Bridging the intention-behaviour gap with behaviour change strategies for physiotherapy rehabilitation non-adherence

Sandra Frances Bassett *PhD (Auckland), MHSc (Hons), DipPhty (Otago)*

Senior Lecturer, Department of Physiotherapy, School of Clinical Sciences, Faculty of Health and Environmental Sciences, Auckland University of Technology

ABSTRACT

This paper reviews the problem of poor adherence to physiotherapy, the associated barriers and facilitators to adherence and bridging the intention-behaviour gap using behaviour change strategies. Adherence to physiotherapy, especially home-based physiotherapy that includes exercise programmes is problematic, which may be due to patients having to implement new behaviours and then integrate them into their daily lives. Further, patients may be adherent to some components of their physiotherapy and not others. Despite clinical, treatment and psychological factors being identified as reasons for poor adherence, the problem still persists. Effective patient education methods are not the total solution to the problem; patients need to be given skills to integrate the physiotherapy activities into their daily lives. Behaviour change strategies provide these skills and enable patients to bridge the intention-behaviour gap. These strategies strengthen patients' self-efficacy and should be selected to meet their needs and assist them to overcome their perceived barriers to undertaking the rehabilitation activities. While treatment goals provide patients with incentives to achieve their desired outcome they do not successfully bridge the gap. Valuable behaviour change strategies are verbal feedback, reinforcement, exercise testing, decision balance sheets, self-regulation, relapse prevention, progressed graded activities and booster sessions and action and coping plans.

Bassett SF (2015) Bridging the intention-behaviour gap with behaviour change strategies for physiotherapy rehabilitation non-adherence. New Zealand Journal of Physiotherapy 43(3): 105-111. doi 10.15619/NZJP/43.3.05

Key words: physiotherapy rehabilitation adherence, adherence barriers and facilitators, intention-behaviour gap, behaviour change strategies

INTRODUCTION

Patient education is valued by physiotherapists, with upwards of 90% using it in their daily practice (Chase et al 1993). Those who took part in the Chase et al (1993) study reported educating their patients about the rationale underpinning their treatments and home programmes with the emphasis on their exercises. The most popular educational methods were discussion, demonstration of exercises, and patient instruction sheets that included diagrams. More recently, electronic methods of patient education have been developed in other areas of health care (Fox 2009, Wantland 2004). However despite the best efforts of physiotherapists in educating patients about their treatment and their role in it, less than desirable adherence to physiotherapy still persists. Patients frequently report forgetting to do their home-based physiotherapy activities, which could well be due to an inability to integrate these into their daily routines (Sluijs and Knibbe 1991). Assisting patients to adhere to their physiotherapy programmes is considered to be a two-step process involving effective education and strategies to integrate the activities into their daily lives and routines (Sluijs and Knibbe 1991). The latter can be achieved by the use of behaviour change strategies, also known as behavioural interventions or cognitive-behavioural techniques, which have been shown to help patients adhere to their physiotherapy rehabilitation (Bassett and Prapavessis 2007). It is these methods that are frequently omitted from physiotherapy rehabilitation, yet should be an integral part of it. Therefore this review will focus on the extent of the problem of poor adherence to physiotherapy, the barriers to and facilitators of adherence, and bridging the intention-behaviour gap using behaviour change strategies that can be applied to physiotherapy rehabilitation. For the purposes of this paper the term behaviour change strategies will be used in preference to behavioural interventions and cognitive-behavioural techniques.

The Problem of Poor Adherence to Physiotherapy Rehabilitation

Adherence to physiotherapy rehabilitation requires patients to implement a number of different activities, such as attending clinic appointments and following the clinic-based and home-based treatment programmes (Bassett 2003, Brewer 1999). Given the number of activities patients have to undertake during a course of physiotherapy rehabilitation, it is not surprising that their adherence to the clinic-based treatment is less than optimal, with non-adherence rates being between 6% and 40% (Byerly et al 1994, Duda et al 1989, Lampton et al 1993).

Adherence to components of the home-based rehabilitation is also less than desirable. In a landmark study, Sluijs et al (1993) found that 24% of patients were non-adherent, 41% were partially adherent and 35% were highly adherent. Similarly, Taylor and May (1996) found that 60% of patients did not follow the advice about refraining from activities that are detrimental to optimal recovery. Patients may not necessarily adhere to all components of a physiotherapy rehabilitation programme. Alexandre et al (2002) found in a back pain study, the percentage of patients who either did not adhere at all or were poorly adherent differed from 49% with clinic attendance, 41% for watching back education videos and 65% for undertaking a prescribed exercise programme. It is apparent from the findings of these studies that adherence to home based activities is problematic with a higher percentage of patients not adhering fully to their required programmes.

Poor treatment adherence has been also classified as intentional and unintentional non-adherence (Horne 1998). When applied to physiotherapy rehabilitation intentional non-adherence can occur when people actively decide not to follow the prescribed treatment for some reason, such as not being able to integrate it into their daily lives. Unintentional non-adherence is a common problem in physiotherapy rehabilitation and frequently happens when the treatment programme is too complex or for whatever reason patients have difficulty integrating the programmes into their daily lives (Sluijs and Knibbe 1991). Finally there are differences in the adherence to short- and long-term programmes, with the latter being the most challenging, especially if they include exercises (Dishman 1991, Ice 1985, Schachter et al 2003). Short-term adherence is usually considered to occur when the activities need to be undertaken during the formal physiotherapy rehabilitation, whereas long-term adherence is required after the formal programme is completed (Sluijs and Knibbe 1991). The problem of adherence to long-term exercise programmes is becoming more important in physiotherapy with the recognition of the positive effects of regular exercise with the increasing ageing population and the prevention of lifestyle disorders (Dean 2009).

Barriers and Facilitators of Adherence

Factors that influence the extent to which patients adhere to their physiotherapy rehabilitation are classified as either barriers, which hinder patients following their treatment, or facilitators that foster their adherence. To some extent barriers and facilitators have an inverse relationship such that a poor sense of coping is a barrier whereas a strong sense of coping is a facilitator. The barriers to adhering to clinic- and home-based physiotherapy rehabilitation have been reported extensively. A number of socio-demographic barriers have been identified, but these are rather contradictory and may be sample dependent. For example, Brewer et al (2000) reported that the younger participants were less adherent than the older ones, whereas older women with fibromyalgia (Dobkin et al 2006, Oliver and Cronan 2002) and with osteoarthritis (Castaneda et al 1998) have been found to be less adherent than their younger counterparts.

A number of clinical and treatment factors have been identified as influencing adherence, but once again some of the research findings are contradictory. Some of these factors are well known barriers to adherence. Examples of clinically related factors are disorders that have periods of remission during which the symptoms are minimal (Sluijs and Knibbe 1991); conditions requiring long-term home based management (Alexandre et al 2002); and complex intrusive treatments/exercise programmes (Flynn et al 1995), especially those that require the assistance of other people (Muszynski-Kwan et al 1988). Patients' beliefs about their injuries/disorders have been found to influence their level of rehabilitation adherence (Taylor and May 1996). In particular, patients who were poor adherers did not believe that their injury was serious and that they were susceptible to further injury if they did not follow their rehabilitation programme. Furthermore, overloading patients with too much information about their injury/disorder and treatment during clinic treatment sessions confuses patients, thereby acting as a barrier (Sluijs et al 1993). However the influence of pain on rehabilitation adherence is not so clear. High levels of pain have been found to reduce adherence to exercise programmes for people with fibromyalgia (Dobkin et al 2006) and osteoarthritis (Rejeski et al 1997). In contrast, Sluijs et al (1993) found that pain did not affect adherence to home-based exercise programmes.

Psychological factors have been found to influence the extent to which patients adhere to their rehabilitation. Patients' perceptions about the barriers to undertaking their rehabilitation programme may operate more strongly than actual barriers (Alexandre et al 2002, Dobkin et al 2006, Sluijs et al 1993). These barriers are commonly not enough time, forgetfulness and inability to fit the rehabilitation into their daily activities (Pizzari et al 2002, Sluijs et al 1993). Other psychological factors that affect adherence are low levels of a sense of personal control (Laubach et al 1996) and self-motivation (Brewer et al 2003, Brewer et al 2000); the presence of depression at the beginning of the rehabilitation (Oliver and Cronan 2002, Rejeski et al 1997) and high anxiety and stress (Dobkin et al 2006); and a sense of helplessness (Castaneda et al 1998, Sluijs et al 1993).

The one psychological factor that has been found to have a very strong impact on rehabilitation adherence is self-efficacy. It is defined as "perceived self-efficacy refers to beliefs in one's capabilities to organize and execute courses of action required to produce given attainments" (Bandura 1997a, p3). Bandura (1997a) also conceptualised perceived self-efficacy as being situational specific, with people feeling efficacious about doing some activities, but not others, as well as being able to do some tasks in some situations but not others. For example, physiotherapists may feel efficacious about presenting a seminar to small groups of their peers, but the same therapists may not feel at all efficacious about presenting the same seminar to a large group of peers in a conference auditorium. Nonetheless there is the notion of generalised self-efficacy whereby people have optimistic beliefs about coping across a wide range of stressful situations (Luszczynska et al 2005).

Distinctions have been made between different types of phase-specific beliefs. The classification that is most relevant to physiotherapy rehabilitation comes from the health action process approach (HAPA, Schwarzer and Luszczynska 2008). The HAPA posits that during a health behaviour change, such as adopting a regular exercise programme, there are three forms of self-efficacy beliefs. The first is task self-efficacy in which the people are confident about their ability to do the exercises. Second, maintenance self-efficacy is about being confident about maintaining the exercise programme over the long term and being able to overcome possible barriers to doing it, such as bad weather, not enough time, and forgetfulness. Third, recovery self-efficacy is the confidence people have restarting the programme after a lapse in their exercise behaviours, which may have occurred as a result of illness or holidays.

Bandura (1997b) explained four major sources of self-efficacy. The first is performance accomplishments, which is based on experiences of personal mastery, and can be raised by successes and lowered by failures. This occurs in physiotherapy when during their rehabilitation, patients master functional activities that have been previously difficult. Second, vicarious experience may occur when people watch others of a similar age and the same gender perform activities. Bandura (1997b) bases vicarious learning on watching others performing threatening activities without experiencing any adverse effects. This source of self-efficacy can be used with physiotherapy patients by getting

them to watch others with a similar set of symptoms successfully exercising without any adverse effects. Third, verbal persuasion occurs when people are led to believe that they will be able to cope with the activity. This is considered to be a weaker source of self-efficacy than those that originate from personal accomplishments (Bandura 1997b). Physiotherapists use verbal persuasion frequently when they provide encouragement to patients who have difficulty with rehabilitation activities. Fourth, emotional arousal comes about when people are fearful of coping in threatening situations, which in turn will affect their self-efficacy in this context. Physiotherapists encounter this when treating people with chronic pain who are unable to do functional activities because of fear avoidance and anxiety.

The use of Behaviour Change Strategies to Bridge the Intention-Behaviour Gap

Generally behaviour change strategies are designed to strengthen peoples' self-efficacy. Making changes to behaviour involves a complex process that includes thoughts or cognitive processes, motivation, emotions, behaviours and changing environmental conditions (Bandura 1997b). This is apparent in daily life with it being quite common for people to not follow through with their intentions or goals. A good example is New Year's resolutions, with most not being implemented (Gollwitzer 1999). Correlations between intentions and behaviour are modest, with intentions only accounting for 20% to 30% of variance in the behaviour (Gollwitzer 1999). A reason for people not following through on their well-meaning intentions is that they do not have the skills to implement them. Nonetheless people who are committed to making changes in their behaviours will persist with making changes even when faced with obstacles (Bandura 1997b). The problems associated with implementing new health behaviours, such as regular exercise, are similar to those encountered with New Year's resolutions. This is evident with the poor rate of adherence to home-based physiotherapy.

A common reason for behaviours not being changed or implemented is that the intention-behaviour gap has to be bridged. For this to happen the intentions or goals need to be explicit, and this can be achieved by specifying strategies that will instigate and maintain the desired behaviours (Schwarzer and Luszczynska 2008, Schwarzer et al 2003). There are a number of behaviour change strategies that can be used successfully to assist patients to bridge the gap and ultimately enhance their physiotherapy rehabilitation adherence. However, not all strategies suit all people and therefore their selection should be based on the patients' preferences, the type of activities, and whether the programmes are primarily clinic- or home-based and if they are long-term or short-term. This process involves identifying the barriers that may hinder the implementation and maintenance of the required behaviours (Gollwitzer 1999). A way of identifying patients' rehabilitation adherence barriers and facilitators is to ask them to list as many as they can think of in 60 seconds, as well as time them to generate the first reason for and against (Cropley et al 2003). If the first reason is a barrier then it is likely that they have not considered following the recommended action (Cropley et al 2003).

The first step in deciding which behaviour change strategies will be suitable for individual patients is to discuss with them strategies they use in their daily lives to remember to keep appointments and/or take medication. The identified strategies may then have to be adapted to suit the content and duration of the patients' physiotherapy programmes. The ultimate aim of educating patients about the use of these strategies is that they can integrate the behaviours into their daily lives such that they become routine (Sluijs and Knibbe 1991). There are a number of behaviour change strategies that have been reported to successfully improve adherence to physiotherapy (Bassett 2006). As adherence to home-based activities is a problem in physiotherapy, the strategies outlined will be applied in this context.

Goal setting is one of the most commonly reported strategies that assists physiotherapy patients to achieve their desired treatment outcomes. For these to be effective they need to be specific, measurable, achievable, realistic and predict a time for successful completion (Cott and Finch 1991, Partridge 1990). Goals are most effective if they are set in collaboration with patients and not dictated by the physiotherapist (Bassett and Petrie 1999). Initially a long-term or global goal should be established taking into account what the patients want to achieve, and possibly modified slightly by the physiotherapist so that the goal is achievable and realistic. As a global goal seems remote, then short-term goals should be set, so that patients achieve the long-term global goal in a staircase fashion (Bassett and Petrie 1999). However there is only limited evidence that goal planning does improve patient rehabilitation adherence (Levack et al 2006). Treatment goals provide the patients with incentives to follow their physiotherapy, but they do not provide the skills necessary for bridging the intention-behaviour gap. Hence once goals have been set, then behaviour change strategies need to be implemented (O'Brien et al 2013).

Four behaviour change strategies use feedback to change behaviours. One is the physiotherapists' feedback about patients' exercise performance and other activities will enable change in behaviours. However this feedback must be honest to assist the correct behaviour being adopted (Meichenbaum and Turk 1987). Second, reinforcement is another form of feedback, which usually leads to the continuation of the correct behaviours (Sluijs and Knibbe 1991). It is most effectively given verbally, with patients being complimented for their achievements and in particular for their adherence to the prescribed activities (Meichenbaum and Turk 1987). Third, feedback resulting from exercise testing has been shown to increase adherence to home-based exercises for people attending cardiac rehabilitation programmes (Ewart et al 1983). As a consequence of the testing, self-efficacy was increased, which in turn was associated with increased home-based physical activity. Once patients know that they are undertaking the physiotherapy activities correctly they can then use self-regulation at home. This involves them regulating their own behaviours and correcting themselves if necessary (Sluijs and Knibbe 1991).

The fourth method of feedback is the use of decision balance sheets, which have been found to be valuable for long-term preventative programmes (Dishman 1991, Geller et al 2012). This is particularly useful for people who are undecided about the benefits of undertaking the recommended activities. People record their anticipated gains and losses from following the recommended activities (Dishman 1991, Geller et al 2012). As people can easily make longer lists of the losses than the gains, it is advisable for them to evaluate each of the losses and gains,

as often the short list of gains carries more value than the long list of losses (see Table 1 for an example of a decision balance sheet).

Table 1: Example of a Decision Balance Sheet for Undertaking a Regular Exercise and Walking Programme

Reasons for Exercising Regularly	Reasons for Not Exercising Regularly
It will improve my health	It will be difficult to find time to exercise
It will reduce my weight	I will not be able to walk in bad weather
It will improve my fitness	I may get sore exercising
It will reduce the likelihood of developing chronic disorders.	I will have to buy exercise clothes and shoes
	I will get tired exercising and walking
	I will not be able to fit in my other routine activities

Relapse prevention involves alerting patients to circumstances which may interfere with their treatment programmes, such as days off and being on holiday (Meichenbaum and Turk 1987). This behavioural strategy is also useful for people who do not have daily routines, such as shift workers, and those who travel a lot as part of their employment. Cues are simple strategies that in the initial stages of behaviour change act as reminders for undertaking the activities. At home patients can put exercise equipment, such as balance boards and running shoes, in obvious places. Cue cards kept in noticeable places, such as handbags, wallets, and on dressing tables and desks have been found to be successful (Bassett and Prapavessis 2007). When symptoms are noticeable they can be used as cues (Bassett and Petrie 1999, Sluijs and Knibbe 1991). For example, patients who had restrictions of movement had higher levels of adherence than those whose symptoms had diminished (Bassett and Petrie 1999). Similarly back pain has been reported as a cue to exercise (Sluijs and Knibbe 1991).

Graded activities and booster sessions have been found to improve treatment adherence (Luszczynska et al 2007) and are used for disorders that require long-term self-management, such as osteoarthritis and obesity (Bennell et al 2014, Luszczynska et al 2007, Pisters et al 2010, Veenhof et al 2006). The graded activities are part of a composite programme that consists of progressive activities, education, advice, reinforcement and goal setting and is tailored to suit individual patient's disorders and their needs (Veenhof et al 2006). Once the formal course of treatment has ceased the booster sessions are held at periodic intervals, preferably over the long term, and are designed to revise and upgrade the activities (Veenhof et al 2006). However there is some debate about the success of graded activities and booster sessions, which has occurred with the long-term self-management of osteoarthritis. Pisters et al (2010) and Veenhof et al (2006) found in favour of this method of treatment, whereas Bennell et al (2014) did not. The differences in the findings of the three studies could be due to the number of booster sessions provided, with Bennell et al (2014) only using two sessions, and the other two studies having up to seven sessions over a period of one year. Hence it would appear long-term disorders benefit from more booster sessions over the long-term.

It is generally considered that behaviour change strategies that are theoretically based are superior because their success can be evaluated by the constructs encompassed in the theoretical framework (Sluijs and Knibbe 1991). There are three theoretical frameworks that are of value in physiotherapy. The first is the HAPA (Schwarzer et al 2003), which relies on improving self-efficacy to increase adherence to treatments. It has been tested with cardiac rehabilitation programmes, both in a predictive manner and with its variables being used as an intervention, and found to be successful (Luszczynska and Sutton 2006, Scholz et al 2005). The HAPA is a social cognitive model, but its point of difference to the other models is that it bridges the intention-behaviour gap with the use of action and coping plans. There are two sequential stages in this model, the motivational and the volitional. In the motivational stage, people base their intentions to change behaviours on an awareness of the risks of not implementing them, the expectations of outcomes based on the positive and negative effects of the changes and their perceived self-efficacy about coping with the changes (Schwarzer et al 2003). People who use planning strategies to cope with the activities and to overcome obstacles to their implementation have been found to be more likely to implement the new behaviours (Sniehotta, Schwarzer et al 2005). Once the behavioural intentions are formed, the volitional stage commences in which the behaviours are planned, commenced, maintained and restarted if there are lapses (Sniehotta, Schwarzer et al et al 2005). Self-regulatory processes are required to ensure that the behaviours become habitual and integrated into peoples' daily lives (Conner and Norman 2005, Sniehotta, Scholz et al 2005).

In the O'Brien et al (2013) study participants initially wrote a realistic functional goal that they wanted to achieve by the end of the 12 week exercise programme. Their plans stemmed from the goals and were developed under the guidance of the researcher. The action plans stated specifically when, where, how and if appropriate, with whom they would undertake the activities. An example of the action plans was *I will walk around the park with my sister for 20 minutes on Tuesday and Thursday at three in the afternoon.* For the development of the coping plans participants were asked to think about obstacles that could prevent them from continuing with their new exercise behaviours and attending the exercise classes, and then tabulate each individually. For example, the coping plan for *I do not like walking in the rain* was *I will overcome this obstacle by riding my exercycle for 30 minutes on the days that it is raining*. In addition, plans can be made to overcome lapses in behaviour, and to assist with restarting the recommended activities (Schwarzer et al 2003).

Action and coping plans have been successful in bridging the intention-behaviour gap by assisting people to change their behaviours (Sniehotta et al 2006, Ziegelmann et al 2006). The plans have had some success in physiotherapy, improving physical function of people with osteoarthritis (O'Brien et al 2013). Further the combination of action and coping plans has been found to be more effective than action plans alone (Sniehotta et al 2006), and the planning is even more beneficial

if it is done with the assistance of another person (Ziegelmann et al 2006). In addition, action plans are more useful in the early stages of rehabilitation, and coping plans are more valuable over the later stages and following discharge from the formal programme (Sniehotta, Schwarzer et al 2005).

The second framework is the protection motivation theory (PMT) which is a fear appeal model. It posits that the protection motivation is the variable that stimulates people to perform the recommended activity (Rogers 1983). In this model, intentions are formed by two appraisals, threat and coping. The threat appraisal involves people evaluating the seriousness of the problem, such as an injury or disease, and their vulnerability to further problems if they do not take action. The coping appraisal involves people appraising the efficacy of the recommended action, such as treatment and their ability to cope with that action or in other words their self-efficacy (Rogers 1983). The threat and coping appraisal variables have been manipulated successfully in a number of studies, with self-efficacy being shown to have the strongest effect on adherence to the recommended treatment (Milne et al 2000). This model has been used with some success in physiotherapy (Bassett and Prapavessis 2011). In this study, participants were given information about their injury detailing the possible seriousness of their injury; their vulnerability to long-term complications if they did not follow the recommended treatment; the effectiveness of the physiotherapy rehabilitation; and advice about coping with clinic- and home-based treatment. The information significantly increased the participants' perceptions of the threat appraisal variables, and the treatment efficacy but not their coping ability or self-efficacy. However the self-efficacy scores were high, and as most of the participants in this study had been to physiotherapy before, Bassett and Prapavessis (2011) reasoned that this indicated consumer satisfaction and that the participants believed that they could cope with the rehabilitation requirements. The combination of the PMT information and the making of action plans has been found to be significantly effective in encouraging young people to exercise regularly in an effort to prevent myocardial infarction at a later stage of life (Milne 2002).

The third framework is the transtheoretical model (TTM), which is a six stage model. It was originally developed by Prochaska and DiClemente (1983) and has since undergone further development (Prochaska et al 2008). This model provides a basis for a behaviour change strategy by focussing on the process of change as opposed to the determinants of change. While the stages are described sequentially, people may be located in any stage when initiating changes in their behaviour. The sequence of the stages is from precontempation through to termination, and people commencing a behaviour change can be classified at any stage. For the stages of the TTM, and peoples' typical responses for each stage, refer to Table 2, which has based the responses on undertaking regular exercise. By using the assessment tool developed by Cropley et al (2003), the stage of change that people are in can be identified. When applied to exercise programmes, the more reasons given against exercising indicates people are in precontemplation, but as the reasons for exercising increase they are moving into the contemplation and action stages. Table 3 shows the stages of change and the relevant behaviour change strategies. A meta-analysis revealed

Table 2: Transtheoretical Model Stages of Change Applied to Regular Physical Activity

Stage of Change	Description
Precontemplation	I am currently not very physically active. I do intend to become physically active in the next 6 months.
Contemplation	I am currently not very physically active, but I am thinking about increasing my level of physical activity in the next month.
Preparation	I am not very physically active, but I am determined to increase my activity in the next month.
Action	I am currently physically active, but I have only begun this activity in the last 6 months.
Maintenance	I am currently quite physically active, and have been so for longer than 6 months.
Termination	I have been physically active for a long time and have no temptation to give up. I am 100% confident that a lapse in behaviour will not occur.

Adapted from: Prochaska et al (2008) The transtheoretical model and stages of change. In: Glanz K, Rimer BK, Viswanath K (Eds) Health behaviour and health education: Theory, research and practice (4th ed.), pp. 97-121.

that (i) self-efficacy increases with the advancing stages of change, (ii) there are greater increases in the use of behavioural strategies from precontemplation to contemplation and (iii) from preparation to action and (iv) the distribution of pros and cons change across the stages (Marshall and Biddle 2001). This model has been applied mostly to long-term exercise programmes.

CONCLUSION

Physiotherapy rehabilitation adherence is problematic, which may be due to the multifaceted nature of these programmes, with patients being expected to undertake a number of different behaviours, such as attend clinic appointments and undertake a range of activities at home. The perceived barriers to adherence seem to operate more strongly than the actual ones. However, self-efficacy has been found to be a particularly strong predictor of treatment adherence, and if this can be strengthened then adherence is likely to improve. On the whole, patients want to adhere to their physiotherapy but they do have difficulty implementing the required behaviours and then integrating them into their lives so they become routine. Patient education alone is not sufficient to enhance treatment adherence, patients need to be given skills to help them adhere to the components of their treatment. Patients' acquisition of these skills may necessitate physiotherapists becoming more aware of behaviour change strategies. Behaviour change strategies have been found to be useful in improving patient adherence to their physiotherapy, because they strengthen self-efficacy and hence patients perceive they can cope with the programme requirements. To ensure that the strategies are effective they must suit the needs of the patients, the activities they are required to undertake and whether the programme is long-term or short-term.

Table 3: Behaviour Change Strategies that Assist Progression through the Stages for Long-term Exercise Programmes

Stage of Change	Behaviour Change Strategies
Precontemplation and Contemplation	Increasing awareness of reasons for exercising, by couching information in PMT framework
	Decision balance sheets
Preparation	Vicarious reinforcement, watching others doing regular exercise
	Thinking about positive reasons for exercise, and visualisation
	Establishing long-term and short-term goals
Action	Setting progressive short-term goals, and associated action and coping plans
	Physiotherapists provide verbal feedback, reinforcement, and graded activities
	Relapse prevention strategies
	Cues
	Self-regulation
Maintenance and Termination	As for Action stage plus booster sessions

Adapted from: Prochaska et al (2008) The transtheoretical model and stages of change. In: Glanz K, Rimer BK, Viswanath K (Eds) Health behaviour and health education: Theory, research and practice (4th ed.), pp. 97-121.

KEY POINTS

- Poor adherence to physiotherapy rehabilitation still persists, despite adherence barriers and facilitators being identified.
- Self-efficacy has a strong impact on adherence and if strengthened, it can facilitate adherence.
- A common reason for rehabilitation behaviours not being implemented is that the intention-behaviour gap is not bridged.
- Behaviour change strategies are valuable for bridging the intention-behaviour gap as they provide patients with skills to integrate the physiotherapy activities into their daily lives.
- Successful behaviour change strategies are verbal feedback, reinforcement, exercise testing, decision balance sheets, self-regulation, relapse prevention, progressed graded activities and booster sessions, and action and coping plans.

ADDRESS FOR CORRESPONDENCE

Sandra Bassett, Department of Physiotherapy, School of Clinical Sciences, Faculty of Health and Environmental Sciences, Auckland University of Technology. Email: sandra.bassett@aut.ac.nz

REFERENCES

Alexandre NMC, Nordin M, Hiebert R, Campello M (2002) Predictors of compliance with short-term treatment among patients with low back pain. *Pan American Journal of Public Health* 12: 89-94.

Bandura A (1997a) Self-efficacy. The exercise of control. New York: W.H. Freeman and Company.

Bandura A (1997b) Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review* 84: 191-215.

Bassett SF (2003) The assessment of patient adherence to physiotherapy rehabilitation. *New Zealand Journal of Physiotherapy* 31: 60-66.

Bassett SF (2006) *The effect of two cognitive-behavioural interventions on patient adherence to physiotherapy rehabilitation* (Ph.D.). University of Auckland, Auckland, New Zealand.

Bassett SF, Petrie KJ (1999) The effect of treatment goals on patient compliance with physiotherapy exercise programmes. *Physiotherapy* 85: 130-137.

Bassett SF, Prapavessis H (2007) Home-based physical therapy intervention with adherence-enhancing strategies versus clinic-based management for patients with ankle sprains. *Physical Therapy* 87: 1132-1143. doi:10.2522/ptj.20060260.

Bassett SF, Prapavessis H (2011) A test of an adherence-enhancing adjunct to physiotherapy steeped in the protection motivation theory. *Physiotherapy Theory and Practice* 27: 360-372.

Bennell, KL, Kyriakides M, Hodges PW, Hinman RS (2014) Effects of two physiotherapy booster sessions on outcomes with home exercise in people with knee osteoarthritis: A randomized controlled trial. *Arthritis Care and Research* 66: 1680-1687.

Brewer BW (1999) Adherence to sport injury rehabilitation regimens. In Bull SJ (Ed.), Adherence Issues in Sport and Exercise New York: John Wiley & Sons, pp. 145-168.

Brewer BW, Cornelius AE, Van Raalte JL, Petitpas AJ, Sklar JH, Pohlman MH, Krushell RJ, Ditmar TD (2003) Protection motivation theory and adherence to sport injury rehabilitation revisited. *The Sport Psychologist* 17: 95-103.

Brewer BW, Van Raalte JL, Cornelius AE, Petitpas AJ, Sklar JH, Pohlman MH, Krushell RJ, Ditmar TD (2000) Psychological factors, rehabilitation adherence, and rehabilitation outcome after anterior cruciate ligament reconstruction. *Rehabilitation Psychology* 45: 20-37.

Byerly PN, Worrell T, Gahimer J, Domholdt E (1994) Rehabilitation compliance in athletic training environment. *Journal of Athletic Training* 29: 352-355.

Castaneda DM, Bigatti S, Cronan TA (1998) Gender and exercise behaviour among women and men with osteoarthritis. *Women and Health* 27(4): 33-53.

Chase L, Elkins J, Readinger J, Shepard, K (1993) Perceptions of physical therapists toward patient education. *Physical Therapy* 73: 787-796.

Conner M, Norman, P (2005) Predicting health behaviour: A social cognition approach. In Conner M Norman P (Eds.) Predicting Health Behaviour (2nd edn). Maidenhead, England: Open University Press, pp. 1-27.

Cott C, Finch E (1991) Goal setting in physiotherapy practice. *Physiotherapy Canada* 43(1): 19-22.

Cropley M, Ayers S, Nokes, L (2003) People don't exercise because they can't think of reasons to exercise: An examination of causal reasoning within the Transtheoretical Model. *Psychology, Health and Medicine* 8: 409-414.

Dean E (2009) Physical therapy in the 21st century (part 1): Toward practice informed by epidemiology and the crisis of lifestyle conditions. *Physiotherapy Theory and Practice* 25: 330-353. doi:10.1080/095939802668027.

Dishman RK (1991) Increasing and maintaining exercise and physical activity. *Behavior Therapy* 22: 345-378.

Dobkin PL, Da Costa D, Abarhamowicz M, Drista M, Du Berger R, Fitzcharles M-A, Lowensteyn I (2006) Adherence during an individualized home based 12-week exercise program in women with fibromyalgia. *Journal of Rheumatology* 33: 333-341.

Duda JL, Smart AE Tappe M K (1989) Predictors of adherence in rehabilitation of athletic injuries: An application of the personal investment theory. *Journal of Sport & Exercise Psychology* 11: 367-381.

Ewart CK, Barr Taylor C, Reese LB, Debusk RF (1983) Effects of early postmyocardial exercise testing on self-perception and subsequent physical activity. *American Journal of Cardiology* 51: 1076-1080.

Flynn MF, Lyman RD, Prentice-Dunn S (1995) Protection motivation theory and adherence to medical regimens for muscular dystrophy. *Journal of Social and Clinical Psychology* 22: 55-69.

Fox MP (2009) A systematic review of the literature reporting on studies that examined the impact of interactive, computer-based patient education programs. *Patient Education and Counseling* 22: 6-13.

Geller KS, Mendoza ID, Timbobilan J, Montjoy MD, Nigg CR (2012) The decisional balance sheet to promote healthy behavior among ethnically diverse older adults. *Public Health Nursing* 29: 241-246.

Gollwitzer PM (1999) Implementation intentions. Strong effects of simple plans. *American Psychologist* 54: 493-503.

Horne R (1998) Adherence to medication: A review of the existing research. In Myers LB, Midence K (Eds.) Adherence to Treatment in Medical Conditions Amsterdam, The Netherlands: Harwood Academic Publishers, pp. 285-310.

Ice R (1985) Long-term compliance. *Physical Therapy* 65: 1832-1839.

Lampton CC, Lambert ME, Yost R (1993) The effects of psychological factors in sports medicine rehabilitation adherence. *Journal of Sports Medicine and Physical Fitness* 33: 292-299.

Laubach WJ, Brewer BW, van Raalte JL, Petitpas AJ (1996) Attributions for recovery and adherence to sport injury rehabilitation. *Australian Journal of Science and Medicine in Sport* 28: 30-34.

Levack WMM, Taylor K, Siegert RJ, Dean SG, McPherson KM, Weatherall M (2006) Is goal planning in rehabilitation effective? A systematic review. *Clinical Rehabilitation* 20: 739-755.

Luszczynska A, Gutierrez-Dona B, Schwarzer R (2005) General self-efficacy in various domains of human functioning: Evidence from five countries. *International Journal of Psychology* 40: 80-89. doi:10.1080/00207590444000041.

Luszczynska A, Scholz U, Sutton S (2007) Planning to change diet: A randomized controlled trial of implementation intentions training intervention to reduce saturated fat intake after myocardial infarction. *Journal of Psychosomatic Research* 63: 491-497.

Luszczynska A, Schwarzer R (2005) Social cognitive theory. In Conner, M. Norman, P (Eds.) Predicting health behaviour (2nd ed., pp. 127-169). Maidenhead, England: Open University Press.

Luszczynska A, Sutton S (2006) Physical activity after cardiac rehabilitation: Evidence that different types of self-efficacy are important in maintainers and relapsers. *Rehabilitation Psychology* 51: 314-321.

Marshall SJ, Biddle SJH (2001) The transtheoretical model of behaviour change: A meta-analysis of applications to physical activity and exercise. *Annals of Behavioral Medicine* 23: 229-246.

Meichenbaum D, Turk DC (1987) Facilitating Treatment Adherence: A Practitioner's Guidebook. New York: Plenum Press.

Milne S, Orbell S, Sheeran P (2002) Combining motivational and volitional interventions to promote exercise participation: Protection motivation theory and implementation intentions. *British Journal of Health Psychology* 7: 163-184.

Milne S, Sheeran P, Orbell S (2000) Prediction and intervention in health-related behaviour: A meta-analytic review of protection motivation theory. *Journal of Applied Social Psychology* 30: 106-143.

Muszynski-Kwan AT, Perlman R, Rivington-Law BA (1988) Compliance and effectiveness of chest physiotherapy in cystic fibrosis. A review. *Physiotherapy Canada* 40(1): 28-32.

O'Brien D, Bassett SF, McNair P (2013) The effect of action and coping plans on exercise adherence in people with lower limb osteoarthritis: A feasibility study. *New Zealand Journal of Physiotherapy* 41: 46-54.

Oliver K, Cronan T (2002) Predictors of exercise behaviors among fibromyalgia patients. *Preventive Medicine* 35: 383-389.

Partridge C (1990). Psychological factors in recovery from physical disability. In Hegna T Sveram M (Eds.) Internation Perspective in Physical Therapy 5. Psychological and Pyschosomatic Problems. London, England: Churchill Livingstone, pp. 103-120.

Pisters MF, Veenhof C, de Bakker DH, Schellevis FG, Dekker J (2010) Behavioural graded activity results in better exercise adherence and more physical activity than usual care in people with osteoarthritis: A cluster-randomised trial *Journal of Physiotherapy* 56: 41-47.

Pizzari T, McBurney H, Taylor NF, Feller JA (2002) Adherence to anterior cruciate ligament rehabilitation. *Journal of Sport Rehabilitation* 11: 90-102.

Prochaska JO, DiClemente CC (1983) Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology* 51: 390-395.

Prochaska JO, Redding CA, Evers KE (2008) The transtheoretical model and stages of change. In Glanz K Rimer BK Viswanath K (Eds.), Health Behaviour and Health Education: Theory, Research and Practice (4th edn). San Francisco, CA: John Wiley & Sons, pp. 97-121.

Rejeski WJ, Brawley LR, Ettinger W, Morgan T, Thompson, C. (1997) Compliance to exercise therapy in older participants with knee osteoarthritis: Implications for treating disability. *Medicine and Science in Sports and Exercise* 29: 977-985.

Rogers RW (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In Cacioppo JT Petty RE (Eds) Social Psychophysiology. A Source Book. New York: Guilford Press, pp. 153-176.

Schachter CL, Busch AJ, Peloso PM, Sheppard MS (2003) Effects of short versus long bouts of aerobic exercise in sedentary women with fibromyalgia: A randomized controlled trial. *Physical Therapy* 83: 340-358.

Scholz U, Sniehotta FF, Schwarzer R (2005) Predicting physical exercise in cardiac rehabilitation: The role of phase-specific self-efficacy beliefs. *Journal of Sport and Exercise Psychology* 27: 135-151.

Schwarzer R, Luszczynska A (2008) How to overcome health-compromising behaviours. The health action process approach. *European Psychologist* 13, 141-151. doi:10.1027/1016-9040.13.2.

Schwarzer R, Sniehotta FF, Lippke S, Luszczynska A, Scholz U, Schuz B, Wegner M, Ziegelmann J P (2003) On the assessment and analysis of variables in the Health Action Process Approach: Conducting an investigation. http://userpage.fu-berlin.de/gesund/hapa_web. [Accessed May 12, 2015].

Sluijs EM, Knibbe JJ (1991) Patient compliance with exercise: Different theoretical approaches to short-term and long-term compliance. *Patient Education and Counseling* 17: 191-204.

Sluijs EM, Kok GJ, van der Zee J (1993) Correlates of exercise compliance and physical therapy. *Physical Therapy* 73: 771-786.

Sniehotta FF, Scholz U, Schwarzer R (2005) Bridging the intention-behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology and Health* 20: 143-160. doi:10.1080/08870440512331317670.

Sniehotta FF, Scholz U, Schwarzer R (2006) Action plans and coping plans for physical exercise: A longitudinal intervention study in cardiac rehabilitation. *British Journal of Health Psychology* 11, 23-37. doi:10.1348/135910705X43804.

Sniehotta FF, Schwarzer R, Scholz U, Schuz B (2005) Action planning and coping planning for long-term lifestyle change: Theory and assessment. *European Journal of Social Psychology* 35: 565-576. doi:10.1002/ejsp.258.

Taylor AH, May S (1996) Threat and coping appraisal as determinants of compliance with sports injury rehabilitation: An application of protection motivation theory. *Journal of Sports Sciences* 14: 471-482.

Veenhof C, Koke AJA, Dekker J, Oostendorp RA, Bijlsma JWJ, van Tulder MW, van den Ende CHM (2006) Effectiveness of behavioral graded activity in patients with osteoarthritis of the hip and/or knee: A randomized clinical trial *Arthritis and Rheumatism* 55: 925-934.

Wantland DJ (2004) The effectiveness of web based vs non-web based interventions: A meta-analysis of behavioral change outcomes. *Journal of Medical Internet Research* 6: e40. doi:10.2196/jmir.6.4.e40.

Ziegelmann JP, Lippke S, Schwarzer R (2006) Adoption and maintenance of physical activity: Planning interventions in young, middle-aged, older adults. *Psychology and Health* 21:145-163. doi:10.1080/14768320500189891.