needs-supportive behavior by practitioners [20] and, thus, GCOS scores provided a means of detecting potential between-arm differences in therapists prior to training. Physiotherapists also completed *The Learning Self-Regulation Questionnaire* [16] to determine their motives for participating in a learning activity.

Patients: Patients completed a self-report questionnaire before their initial physiotherapy session, which assessed demographic and motivation variables as well as CLBP severity and disability [1]. All measures for both physiotherapists and patients are presented in Table 3.

Primary outcome measure – physiotherapists' needs support

Health Care Climate Questionnaire (HCCQ): Audio recordings were made of intial treatment sessions involving 24 physiotherapists, each with a different patient (i.e., the patient's first visit to the physiotherapist). Using a computer-based algorithm, an independent researcher randomly assigned audio recordings to the 3 raters. Raters each listened to 12 recordings and used the HCCQ to assess physiotherapists' needs supportive communication. Thus, 12 randomly selected recordings were rated by a single rater, while a further 12 were double-rated and inter-rater reliability was assessed. The 6-item HCCQ is designed to measure the extent to which a health care practitioner interacts with his or her patient in a needs-supportive manner, and example items included, "the physiotherapist listened carefully to how the participant wanted to do things" and "the physiotherapist tried to understand how the participant saw things before suggesting how to do things". The scale includes 7-point Likert scales, anchored at 1= not true at all, 4 = somewhat true, 7= very true [16]. Previous scores derived from the HCCQ have demonstrated good inter-rater reliability and construct validity [17].

Blinding

Patients were blinded to treatment allocation. Independent raters were also blinded to treatment allocation and study design. Due to the nature of the intervention, it was not possible to blind the treating physiotherapists. Also, logistical constraints meant that the researcher who administered questionnaires was not blinded.

Sample Size

The required sample size was calculated using an effect size derived from a meta-analytic estimate of blinded needs support ratings associated with SDT-based training (mean effect of d = 1.4, range of 0.33 to 1.57) [18]. Using G*Power software [19], the sample size needed to detect this effect for the blinded HCCQ ratings (α = .05, 90% power) was estimated to be 20 participants, 10 in each arm. To allow for potential problems with data collection (e.g., scheduling problems or audio recording difficulties), we aimed to recruit a sample of 24 physiotherapists, 12 in each arm.

Statistical analysis

Having computed aggregate scores, skewness and kurtosis estimates were calculated for all variables. Descriptive statistics were computed for all patient and physiotherapist characteristics measures, and independent t-tests were employed to explore differences across the study arms. These tests were important because clients' or subordinates' (e.g., employees who report to a manager or students who are required to follow instructions from a teacher) characteristics can influence the needs support that a practitioner provides [20]. Therefore, clinical differences (e.g. differences in pain scores or functional disability) or motivational differences (e.g., patient motivation for treatment or physiotherapists' motivational

orientations) across the trial arms could have influenced interactions between patients and physiotherapists.

Primary Analysis: An independent t-test was implemented to assess between-arm differences on blinded raters' HCCQ ratings. An effect size (Cohen's *d*) [21] and a 95% confidence interval was also calculated. In line with Cohen's recommendations, we interpreted *d* values of 0.2, 0.5 and 0.8 as small, moderate, and large, respectively.

Results

Data were collected between March and November 2011, with recruitment stopped once the prespecified sample size had been reach. On average, patients attended their initial appointment and had their interactions with their physiotherapist audio recorded 16.7 weeks (SD = 6.9 weeks) after the end of the CONNECT training (i.e., February, 2011). No adverse events were reported.

Patient and Physiotherapist Characteristics

Patient demographics and CLBP-related variables (e.g., pain-related disability [22] and health status [23]) were similar to previous CLBP research in Irish public hospitals [24, 25]. There were no significant ($p > .05$) or clinically meaningful between-arm differences on any patient or physiotherapist characteristic variables (Table 4).

Primary Analysis

Needs support (HCCQ) scores provided by blinded raters were normally distributed (skewness/kurtosis values in the range -1 to +1), supporting the use of independent t-tests. Inter-rater reliability on the 12 double-rated recordings was also acceptable (ICC = .79). An independent samples *t*-test demonstrated that there was a large between-arm difference in needs support scores ($p < .001$, $d = 2.27$, 95% CI = 1.18 - 3.21), with intervention arm physiotherapists ($M = 4.57$, $SD = 0.85$) rated as significantly more supportive than control arm physiotherapists ($M = 2.78$, $SD = 0.72$).

Discussion

To the authors' knowledge, this is the first study to investigate the effect of a SDT-based communication skills intervention on physiotherapists' needs supportive behavior. Analyses indicated that the intervention had a large positive influence on physiotherapists' needs supportive behavior with patients under experimental conditions, thus supporting the main study hypothesis.

Although this is the first study to use an intervention based on SDT principles in a physiotherapy setting, other interventions have been conducted with HCPs treating patients for whom behavior change is a main focus of treatment (e.g., physicians counselling smokers to quit) [26]. A recent meta-analysis included five studies that examined the effect of SDT-based interventions on HCPs' needs supportive behavior [18]. Effect sizes associated with blinded needs support ratings in these studies ranged from 0.33 [27] to 1.57 [26]. One possibility as to why the effect in this study was relatively larger in magnitude is that physiotherapists may be particularly amenable to this type of training and, therefore, implemented the communication strategies more closely to protocol compared with HCPs in other studies. However, it should be noted that the lower bound of the 95% CI for our effect ($d = 1.18$ to

3.21) falls within the range of effect sizes found in other studies (0.33 to 1.57). Thus, our seemingly larger effect may be an artifact of chance attributable to our relatively small sample size. Physiotherapists may, in fact, be similar to other HCPs in their capacity to learn and implement needs supportive behavior in clinical practice.

Strengths and Limitations

It is noteworthy that this study was powered to detect differences in the primary outcome, and that this outcome was collected using a gold-standard method, namely observation by expert assessors who were blinded to treatment allocation [28]. This approach is particularly valuable in order to overcome various biases associated with self- and patient-reported data [29].

A limitation of this study was that physiotherapists' needs support in clinical practice was only assessed at one time-point. Ideally, to determine if the effects of the intervention on needs supportive behaviors persist over time, physiotherapists' behavior should be assessed at various time points [5, 28]. Also, investigating the physiotherapists' change in needs support from before to after the communication skills training would have allowed us to more confidently attribute between-arm differences to the intervention effects. To partially address this limitation, we assessed physiotherapists' motivational orientation (General Causality Orientation Scale) as this has been shown to correlate with needs supportive behavior [20]. Baseline scores on this measure across the 2 arms of the trial were similar; however differences in needs support prior to the intervention are still possible.

Another potential limitation of this study relates to the degree to which physiotherapsists implemented the intervention in a standardized fashion. The 5A framework

was also intended to assist physiotherapists in implementing effective communication in their clinical practive by way of structured approach (that could be modified based on their clinical judgement). In keeping with SDT principles, however, physiotherapists were also provided with choice regarding the specific strategies they felt were most important or required the most improvement. This approach recognizes that physiotherapists all have unique communication skills before arriving at training and a tailored approach is appropriate to maximize the degree to which physiotherapists communicated with their patients in a manner that was consistent with the theory-driven principles and strategies in the training (i.e., standardized implementation of communication skills). Ideally, baseline recordings could be analyzed prior to training by workshop leaders or mentors who could then help guide physiotherapists towards the communication skills that required greatest improvement.

Finally, one must also consider the potential impact of the presence of the dictaphone in the treatment area. Having a recording device nearby may have resulted in physiotherapists in experimental group temporarily displaying the communication skills taught in the workshops. In future, researchers may wish to examine physiotherapists' behavior in a less obtrusive manner and, as noted previously, examine behaviour in multiple sessions over an extended period of time in order to more accurately measure therapists' normal clinical practice.

Future research

Future research should employ larger samples and investigate the extent to which treatment effects endure over time. Researchers could also investigate the feasibility of incorporating SDT-based communication skills education into undergraduate and postgraduate programs. However, the effect on patient outcomes and the cost effectiveness

of the intervention should be examined before methods for widespread implementation are developed and employed [13]. Analysis of outcomes from the main CONNECT trial will provide initial evidence in this regard [1].

Conclusions

Communication that supports patients' psychological needs can lead to better outcomes, but is often not employed by HCPs. This study indicates that, in a single consultation session, greater needs supportive behavior was evident for HCPs who participated in the CONNECT intervention relative to those in a non-intervention control group. [15, 22, 23, 31-36]

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491 **Figure Legend**

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493 Figure 1: CONSORT Flow Diagram

Inclusion criteria	
Age	18 to 70 years
Diagnosis	LBP of mechanical origin with/ without radiation to the lower limb
Pain duration	chronic (≥ 3 months) or recurrent (≥ 3 episodes in previous year)
Language	English speaking and English literate
Contact status	Access to a telephone
Exclusion criteria	
Pathology	Suspected or confirmed serious spinal pathology (fracture, metastatic, inflammatory or infective diseases of the spine, cauda equina syndrome/widespread neurological disorder). Nerve root compromise (2 of strength, reflex or sensation affected for same nerve root)
Past medical history	Spinal surgery or History of systemic / inflammatory disease
Current medical status	Scheduled for major surgery during treatment
Treatment status	Currently or having received treatment for CLBP within previous 3 months
Pregnancy	Suspected or confirmed pregnancy
Contraindications	Unstable angina / uncontrolled cardiac dysrhythmias / severe aortic stenosis / acute systemic infection accompanied by fever No confounding conditions, such as a neurological disorder or an intellectual disorder

Table 1: Patient Inclusion and Exclusion Criteria

Strategy	Description / Example	Main Basic Psychological Need(s) Targeted
	ASK	
Using Open Ended Questions	"Tell me"/"What"/"How" are useful terms when asking questions as they allow the patient to elaborate on their story. Example: *"What kind of things are you doing to alleviate the pain at the moment"*	Relatedness
Using Single Questions	Avoid asking multiple questions at one time. Instead, ask one question and wait for a response before asking a second question.	Relatedness
Staying Silent	Allow the patient to complete sentences and finish speaking before following up with further questions.	Relatedness
Paraphrasing	After listening to the patient, summarize your perception of the main points. Examples: *"So what I am hearing is that…" or "It sounds like …."*	Relatedness
Empathizing	Show the patient that you understood the emotions that went along with the issue being discussed. Examples: *"I can see this upsets you" or "That must be very frustrating"*.	Relatedness
Gauging Patient Readiness to accept advice	Ask the patient if he or she is ready to consider advice regarding activities outside the clinic. Example: *"There a number of things you can do that will help … would you like to hear a few suggestions?"*	Autonomy
	ADVISE	
Catering for Different Learning Preferences	Use a selection of methods (aural, visual, kinesthetic) to educate the patient (during session and take home materials); these methods cater for multiple learning preferences.	Competence
Closing the Loop	Ask patients to paraphrase/demonstrate information that had been provided. Provide corrective feedback as required, and re-test understanding. Example: "*To be sure that I was clear could you please tell me, in your own words, your understanding of the …..."*	Competence
Providing a Rationale	Explain to the patient the rationale behind your advice. Example: *"As we discussed earlier, your back needs support from the muscles around. So, if you can do these exercises you can really provide your back with extra support …" or "Research shows that PA such as walking is a great way to..."*	Autonomy
Providing Opportunities for Patient Input or Choice	Ask the patient to provide input or make choices when providing advice. Example: "*Getting some physical activity –like going for a walk, riding your bike or swimming – is really good for your back. Is there a type of exercise that you prefer?"*	Autonomy
Using Autonomy	Support and encourage the patient to accept personal responsibility for his/her recovery. Avoid coercion or guilt inducing phrases.	Autonomy & Competence

Supportive Phrases Instead of Controlling Language	Examples: *"Here are some things that will help you overcome…" or "If you complete these exercises then you'll strengthen your back and it will be less likely to give you pain", instead of "Do this for me"* or "You have to…" or "You must…".	
AGREE		
Employing SMART Goal Setting	Agreed on goals that are Specific, Measurable, Achievable, Recorded, and Time-based. Example: *Earlier you mentioned that you are finding walking hard walking for long periods. For this week we could set a target of 15 minutes walking per day, how many days do you think you could achieve that target in the next week?"*	Competence
Ensuring Active Patient Participation in Goal Setting	Ask the patient for his/her opinions/comments during goal setting. Take into account patient's subjective history (e.g. family/work commitments). Example: *What time of day would suit you best for these exercises?*	Autonomy & Competence
ASSIST		
Identifying Barriers and Obstacles	Discuss at least one likely barrier to following treatment advice. Example: "*Is there anything you can think of that might stop you from accomplishing your exercise goal?"*	Competence & Autonomy
Identifying Solutions and Obstacles	Brainstorm with the patient ways to overcome this barrier (e.g. '*identifying enablers'* and 'cognitive restructuring'). Examples: "*Walking can be a fun and social activity that doesn't seem like hard work. How would you feel about walking with a friend/neighbor?" and suggest changing thoughts from "I am too out of shape to walk to the shop" to "If I take it nice and easy and remember to breathe, relax and take a rest when I need one, I will be able to walk to the shop."*	Competence & Autonomy
ARRANGE		
Providing a Rehabilitation Diary	Provide the patient with a rehabilitation diary to help him/her keep track of home-based rehabilitation (e.g., exercise, physical activity).	Competence & Autonomy
Following-Up	Suggest a specific follow-up appointment, provide guidance regarding when an appointment should be arranged (e.g., no more than 2 weeks later), or inform the patient that no follow-up appointment is needed.	Relatedness & Competence
Offering Contact	Invite the patient to contact you in the event of difficulties or questions.	Relatedness & Competence

Table 2: Mapping Communication Strategies to the '5A' Framework and Self-Determination Theory

Measure	Description
Physiotherapist	
General Causality Orientation Scale (GCOS)	This is a 17-item scale that assesses the strength of different global motivational orientations within an individual [15]. Subscales for autonomous, controlled and impersonal personality types are included.
Learning Self-Regulation Questionnaire (LSRQ)	The questionnaire provides both self-determined and controlling reasons for participating in learning experiences and asks individuals to rate on a 7-point Likert scale how true the statement is for them. The questionnaire is divided into two subscales; self-determined regulation and controlled regulation [31].
Patient	
The Modified Core Set of Questionnaires in Back Pain Research	Paitents comeplered the “Bothersomeness Scale”, “Interference with Work Scale” and “Satisfaction with Current Symptoms Scale” from the “Core Set of Outcomes” [32].
Global Perceived Effect Scale (GPE)	The GPE is an 11-point NRS that assesses the patient’s perception of recovery. It is considered to have high face validity and is often used as the reference standard against which other subjective measures are tested when assessing their measurement properties [33].
Roland Morris Disability Questionnaire (RMDQ)	This questionnaire consists of 24 yes/no items regarding the impact of back pain on activities of daily living. The RMDQ is used widely in low back pain studies as a standardized measure of activity limitation and

	has demonstrated good validity, reliability and responsiveness [22].
EuroQuol-5D Weighted Index	The EuroQol is a standardized instrument that provides a simple descriptive profile and a single weighted health index value for health status. It is applicable to a wide range of health conditions for which it has been shown to demonstrate good validity and reliability [23].
Depression Anxiety Stress Scale-21 subscale (DASS)	The DASS includes a set of three self-report scales designed to measure symptoms of psychological distress including depression, anxiety and stress, the 7-item depression subscale was used in the current study [34].
Fear Avoidance Beliefs Questionnaire (FABQ) Physical Activity	This is a five-item self-report questionnaire that specifically focuses on participants' beliefs about how physical activity affects their low back pain [35].
Perceived Competence Scale (PCS)	This four-item scale has consistently produced scores with good reliability and validity in relation to a variety of health-related behaviors, including PA [9]
Treatment Self Regulation Questionnaire (TSRQ)	This 15-item instrument is used to assess self-detemrined and controlled motivation towards healthcare treatment, as well as amotivation (absencc eof motivation). It has demonstrated good reliability and validity across diverse health-related behaviors [36].

Table 3: Description of Physiotherapist and Patient Characteristics

Characteristics	**Control (*n*=12)** **Mean (SD)**	**Experimental (*n*=12)** **Mean (SD)**	***p***
Patients			
Age (years)	47.88 (13.05)	46.80 (6.30)	0.82
Gender (% female)	83.3%	75%	0.37
Previous LBP (% YES)	66.6%	75%	0.67
Currently employed (% YES)	33.3%	41.66%	0.68
Pain Intensity	6.50 (2.11)	6.75 (1.66)	0.75
Pain Bothersomeness	3.58 (1.00)	3.33 (.99)	0.54
Pain Activity Interference	3.33 (1.27)	3.83 (1.03)	0.26
Symptom Satisfaction	1.33 (0.49)	1.75 (1.22)	0.28
Global perception of recovery	-0.14 (2.81)	-0.42 (2.68)	0.38
Quality of life	0.46 (0.17)	0.35 (0.17)	0.15
Disability	11.55 (4.01)	14.33 (3.92)	0.11
Depression	8.67 (6.57)	8.52 (8.51)	0.92
Fear-avoidance	14.92 (6.57)	16.25 (7.91)	0.66
Perceived competence	6.6 (0.65)	6.88 (0.20)	0.18
Self-determined motivation	-2.42 (2.32)	-3.58 (3.58)	0.09
Physiotherapists			
Age	34.92 (5.98)	32.67 (3.28)	0.27
Experience (years)	10.17 (5.03)	8.83 (3.67)	0.47
GCOS (A)	101.00 (6.19)	95.00 (8.33)	0.14
GCOS (I)	45.25 (10.34)	39.82 (10.75)	0.23
GCOS (C)	57.00 (14.95)	57.91 (8.09)	0.86
LSRQ(A)	6.65 (0.43)	6.40 (0.77)	0.34
LSRQ (C)	10.50 (3.15)	10.25 (3.96)	0.39

Table 4: Patient and Physiotherapist Characteristics. **Note:** $p \leq 0.05$ = level of significance; GCOS (A) = General Causality Orientation Scale (Autonomous); GCOS (I) = General Causality Orientation Scale (Impersonal); GCOS (C) = General Causality Orientation Scale (Controlling); LSRQ (A) = Learning Self Regulated Questionnaire (Autonomous); LSRQ (C) = Learning Self Regulation Questionnaire (Controlling).

Cluster Enrollment

A total of 24 physiotherapists from 4 clinics in Dublin, Ireland were recruited into the study. The clinic was the unit of randomization (cluster n = 4)

Prior to allocation of clusters to intervention or control arm, participating physiotherapists (n = 24) attended a 1 hour refresher course on the evidence-based management of CLBP and completed a baseline assessment

Cluster Allocation

Clinics allocated to intervention (n = 2)

Clinics allocated to control (n = 2)

Intervention

2x4hr communication skills training workshops including an introduction to the principles of Self-Determination Theory and their application to physiotherapy.

Data Collection (Audio Recording of treatment sessions)

Patient consent was obtained prior to their initial physiotherapy appointment. An audio recording of each participating physiotherapist (n = 24) treating a CLBP patient in clinical practice was collected.