

Chapter 32

Promoting Adherence to Rehabilitation through Supporting Patient Well-Being: A Self-Determination Perspective

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Chapter Overview

The purpose of this chapter is to provide a framework to demonstrate how adherence to rehabilitation programmes and patient wellbeing can be supported through the application of a growth-based social cognitive theory commonly used within sports psychology today. The chapter is divided into four main sections: (a) a brief overview of self-determination theory, describing how it can be applied to promote rehabilitation adherence and patient wellbeing, (b) a description of the personal and situational factors which influence adherence, (c) a review of the most commonly used strategies by physiotherapists to promote adherence, and (d) an illustration of how these strategies can support basic psychological need satisfaction and support patient wellbeing. We conclude with a brief discussion on potential avenues for future research.

Introduction

Rehabilitation adherence is defined as the extent to which a patient's behaviour corresponds with the health care professionals' recommendations (World Health Organisation [WHO], 2003). It is a behavioural process, greatly influenced by the environment (Vrijens et al., 2012), and shaped by individual social context, personal knowledge, abilities, motivation and available resources (Vrijens et al., 2012). In practical terms, rehabilitation adherence is the voluntary action of patients in abiding by health professional recommendations (Granquist & Brewer, 2013).

There are several clear, obvious and direct benefits of adhering to rehabilitation advice, such as: improved physical functioning, reduced pain, and improved quality of life (Armijo-Olivo, et al., 2011; Fransen & McConnell, 2009; Kay et al., 2005). However, despite the positive impacts on psychological and physical recovery following injury, adherence rates are consistently low (Granquist & Brewer, 2013), even when the value of adherence is widely reinforced by practitioners (Naqvi et al., 2020). To illustrate, patients have been found to be adherent only 50% of the time when in clinic (e.g., Kolt & McEvoy, 2003) and between 30–67% of the time in response to home exercise instructions (e.g., Beinart et al., 2013; Peek et al., 2017). Poor treatment adherence is not only a concern within physiotherapy (McLean et al., 2010), but also within cardiovascular medicine (Kolandaivelu et al., 2014), asthma treatment (Bender & Rand, 2004), and affective disorders (Colom et al., 2005). Further to the adverse impact non-adherence has on functional outcomes, it has also been related to excess care visits, increased treatment costs and increased hospitalisation (Svarstad et al 2001). Indeed, it is estimated that the cost of nonattendance to appointments was approximately £18,000 (US \$24,344) per week in a Community Musculoskeletal (MSK) Physiotherapy Service (Tan et al., 2017). Treatment non-adherence may also elicit indirect costs in terms of decreased productivity (Jin et al., 2008), further illustrating the importance of supporting adherence to rehabilitation programmes to both improve patient outcomes and decrease the burden on health care services and business.

In addition to providing direct functional support for injury rehabilitation, a broader understanding of the reasons why patients comply with rehabilitation guidance may help practitioners increase patient engagement while also facilitating post-treatment outcomes (Williams et al., 2006). Furthermore, Driver et al. (2019) reported that physiotherapists recognise the psychological effect of injury occurrence and the impact that effective psychological support following injury may have on treatment outcomes.

Healthcare professionals are influential in creating interventions to both reduce the negative responses associated with injury, and promote adherence (e.g., Gordon et al., 1998; Pearson & Jones, 1992). Mechanistically, though it is widely reported that physiotherapists use psychosocial strategies in practice to promote adherence (Driver et al., 2019), it is also important that strategies are evidence-based and theoretically underpinned (Driver et al., 2019) to increase the likelihood that injured athletes recover both physically and psychologically from injury.

Given the importance rehabilitation adherence has on outcomes, the focus of this chapter is on utilising motivational research on adherence to identify explicit and more implicit strategies used to support adherence and engagement in rehabilitation programmes. A secondary objective is to link these strategies inductively to a motivational theoretical framework that, based on the satisfaction of fundamental psychological needs, simultaneously predicts individual psychological wellbeing. More specifically, the chapter (a) discusses how motivational theory can be used as a framework for promoting adherence and enhancing psychological wellbeing; (b) provides an overview of the most utilised strategies by physiotherapists to promote adherence; (c) indicates how current strategies may satisfy basic psychological needs and support patient wellbeing, and (d) provides suggestions on future research.

Understanding Adherence to Rehabilitation

The effectiveness of musculoskeletal injury rehabilitation is often inhibited by patients failing to adhere to programmes provided by physiotherapists (McLean et al., 2013). Unsurprisingly, there are consequences of non-adherence for treatment effectiveness and the duration of treatment (Martin et al., 2005). Furthermore, it also increases the demand placed upon health care professionals, undermines the therapeutic relationship, and increases waiting times, cost of care, and ill-being (e.g., Hayden et al., 2005; Jin et al., 2008). In contrast, adhering to recommended medical advice has been associated with improved physical functioning, reduced pain, positive wellbeing, and overall improved quality of life (Armijo-Olivo, et al., 2011; Ben-Ezra et al., 2013; Fransen & McConnell, 2009; Kay et al., 2005). Non-adherence can be manifested in a number of different ways, for example: performing exercises incorrectly, forgetting or misunderstanding advice, paying inadequate attention to instructions, or failure to attend set appointments (Martin et al., 2005).

Self-Determination Theory

Specifically, in the context of rehabilitation adherence, researchers have frequently adopted psychosocial motivational theories to help explain the factors underlying behavioural change (Hagger et al., 2009; Hagger, 2010; for further discussion, see Chapter 2 [Rebar et al., 2021], Chapter 3 [Quested et al., 2021], Chapter 4 [Brand & Ekkekakis, 2021], and 5 [Delli Paoli, 2021]). One such growth-based social cognitive theory used extensively across multiple contexts and specifically within healthcare is the self-determination theory (SDT; Ryan & Deci, 2017; Ryan & Deci, 2000; also see Chapter 3; Quested et al., 2021). SDT posits that human beings have innate tendencies for growth, to master challenges and to assimilate motives as they seek a coherent sense of self (Ryan & Deci, 2000). In other words, they engage in activities that give them purpose and value. The extent of its use is attributed to its scope in encompassing the social environment and individual psychological factors, and the fact that it is growth-focused, and readily (and intuitively) applicable to interventions targeting intrinsic motivation, wellbeing and health. Further, SDT is a theory that, in addition to recognising the role of competence to motivated behaviours, incorporates the concepts of autonomy and the feeling of being connected as fundamental to motivation, enhanced performance, and wellbeing (Standage & Ryan, 2012).

SDT is a macro-theory comprising six mini theories, each of which aim to describe motivational based phenomena emerging from research (Deci & Ryan, 2000). According to SDT, growth, development, intrinsic motivation, and wellbeing are most readily achieved in social contexts that are supportive of three innate and fundamental psychological needs: autonomy, competence, and relatedness (Ryan & Deci, 2000). According to basic psychological needs theory (BPNT; Ryan & Deci, 2000) the three needs are essential nutrients for growth and effective functioning. Specifically, the need for autonomy is characterised by the desire for humans to act consistently with their own interests and values. The need for competence pertains to meeting challenge and achieving mastery in a given context, while relatedness represents the need for a supporting, caring connection with others (Deci & Ryan, 2000). It is suggested that environments perceived as supportive (socially), nurturing of confidence, and volitional, increase a sense of wellness and vitality (Ryan & Deci, 2017; Deci & Ryan, 2000).

BPNT has been used extensively to examine optimal growth, motivation and wellbeing (Hodge & Gucciardi, 2015). The satisfaction of autonomy, relatedness, and competence supports these growth tendencies and specifically, motivation is internalised (i.e., externally prompted motives become increasingly self-regulated; Deci & Ryan, 2000), and wellbeing is increased (Molix & Nichols, 2013). Consequential positive effects have been realised in health (Baard et al., 2004), work, and exercise (Gunnell et al., 2013) contexts. Ryan and Deci (2000) proposed that the degree to which the three psychological needs are fulfilled will affect the extent to which an individual will engage in positive

behaviours (e.g., adherence to rehabilitation programmes). In contrast, if these needs are frustrated, ill-being and passive engagement are predicted (e.g., non-adherence; Gunnell et al., 2013).

Researchers have highlighted the beneficial influence of supporting basic psychological needs on individual's wellbeing across a variety of domains such as: education (Miserandino, 1996), work (Gagné & Deci, 2005), family (Gronlnick et al., 1997), and sport (Gagné et al., 2003). Within the rehabilitation context, previous work has demonstrated that when needs are supported, participation in treatment is more volitional, and long-term adherence more likely (Ng et al., 2013). Within an injury context, but specifically focusing on effective return to sport, Podlog and colleagues (2010) explored whether satisfying athletes' basic psychological needs would improve aspects of wellbeing and produce positive *return to sport* outcomes. They concluded that competence perception fulfilment was related to higher levels of vitality and positive affect, which partially predicted an enhanced perspective upon return to sport. Additionally, satisfying the need of relatedness was positively related to increased levels of self-esteem and vitality, which reduced concerns over returning to sport following injury. Environments that promote the satisfaction of the three basic needs can thus be instrumental in reducing concerns regarding returning to sport following injury (Podlog & Eklund, 2006; Podlog & Eklund, 2007a). Although there is an increasing amount of research exploring need satisfaction in an injury context, research examining the frustration of these needs has been limited (Gunnell et al., 2013). While health-related research has tended to focus on individuals' perceptions of their medical professionals' support of their basic psychological needs (Ng et al., 2013), additional research on the influence satisfying and frustrating basic psychological needs has on sport injury and rehabilitation may prove illuminating (Li et al., 2019).

At an organisational level, Hall et al. (2010) and Picorelli et al. (2014) suggest that, to improve treatment adherence, health professionals should function within environments that enable them to make specific rehabilitation regimen decisions based on: patient preference, clinical circumstances, personal experience, and scientific evidence. The desirability of a more patient-centred approach to rehabilitation is further supported through studies which have indicated that, at an individual level, physiotherapists understand the importance and potential to effect successful outcomes following treatment, and of using psychosocial interventions to increase rehabilitation adherence (Driver et al., 2019; Hemmings & Povey, 2002; Francis et al., 2000; Arvinen-Barrow et al., 2007; Holden et al., 2015; Arvinen-Barrow et al., 2010; Laffety et al., 2008; Niven, 2007). Moreover, they also acknowledge the value of utilising psychological strategies in their practice to help alleviate the potential negative psychological effects associated with injury (Jevon & Johnston, 2003; Clement & Arvinen-Barrow, 2013; Arvinen-Barrow et al., 2010). Although the importance of adherence and psychosocial strategies to enhance rehabilitation are clearly expressed by physiotherapists, research suggests that many practicing physiotherapists lack confidence in using such strategies (Driver et al., 2019; Jevon & Johnston, 2003). Nevertheless, it is encouraging to know that physiotherapists have explicitly expressed interest in gaining knowledge of psychosocial strategies which may increase rehabilitation adherence (Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010; Hemmings & Povey, 2002). One of the key predictors of effectively implementing behavioural change is understanding other factors that might impact on one's ability to do so; adherence is no different.

Moderating Factors in Predicting Adherence to Rehabilitation

It is clear from the evidence reviewed that using growth-based models such as SDT and specifically its sub-theory of basic psychological needs as a framework for promoting adherence to rehabilitation protocols may be fruitful (Podlog et al., 2007b). Unfortunately, however, simply creating environments that support basic needs and thus according to SDT, wellbeing may oversimplify the situation. Within the personal and social milieu there are a variety of other factors that can impact the relationship between received instructions and adherence in the context of injury (Jack et al., 2010).

Post-injury behaviour, such as adherence, is influenced by patients' cognitive appraisals of a variety of personal and situational factors; these in turn influence perceptions of the injury state and in turn behavioural and emotional responses (Brewer, 2001; Brewer et al., 2003; Wiese-Bjornstal et al., 1995; Wiese-Bjornstal et al., 1998). Personal factors include type of injury (e.g., type, severity), and psychological (e.g., motivation, personality, kinesiophobia), physical (e.g., physical state, activity levels) and demographic (e.g., gender, age) individual differences (Walker et al., 2007). Whereas situational factors relate to environmental (e.g., physiotherapy environment, rehabilitation sessions) and social influences (e.g., social support; Marshall et al., 2012).

Consideration of potentially moderating factors will allow practitioners to both predict lower levels of adherence (Wheeler et al., 2012), and further consider their approach to individualised patient support. Psychosocial motivational theories have been instrumental in describing behaviour regulation in the rehabilitation environment (Hagger et al., 2009; Hagger, 2010); gaining a nuanced understanding of *why* patients engage or disengage in rehabilitation will likely enhance promotion of adherence (Goddard et al., 2020). Moreover, when developing interventions to successfully facilitate behaviour change, these should be theoretically grounded and evidence-based around the factors that influence successful rehabilitation (Arvinen-Barrow & Clement, 2017; Lippke & Ziegelmann, 2008). Within this section, we will reflect on a number of personal and situational factors that have been demonstrated to moderate the relationship between prescribed rehabilitation protocols and adherence within athletic populations; these may need to be considered in targeting basic need satisfaction and wellbeing.

Personality Characteristics

In their extensive review ($n = 45$ studies), Appaneal and Habif (2013) identified over twenty personality characteristics associated with rehabilitation and injury outcome (e.g., anger, depression, anxiety, optimism, competitiveness, hardiness). Consequently, the role of personality in predicting rehabilitation adherence may be a significant area to examine (Wheeler et al., 2012). For a more comprehensive discussion on personality and physical activity, see Chapter 6 (Wilson & Rhodes, 2021).

Of the research that has been conducted, much has focused around the "Big Five" personality domains of Neuroticism, Openness, Extraversion, Agreeableness and Conscientiousness (Costa & McCrae, 1992), with evidence provided of associations with rehabilitation adherence. For example, positive correlations have been found between adherence and extraversion (Booth-Kewley & Vickers 1994; Courneya & Hellsten, 1998; Lin et al., 2007; Wheeler et al., 2012), agreeableness (Booth-Kewley & Vickers, 1994) and conscientiousness (Booth-Kewley & Vickers, 1994; Courneya & Hellsten, 1998; Sakofske et al., 2007). Conversely, negative correlations have been reported between adherence and neuroticism (Courneya & Hellsten, 1998; Kewley & Vickers, 1994; Sakofske et al., 2007). More recently, exploring adherence within diabetes patients, Wheeler et al., (2012) found that conscientiousness and extraversion were related to adolescents' self-report of adherence, while neuroticism was significantly related to non-adherence. In contrast, Hilliard et al. (2014), utilising the Big Five, found that there were no significant correlations between neuroticism, extraversion, and adherence to exercise participation, however, they found that conscientiousness, agreeableness, and openness were significantly correlated with adherence. According to Hilliard and colleagues (2014), the Big Five personality factors explained 9% of the variance in attendance to all rehabilitation sessions, and 16% of the variance in adherence ratings across sport settings.

Whilst the extent of the research is substantial, it is difficult to draw conclusions on specific personality characteristics as replication of research is scarce (Appaneal & Habif, 2013). Nevertheless, whether directly related to adherence, or through other identified predictors, understanding their patients, and the personality attributes that may predict adherence will assist practitioners in tailoring programmes to more effectively meet individual needs (Wheeler et al., 2012).

Self-Efficacy

Self-efficacy is a widely researched individual difference factor which has been found to impact rehabilitation adherence (McGrane et al., 2015). Defined as the belief in one's ability to execute certain tasks and to achieve a specific outcome (Bandura, 1977), research examining the role of self-efficacy on adherence has demonstrated significant positive correlations between self-efficacy and physical and mental health (e.g., Robb et al., 2013) and resultant elevated levels of physical functioning (e.g., Carlsson et al., 2004). Specifically, in a rehabilitation adherence setting, self-efficacy has shown to be a strong predictor of adherence to home-based physiotherapy treatments (McGrane et al., 2015), outpatient physical therapy (Jack et al., 2010), and cardiac rehabilitation and exercise treatment (e.g., Martin & Sinden, 2001; Slovinec D'Angelo et al., 2014). According to Mayer (2014), self-efficacy plays a significant role in adherence to rehabilitation programmes due to its association with motivation. This function may be realised through its influence on the initiation of behaviours and persistence to overcome barriers to achieve results (Bandura, 1997; Schwarzer & Luszczynska, 2007). Self-efficacy is also associated with problem solving which increases positive emotions and relates to one's sense of control over their environment and behaviour (Bandura, 2001); these may in turn facilitate rehabilitation adherence. Research on the closely related concept of self-esteem (Judge & Ilies, 2002) suggests that if a patient perceives that they are unable to accomplish tasks set and do not receive support from their medical professional, esteem is undermined (Pettigrew, 2001). Promoting self-efficacy or the belief in the patient's ability to meet the demands of rehabilitation tasks and recover effectively is therefore likely to promote both adherence and positive affective behaviours. For further discussion on self-efficacy, see Chapter 27 (Hepler et al., 2021).

Emotional Responses

Injury can be a stressful time for most individuals, and how they respond to injury is dependent on the individual's cognitive appraisals, which subsequently influence emotional responses (e.g., anger, fear, tension; see Chapter 12 for more discussion on affect, emotion, and mood; Zenko & Ladwig, 2021), and as previously mentioned, behavioural responses (e.g., rehabilitation adherence; Wiese-Bjornstal et al., 1998). In short, Wiese-Bjornstal and colleagues suggest that cognitions influence emotions which in turn affect behaviours, and these are likely to impact on wellbeing and outcomes following injury (Walker et al., 2007). Injured individuals may experience depression, anxiety, and posttraumatic stress disorder (PTSD; Giummarra et al., 2018). Indeed, research suggests that a fifth of individuals who sustain traumatic injury display psychological distress, and one in three meet the threshold for depression and PTSD (Shih et al., 2010; Sterling et al., 2011). While it is normal for athletes to encounter emotional responses such as tension, depression, anger, frustration and boredom (Evans & Hardy, 2002; Pearson & Jones, 1992; McDonald & Hardy, 1990), up to 13% report high levels of psychological distress post injury (Brewer et al., 1993) and severity of the injury exacerbates the risk of significant psychological issues (Heil, 1993). Given that psychological distress may remain high up to three years following injury (Craig et al., 2016), helping patients constructively manage their appraisals of injury and rehabilitation may be an important support function of physiotherapists.

Social Support

As alluded to at the start of this section, Wiese-Bjornstal et al.'s (1998) integrated model of responses to sports injury suggests that situational factors (e.g., rehabilitation environment, rehabilitation sessions, social support, treatment efficacy) influence cognitive appraisals of the injury, and these in turn have a significant impact on behaviour, emotional responses, and rehabilitation outcomes (Wiese-Bjornstal, 2010). The model also specifically describes the influence social support has on rehabilitation adherence; it is viewed as an important factor in assisting individual abilities to cope with the stressors associated with injury (Mitchell et al., 2014; Wiese-Bjornstal et al., 1998). Regarding

rehabilitation adherence, early research suggested that social support is a key predictive factor (Byerly et al., 1993). More specifically, and in support of the model, research has confirmed that social support can facilitate rehabilitation adherence by boosting self-esteem, buffering stress, increasing perceived tangible assistance, decreasing depression symptoms (Mitchell et al., 2014; Wallston et al., 1983; Shumaker & Hill, 1991) and enhancing subjective wellbeing (Thomas, 2010). Receiving and perceiving support from friends, family, significant others (e.g., coaches), and healthcare professionals is pivotal to adherence (Magee et al., 2010), and in the context of rehabilitation, the physiotherapist is pivotal to providing social support for the patient (Gordon et al., 1998).

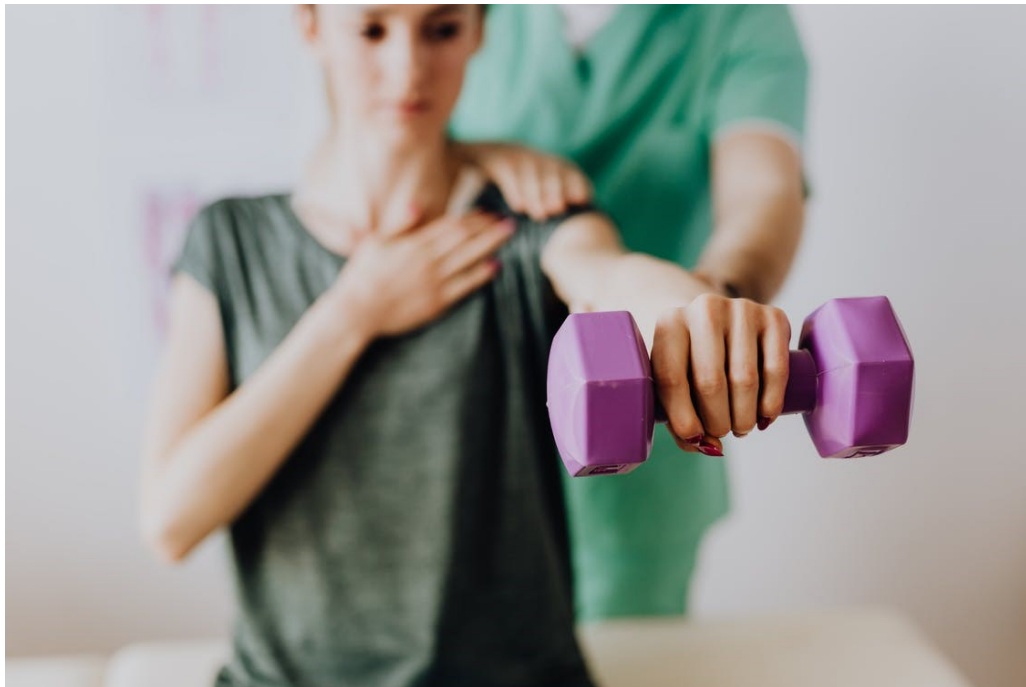


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Therapeutic Alliance

A strong working alliance based on consensus in relation to goals, tasks set and a positive connection between patient and provider (Fuertes et al., 2017) is important in health care (Koudriavtseva et al., 2012). A strong alliance also encapsulates emotional and cognitive components of communication, with goal setting and trust seen as vital to achieving successful outcomes (Fuertes et al., 2017). Fuertes and associates found medium to large effects when examining working alliance and patients 'buy-in' to treatment, perception of benefit from treatment, and rehabilitation adherence (Fuertes et al. 2007; Fuertes et al., 2008; Fontanella 2013; Fuertes et al. 2013; Fuertes et al. 2015).

A key component of the therapeutic relationship is the concept of trust, and while trust between patient and practitioner has been widely researched, operationalising the concept of trust has been difficult (Pearson & Raeke, 2000). Nevertheless, Rowe and Calnan (2006) found trust to facilitate strong working relationships between health care professionals and patients, and consequently, it has been the focus of several studies in recent years (Fuertes et al., 2017). Thom et al. (2002), for example, found that patients who had low levels of trust in their health care provider were less likely to maintain their treatment recommendations, report fewer symptom improvements and lower satisfaction with the care provided. Furthermore, Baker et al. (2003) identified trust between patient and health care professional as the main predictor of treatment satisfaction.

Independent of trust, the working alliance has been associated with patient belief in efficacy of treatment, treatment adherence and patient satisfaction (Fuertes et al., 2007). Brewer and colleagues (2003) reported that patients' belief in treatment predicted rehabilitation attendance and adherence. Therefore, it is important that practitioners have a close working relationship with patients to ensure that they can improve patients' perceptions of treatment efficacy (Levy et al., 2008). Exploration into the working alliance is in its infancy (Fuertes et al., 2017), nevertheless, preliminary research in this area suggests it is a promising area for interventions in adherence (Schoenthaler et al., 2009), as stronger relationships between medical professionals and patients can lead to better buy-in, increased patient satisfaction, and improved treatment outcomes (Fuertes et al., 2007; DiMatteo et al., 1993).

Treatment Efficacy

While self-efficacy pertains to an individual's belief in their ability to be successful (Bandura, 1977), treatment efficacy is described as an individual's belief that the prescribed treatment will lead to desired health outcomes (Taylor & May, 1996). Strong treatment efficacy and perceptions of effectiveness of rehabilitation has been positively associated with better adherence to rehabilitation programmes (e.g., Brewer et al. 2003a; Evans & Hardy, 2002; Milne et al., 2005). Levy et al. (2008) found that treatment efficacy predicted adherence in both home-based and clinical based rehabilitation. Exploring the role of psychological processes on outcomes following shoulder physiotherapy, Chester and colleagues (2018) more recently concluded that patients who expected or believed that their treatment would lead to a complete recovery had more successful outcomes. The aforementioned research aligns with Bandura's (1977, 1982) self-efficacy theory which indicates that self-efficacy impacts cognitions, behaviours, actions, and emotions. Further, and of particular pertinence to the rehabilitation context, Bandura (1982) argued that increased efficacy would determine coping behaviours and dejection following past failures. Consequently, an athletes' appraisal of their self-efficacy following injury is highly likely to impact their future behaviour, such as adherence (Hargreaves & Waumsley, 2013). One method that physiotherapists may use to facilitate treatment efficacy and increase an individual's sense of autonomy is through the process of setting mutual goals with patients (Kingston & Wilson, 2009). Crucially, facilitating treatment efficacy through this mechanism may also increase meaningful communication, and improve relationships between the patients and the supporting medical professionals (Wadey et al., 2011).

Although there are any number of factors that can impact on rehabilitation adherence which are beyond the scope of SDT, this section highlights the importance of supporting personality factors such as conscientiousness, facilitating belief in meeting the demands of the rehabilitation process, and ensuring that patient emotional states are considered. At a situational level, it is clear that the physiotherapist can play a pivotal role in supporting the injured athlete and facilitating patient belief through effective communication and connecting with patients in a respectful and trustful manner.

The research reviewed paints a compelling picture of personal and situational factors affecting rehabilitation adherence and wellbeing. It is important therefore, that practitioners at all levels are provided with opportunities to better support engagement with rehabilitation protocols. Physiotherapists clearly already utilise many appropriate strategies to promote adherence in practice, and it is likely that these strategies also satisfy the three basic psychological needs of autonomy, competence, and relatedness. The following section of this chapter will consider research on self-reported use of strategies by physiotherapists to promote rehabilitation adherence. Further, there will be an attempt to explicitly link the reported strategies to the satisfaction of basic psychological needs to illustrate their potential wider benefits for motivation, growth and wellbeing.

Common Strategies Utilised by Physiotherapists in Practice

Goal Setting, Monitoring Progress, and Positive Reinforcement

Goals are direct regulators of human action; they can be used to provide impetus for behaviours (Kingston & Hardy, 1997; Locke & Latham, 1985; Ryan & Deci, 2000). Goal setting, (i.e., the act of identifying and strategizing around objectives) contributes to action through two main functions, a motivational function and a cognitive function. Motivationally, goal setting influences the degree of effort an individual commits towards a goal (Locke & Latham, 1990), while the cognitive effects of setting goals influence the individual through, for example, increased focus and action, increase persistence, and the adoption of alternative strategies when they are in doubt (i.e., problem solving; Locke & Latham, 1990; Locke & Latham, 2013). It is apparent, therefore, that it is not so much the goals themselves that provide volition, but the process of reflecting, setting, strategizing and pursuing goals that create the impetus for action (Kingston & Wilson, 2009).

Research examining strategies to enhance adherence to rehabilitation programmes has demonstrated that goal setting is a key strategy (Arvinen-Barrow et al., 2010; Arvinen-Barrow et al., 2007; Babatunde et al., 2017; Driver et al., 2019; Hemmings & Povey, 2002; Holden et al., 2015; Jevon & Johnston, 2003; Niven, 2007). More specifically, Niven (2007) reports that setting goals, progress monitoring, and provision of positive feedback (from physiotherapists) are frequently used to support adherence. Furthermore, goal setting is reported to encourage accountability, especially when patients have had an input into the goal setting process (Niven, 2007). Babatunde and colleagues (2017) found that a third of physiotherapists in their study used goal setting to enhance rehabilitation adherence, while Driver and colleagues (2019) found that 95% of the physiotherapists surveyed used goal setting in the last 12 months. This frequent use of goals and goal setting is also supported in research highlighting the benefits of using goal setting to increase rehabilitation adherence (Scherzer et al., 2001; Evans & Hardy, 2002).

Reinforcing the findings of Niven (2007), as well as the notion that goal setting itself positively impacts engagement and adherence, a number of researchers have demonstrated the beneficial effects of goal-based positive reinforcement and feedback to patients (Arvinen-Barrow et al., 2007; Driver et al., 2019; Francis et al., 2000; Holden et al., 2015). This starts to illustrate some of the mechanisms underpinning the positive effects of goals. Francis and colleagues (2000), for example, found that physiotherapists in a sport setting used short-term goals to increase athlete motivation and provide positive reinforcement. Extending this suggestion, Driver et al. (2019) argued that positive reinforcement may be a physiotherapists natural response to encourage desired behaviours, rather than a specific strategy to enhance rehabilitation adherence. The importance of monitoring goals as a route to providing feedback and encouragement to patients during rehabilitation has been demonstrated widely (Babatunde et al., 2017; Niven, 2007; Peek et al., 2017), and further is considered to be one of the key components to support physical activity behavioural change (National Institute of Clinical Excellence [NICE], 2014).

Whilst the evidence presented suggests that goal setting, monitoring progress, and providing positive reinforcement are beneficial for increasing rehabilitation adherence, it is also reasonable to suggest that the basic psychological needs of competence and autonomy are simultaneously being satisfied. Making the link between these two concepts, Deci and Ryan (2000) contended that to understand goal-directed behaviour (as well as the psychological development and wellbeing), one must consider the three basic psychological needs that give goals their psychological potency, and which influence the regulatory processes which direct goal pursuits. Extending this link, and in alignment with the predictions of SDT and need satisfaction, Latham and Locke, (2007) proposed that goal setting not only positively affects performance, but also increases subjective wellbeing.

Achievement has a cyclical relationship with self-confidence. In the rehabilitation context, when patients are completing their goals in their rehabilitation, they are more likely to feel confident in their injury, which in turn allows them to master the rehabilitation exercise they have been tasked with (Niven, 2007; Brewer et al., 2003; Podlog & Eklund, 2010). By providing patients with positive feedback, positive encouragement, and reinforcement, clinicians provide patients with the opportunity to develop confidence in their capability to complete their rehabilitation exercises correctly. In both cases the basic need of competence is likely being fulfilled, and behaviours become increasingly self-regulated and integrated to the self (Ryan & Deci, 2000).

One of the secondary benefits to sharing information and helping patients understand the importance of completing exercises correctly is that they perceive a greater level of autonomy around their treatment. According to Podlog et. al. (2011), if physiotherapists increase an individual's control over rehabilitation, they can reduce any external pressures following injury. This can be done, for example, by allowing patients or athletes to select when or how they carry out their rehabilitation exercises. Furthermore, allowing patients to have input in the goal setting process may also increase their sense of control. With mutually agreed upon goals, patients are more likely to adhere because there is a sense of ownership, thus satisfying the need of autonomy (Podlog & Eklund, 2010), and helping them to internalise their rehabilitation behaviours.

The process of setting goals, monitoring progress, and receiving positive reinforcement from physiotherapists is a key strategy utilised by physiotherapists to facilitate rehabilitation adherence. In addition to the direct motivational benefits around effort and persistence, by utilising these strategies, physiotherapists are also likely to be increasing patients' perceptions of competence around the injury. Moreover, encouraging patients to have an input into the goals set in rehabilitation, sharing information, and giving ownership in completing exercises correctly may support autonomy perceptions.

Providing Information and Rationale for Treatment

Babatunde et al. (2017) noted that providing patients with information and a rationale of treatment was a commonly cited strategy used by physiotherapists. Physiotherapists have suggested that increasing patient knowledge of injury can help create a strong working relationship between them and the patient (Peek et al., 2017). It can increase confidence, positive perceptions regarding the cessation of treatment, and speed the rehabilitation process (by providing clear steps of rehabilitation; Podlog & Eklund, 2009; 2010), as well as patient adherence (Peek et al., 2017).

The manner in which this information is provided can range from verbalising strategy and potential benchmarks to providing supportive written or online resources. Receiving education on self-management of treatment has been found to have a positive effect in patients with chronic low-back pain (Cooper et al., 2009). Similarly, Ninedek and Kelt (2000) reported that increasing patient knowledge and understanding of their injury increases the likelihood of effectively coping with the associated psychological stress. Educating patients and providing knowledge regarding their injury is also likely to enhance the quality of the patient-physiotherapists relationship; this has been highlighted as a key predictor of patient engagement in rehabilitation (Podlog & Eklund, 2007). Similarly, providing patients with information is likely to facilitate trust, which in turn would increase the connection between them and support the working alliance. This collaboration with and provision of resources to patients, and the closeness and enhanced connectivity that results, is likely to support the basic psychological need of relatedness. Further, providing patients with advice, guidance, and knowledge regarding their injury and prevention helps satisfy the basic need of competence through instilling belief regarding recovery, notably around returning to sport (Podlog et al., 2011).

Tailoring Exercises to Individual Patient Needs

Central to the notion of patient-centred support, is the value attached to an individualised approach. This facilitates the perception that patients' needs are the primary rationale for specific prescribed exercises. Fundamentally, by designing exercises which are patient-centred, individuals are more likely to engage in the rehabilitation process (Hall et al., 2010; Niven et al., 2007). There is an abundance of evidence to support this contention; physiotherapists provide a wide variety of exercises which are injury site and severity dependent and are often tailored to meet individual patient needs (Babatunde et al., 2017; Peek et al., 2017; Niven, 2007). In fact, 60% of physiotherapists noted that they manipulate aspects of the rehabilitation programme on an individual primarily to facilitate adherence (Babatunde et al., 2017). For example, individualised regimens would reflect how exercises could be incorporated into a patient's daily routine, reduce the frequency or complexity of exercises, and be based on patient preferences (Babatunde et al., 2017; Peek et al., 2017).

The tailoring of rehabilitation programmes to individuals provides the opportunity to support all three of the fundamental basic needs described within SDT. Rehabilitation programmes with significant patient input and mutually agreed upon exercises and goals are likely to promote a strong working alliance between the patient and physiotherapist (and hence support the need relatedness), and increase the patient's perception of autonomy. Further, by tailoring sessions based on patient ability, preferences, and lifestyle, patients are more likely to: (a) complete their prescribed rehabilitation programmes, and (b) master the specific exercise, and thus satisfy the basic need of competence.

Adopting a highly individualised approach can help patient's perception that their needs are front and centre of decisions regarding specific support. Tailoring exercises and designing bespoke programmes has been associated with improved rehabilitation adherence (Babatunde et al., 2017; Peek et al., 2017; Niven, 2007). Furthermore, the wider benefit in terms of performance and wellbeing can be realised as tailoring exercises to suit patients' requirements can simultaneously satisfy all three basic psychological needs.

Providing Practical and Emotional Support

In the context of rehabilitation, the physiotherapist is ideally placed to provide support to the patient (Koudriavtseva et al., 2014). Following injury, an athlete may experience a range of feelings such as anxiety, frustration, anger and/or isolation (Johnston & Carroll, 1998), which may be alleviated or suppressed through physiotherapists direct support or by increasing a patient's sense of support (Arvinen-Barrow et al., 2010; Jevon & Johnston, 2003; Niven, 2007). Physiotherapists can support and influence rehabilitation adherence positively in a number of ways by building a positive rapport and communicating effectively with patients (Granquist & Brewer, 2013). Moreover, providing patients with a rationale for exercises without jargon or overly technical language, and recognising individuals needs for informational and emotional support, are examples of how a physiotherapists' can promote an environment which encourages rehabilitation adherence (Granquist & Brewer, 2013). Interviews with physiotherapists indicate that they see it as their role to provide support to patients, as they are more likely to adhere if they are comfortable in the environment (Anderson, 2007). It is also important to note that physiotherapists understand that, if patients are insufficiently supported by significant others, it can have a negative impact on adherence (Niven, 2007; Nindek & Kolt, 2000). Consequently, any methods to help patients' sense of direct and indirect support can help support adherence through fulfilling the basic psychological need of relatedness. This relatedness-enhancing support can take many forms, such as listening to concerns, helping individuals control emotions, providing positive feedback, providing education about the injury, and providing steps to overcome the injury (Podlog & Eklund, 2010). It is also important to recognise that support should be consistent, and active. Being too hands off in an attempt to give autonomy, or perceiving that the patient requires less support as they progress through

the rehabilitation, may inadvertently undermine basic need satisfaction, which can have a consequential impact on rehabilitation outcomes and patient wellbeing (Podlog et al., 2011).

Implications

This chapter has provided an overview of the research surrounding rehabilitation adherence with specific reference to some of the factors that underpin engagement with rehabilitation. The BPNT has been used extensively to examine optimal growth, motivation, and wellbeing (Hodge & Gucciardi, 2015), and research suggests that environments supportive of the three basic psychological needs of autonomy, competence, and relatedness promote positive health behaviours and wellbeing (Baard, et al., 2004; Gunnell et al., 2013; Molix & Nichols, 2013). One such adaptive behaviour that results from need satisfaction, and in the context of injury rehabilitation, is adherence (Gunnell et al., 2013). In practice, physiotherapists are integral in providing both physical and psychological support to patients (Jevan & Johnson, 2003), and therefore it is important for physiotherapists to develop a clear understanding of strategies to increase adherence and their potential wider implications (e.g., working alliance, emotional support, and wellbeing).

Broadly speaking, to support the needs of autonomy, relatedness, and competence, physiotherapists should aim to create environments which satisfy these needs (Podlog et al., 2010). Whilst it is recognised that physiotherapists currently use several strategies that effectively support adherence, a more formalised, direct approach may help to optimise adherence and satisfy basic psychological needs. Although much of the empirical support for the value of basic need satisfaction has focused on need satisfaction, frustration of these needs even inadvertently may undermine adherence and wellbeing. This type of strategic approach has the potential to help patients assimilate motives and facilitate wellbeing throughout the rehabilitation process.

It is important to acknowledge that whilst it seems that innate psychological need satisfaction in the rehabilitation environment would produce positive outcomes, there are a number of factors which have the potential to moderate its relationship with adherence and subsequently the effectiveness of treatment (Brewer, 2001). Whilst those that have been highlighted within the research to date have been discussed, there are any number of other personal and situational factors which may impact the ability of a patient to adhere to recommended treatment. It is important that future research systematically examines *in situ* the personal and situational factors which predict rehabilitation adherence, the direct and indirect effects of psychological need satisfaction (or thwarting), and the consequences for psychological wellbeing and clinical outcomes. Such work has the potential to provide a more holistic picture for physiotherapists of the factors influencing rehabilitation adherence and outcomes. It is also important to consider and further explore physiotherapists' views, knowledge, and perceptions of adherence; it is clear from the research to date that they have a rich insight into factors influencing adherence, and that they utilise a number of strategies that also enable basic psychological need satisfaction.

Post-injury behaviour changes are influenced by cognitive appraisals of personal and situational factors, and these in turn influence perceptions of the injury state and associated behavioural and emotional responses (Brewer, 2001; Brewer et al., 2003; Wiese-Bjornstal et al., 1995; Wiese-Bjornstal et al., 1998). It is therefore important that differences and changes in wellbeing and need satisfaction are monitored through the different stages of injury (i.e., onset, rehabilitation and return to play). Future research should therefore utilise a longitudinal approach to understanding how needs may be satisfied or frustrated throughout the course of the injury (Podlog et al., 2010).

Finally, although we have demonstrated physiotherapists are using many strategies which inadvertently (and simultaneously) support adherence and basic psychological need satisfaction, more work is required on educating practitioners through targeted continued professional development.

Conclusion

The objective of the physiotherapist is primarily to facilitate recovery from injury through movement and exercise, manual therapy, education and advice. It is apparent that, within their advice and support particularly around self-administered rehabilitation they simultaneously meet and nurture the basic psychological needs of their patients. Consequently, in accordance with Deci and Ryan's (1985; 2000) SDT, the benefit to patients of, for example, shared decision-making, feedback, resource support, and ongoing communication, is that in addition to directly facilitating recovery, there are wider and simultaneous benefits for patient psychological wellbeing. This chapter has sought to illustrate these benefits and provide some guidance on how these widely used strategies may be more effectively framed to satisfy the basic needs. We have also discussed a number of moderating factors that may influence the relationship between physiotherapy support and adherence to rehabilitation.

Developing a consistent and strategic-based approach to supporting rehabilitation adherence explicitly grounded in motivational theory, empiricism, and descriptions of strategy use by physiotherapists can go a considerable way to help to facilitate patient adherence, promote adaptive behaviours and cognitions, and more broadly enhance patient wellbeing.

Learning Exercises

1. Why is an understanding of self-determination theory, and in particular it's sub-theory of basic needs potentially so helpful for the practicing physiotherapist?
2. Physiotherapists can have both a direct and indirect influence on patient wellbeing; please explain how and why?
3. What are the primary factors that influence adherence to rehabilitation guidance?
4. Why is personal and collaborative goal setting viewed as such a fundamental skill in supporting adherence of the injured athlete?
5. In what ways can the physiotherapist directly support the injured athletes three basic psychological needs?
6. How can the knowledge gleaned from this chapter enhance the applied practice of physiotherapists and patient outcomes?

Further Reading

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