British Journal of Health Psychology (2006), 11, 103–117

The British Psychological Society
www.bpsjournals.co.uk

A conceptual care model for individualized care approach in cardiac rehabilitation – combining both illness representation and self-efficacy

Margaret Lau-Walker*
European Institute of Health and Medical Sciences, University of Surrey, Guildford, UK

Purpose. This paper analyses the two prominent psychological theories of patient response – illness representation and self-efficacy – and explore the possibilities of the development of a conceptual individualized care model that would make use of both theories.

Methods. Analysis of the literature established common themes that were used as the basis to form a conceptual framework intended to assist in the joint application of these theories to therapeutic settings.

Results. Both theories emphasize personal experience, pre-construction of self, individual response to illness and treatment, and that the patients' beliefs are more influential in their recovery than the severity of the illness. Where the theories are most divergent is their application to therapeutic interventions, which reflects the different sources of influence that each theory emphasizes. Based on their similarities and differences it is possible to integrate the two theories into a conceptual care model.

Conclusion. The Interactive Care Model combines both theories of patient response and provides an explicit framework for further research into the design of effective therapeutic interventions in rehabilitation care.

Research repeatedly suggests that for cardiac rehabilitation programmes to become more effective they should address the psychological needs of the patient as well as their physical needs (Jolliffe *et al.*, 2004; Linden, Stossel, & Maurice, 1996; Mayou, 1996; Mullen, Mains, & Velez, 1992). Without accommodating patients' individual psychological perspectives when developing and delivering care strategies, research indicates that there is a potential for ineffective communication, and ultimately, a failure to provide appropriate rehabilitation strategies that sustain long-term health behaviour change (NHS, 1998). This paper provides an overview of two prominent cognitive theories of individualized care in cardiac rehabilitation (CR) – illness representation

*Correspondence should be addressed to Margaret Lau-Walker, European Institute of Health and Medical Sciences, University Campus, Duke of Kent Building, Stag Hill, Guildford GU2 7TE, UK (e-mail: m.lau-walker@surrey.ac.uk).

DOI:10.1348/135910705X41914

and self-efficacy – and proposes that the development of effective individualized care for cardiac rehabilitation would benefit from their integration into one framework.

Health care guidance suggests that the patients' decisions, and the actions resulting from these decisions, need to be better understood by practitioners and explicitly incorporated within a framework of individualized care (SIGN, 2002; Thompson, Bowman, De Bono, & Hopkins *et al.*, 1997a; Coats, McGee, Stokes, & Thompson, 1995). Despite these exhortations to balance exercise-based cardiac rehabilitation with psychosocial interventions, surveys continue to identify that psychosocial factors are still poorly assessed (Lewin, Ingleton, Newens, & Thomspon, 1998). The measurement of the psychological and quality of life criteria remains patchy (Bethell, Turner, Flint, & Rose, 2000), and the lack of structured assessment tools to assist in the identification and measurement of the patients' illness beliefs and expectations means that nurses and practitioners do not use psychological interventions systematically (Lau-Walker, 2004; Thompson, Bowman, & Kitson, 1995). Moreover, whilst there appears to be a general consensus about the importance of assessment and management of psychological support for patients, there has been no agreement on the specific theory or model to be employed from which interventions can be generated. On this point the National Service Framework for Coronary Heart Disease (Department of Health, 2001) recognized the need to continue to research factors that have a positive impact on CR patients and to pursue the establishment of a well-grounded theoretical framework to develop models of care that deliver effective rehabilitation interventions.

Theoretical frameworks for psychological support and individualized care

The 1995 and 2002 British Association for Cardiac Rehabilitation guidelines (Coats *et al.*, 1995; SIGN, 2002) offer practitioners two theoretical frameworks:

(1) the common sense representation of illness model (Leventhal, Meyer, & Nerenz, 1980) to explore patient knowledge and understanding of their cardiac event; and
(2) self-efficacy (Bandura, 1977) to reduce anxiety and increase coping capability following a CR programme.

Though the guidelines make joint reference to the concepts of illness perception and self-efficacy, the research literature has treated these two concepts as quite separate frameworks for the design of the treatment of patients. Their details have been independently constructed and tested with a diverse range of illnesses and clinical settings, generating a considerable amount of evidence as to the importance of patient beliefs or expectations for the recovery process. Underpinning both theories is the acknowledgement that patients interpret the events that affect them and construct responses and future outcomes on a rational basis that is unique to each patient. Thus, both theories seek to explain why patients with similar conditions differ in their response to that condition, and how carers can best manage these differences. In their own terms each theoretical framework argues that it is through the individual's experience (which carers can manage), rather than their personality (which carers cannot effect), that patients' actions and perceptions are informed.

Illness perception

The self-regulatory model (SRM) of illness (Leventhal, Nerenz, & Steele, 1984), often referred to as the common sense representation model because its roots are in the

empirical data collected from interviewing patients, is the most widely used model in the last 10 years to explain how people interpret current and potential health events or threats. As a theoretical model it describes patients as active problem solvers whose health related behaviour is based upon, and then regulated or influenced by, the presentations or beliefs they themselves generate about illness (Leventhal & Cameron, 1987; Leventhal *et al.*, 1984). The basic premise of this model is that individuals are motivated to regulate or minimize their health-related risk and act to decrease health threats in ways consistent with their perceptions of them. Three recurring – and thus self-regulating – stages guide an individual's coping or adaptive behaviour:

(1) An active processing system generates both cognitive representations of the health threat and the emotional reactions to it.
(2) Representations thus formed steer the development of action plans for coping with the problem and the emotion. The processing system considers both concrete somatic experiences (e.g. painful symptoms) and abstract ideas or semantic information (e.g. the reaction between symptoms and a disease).
(3) Appraisal of the coping response determines whether action taken moved the individual closer to or further from the goals specified by the representation. Information from the appraisal is evaluated and feeds back to alter either the way the problem was represented or the coping strategy chosen. Subject to appraisal within this process, the representations thus formed are updated and, therefore, are self-regulating and change over time (Leventhal, *et al.*, 1984).

Illness perception: Sources of information

In Leventhal's model, patients' past experience with illness is organized in a complex memory structure that is used to cluster and organize illness knowledge. The construction and updating of these illness representations guide choices of behaviour and appraisal, and form the basis of a critical evaluation of any professional advice and guidance offered as part of the patient's treatment. Many aspects of the 'common sense representations' of illness stem from the interpretation of information received during medical encounters, but social and cultural factors also shape the appraisal process and the action taken in response to a perceived health threat. Sources of knowledge from which particular representations are formed include the mass of illness information within our culture (environmental stimulus), individual personal illness experience (perceptual symptoms), and social communication (Leventhal *et al.*, 1984). The constant interaction of environmental and perceptual stimuli within the individual's own memory system explains why different people construct different representations and undertake different action plans to respond to apparently similar medical conditions.

Illness perception components

The attributes or content of illness representations have been consistently organized into five dimensions (Leventhal *et al.*, 1997), which together make up laypeoples' common sense perceptions of an illness episode or a health threat. These attributes include:

Disease identity – Signs, symptoms or the label given to an illness reflect the individual's perception of what the problem is;

Cause – Individuals generate ideas about what caused the problem or how one gets a particular disease;

Timeline – Expectations are held about the duration of the problem and whether it will be acute, chronic, episodic or cyclical in nature;

Consequences – How an individual perceives possible consequences of a disease, in terms of short or long-term physical, social, economic and emotional effects;

Control/cure – Ideas about what the patients themselves, or others, can do to influence the course of an illness determine perceptions of whether it can be cured or controlled.

Therapeutic use of illness perception

Leventhal, Nerenz & Steele (1984) emphasizes that patients construct a belief about themselves as well as their condition. To be successful, therefore, therapeutic interventions need to accommodate and utilize such beliefs. The rationale for this approach is essentially that not only do patients contemplate what is happening to them and the future consequences of their condition, but also they have a well-established construct of themselves, based on their interpretation of their own experiences. This construct indicates what the patient believes they are, and are not, capable of acting upon to respond to their current health condition, and informs their plan of action, accounting for the different individual responses to similar medical conditions.

The model has been used to examine individuals' perceptions about a variety of illnesses, including hypertension (Meyer, Leventhal, & Gutmann, 1985), diabetes (Gonder-Frederick & Cox, 1991), acute myocardial infarction (Johnson & King, 1995) and sexually transmitted diseases (Jadack, Keller, & Mims, 1991). These studies indicate that patients have implicit models or beliefs about specific diseases and that these beliefs guide their behaviours both in seeking diagnoses and during treatment. When illness occurs, the patient already has a lay representation of the illness and the coping strategies relevant to operate in response. The health care professional must be prepared to elicit what these pre-conceived ideas are before attempting to provide alternative constructs to be adopted or else risk rejection of their advice and guidance (Bennett, Mayfield, Norman, Lowe, & Morgan, 1999; Petrie, Weinman, Sharpe, Buckley, 1996; Shaw, 1999).

Research studies using illness perception components show that patients' beliefs about their health condition are more influential in determining coping and recovery (Blumenthal, Califf, Williams, & Hindman, 1983; Byrne, 1982; Diedericks *et al.*, 1991; Scharloo *et al.*, 2000) than the severity of their illness and have a strong association with patients behaviour changes in relation to recovery in CR (Affleck, Tennen, Croog, & Levine, 1987a, 1987b; Bar-on, 1987; Cooper, Lloyd, Weinman, & Jackson, 1999; Petrie *et al.*, 1996; Wenger & Froelicher, 1996; Gilutz, Bar-on, Billing, Rehnquist, & Cristal, 1991). A belief that the illness will be intermittent or discontinuous (Herda, Siegeris, & Basler, 1994; Petrie *et al.*, 1996; Skevington, 1993; Weinman, Petrie, Moss-Morris, & Horne, 1996; Williams, Robinson, & Geisser, 1994) and a low level of perceived disability or seriousness of the illness appear to be associated with more positive outcomes (Petrie *et al.*, 1996; Hampson, Glasgow, & Zeiss, 1994; Jensen, Turner, & Romano, 1994; Pollock, 1993). Similarly, high scores on perceptions of internal personal control are associated with a perceived favourable course of illness (Dalal & Sing, 1992; Flor, Behle, & Birbaumer, 1993; Gilutz *et al.*, 1991; Marshall, 1991; Pastor *et al.*, 1993; Schussler, 1992). More recent longitudinal surveys of illness perception on patients in cardiac rehabilitation, Petrie *et al.* (1996) and Cooper *et al.* (1999) have also shown that

attendance on rehabilitation programmes was significantly related to a stronger belief that the illness could be controlled or cured. Using the insights from the SRM a number of interventions have been specifically developed to get patients to think differently about their illness using cognitive behavioural techniques (Petrie, Cameron, Ellis, Buick, & Buick, 2002; Pimm, 1997; Sharp *et al.*, 1996; Williams *et al.*, 1993; Wyer *et al.*, 2001).

Although research shows that illness perceptions and self-beliefs about coping strategies are related to health outcomes, most of the research results are based on cross-sectional analyses, making it hard to draw conclusions about the casual directions of the relations between coping, illness perception and outcome (Scharloo *et al.*, 1999). Moreover, researchers using Leventhal's illness representation model have tended to focus on the relationship between the illness components and the illness outcomes rather than the patients' construct of themselves (Petrie *et al.*, 2002). It is has been suggested that the SRM approach does not explore the affective domain sufficiently, and that more research is needed to address the internal factors of coping rather than the focus on the external factors such as social support and attendance to the rehabilitation programme (Miller & Rollnick 2002).

Self-efficacy

Self-efficacy refers to the same theme as Leventhal's belief in the patient having a well-established construct of themselves, based on their own interpretation of their experiences. The leading researcher and writer on efficacy is Albert Bandura (1977, 1982, 1986, and 1997), who asserts that behaviour is the outcome of an interaction between cognitive processes and environmental events. People process and synthesize feedback from sequences of events over long intervals about the situational circumstances and the patterns and rates of action that are necessary to produce given outcomes. In this context, Bandura argues that self-efficacy is constructed from personal experience and is not a product of personality. He affirms the view that perceived self-efficacy relates to beliefs about capabilities of performing specific behaviour in particular situations (Bandura, 1997; Schunk & Carbonari, 1984). A means to a desirable outcome will not lead to behavioural change unless the patient believes that they can perform the behaviour in the required situation. Perceived self-efficacy as Bandura uses it, is not a measure of the skills one has, but a belief about what one can do under different sets of conditions with whatever skills one possesses. Hence different people with similar skills, or the same person under different circumstances may perform poorly, adequately, or extraordinarily, depending on fluctuations in their belief of personal efficacy.

Outcome expectation and self-efficacy

Bandura's major contribution to the social cognitive theory is the concept of perceived self-efficacy in the context of cognitive behaviour modification. Bandura (1977) distinguished between two types of expectations: outcome expectancy and self-efficacy. Outcome expectation is the perception of the possible consequences of one's own actions that a given behaviour will lead to a particular outcome. This outcome is then considered in terms of its value to the individual. Self-efficacy expectations by contrast, are a person's beliefs about their own ability to cope with situations. Self-efficacy expectation reflects the belief that one can successfully execute the behaviour required to produce the outcome. High efficacy expectations are related to perseverance of effort

at a task and the maintenance of therapeutic improvement (Bandura, 1982). Hence, a patient may believe that regular exercise will improve his or her future health (high outcome expectancy), but may still dismiss this strategy for improved health because they have a low efficacy expectancy (having never been a regular exercise participant the patient will not see themselves as able to start regular exercise now, and will certainly not believe themselves able to sustain it).

Empirically, the distinction between outcome expectancy and self-efficacy is hard to confirm because the latter does not operate without the first. Outcome expectancy can be seen as a precursor of self-efficacy because an individual usually makes assumptions about the possible consequences of behaviours before inquiring whether they can successfully undertake the required actions. Studies by Maddux, Sherer, and Rogers (1982) demonstrated that outcome expectation plays a larger role in predicting change in behaviour, while other research (Strecher, DeVellis, Becker, & Rosenstock, 1986) tends to support the notion that outcome expectation predicts an individual's intention to perform a behaviour while efficacy expectation predicts actual performance. However, Bandura specifies self-efficacy as a mediator between outcome expectancies and intentions, so the direct influence of outcomes expectancy on intention is unclear. According to Schwarzer and Fuchs (1995), the research findings on this issue are inconsistent and both concepts appear as primary candidates for motivating change. Sanz and Villamarin (2001), however, suggest that self-efficacy is moderated by outcome expectations. Where outcome expectations are not evaluated alongside self-efficacy it is not possible to check the potential interaction between these two variables.

Self-efficacy: Sources of information

One of Bandura's major contributions in expectancy theory was the distinction between information conveyed by directly experienced events and (efficacy) information that becomes instructive only through cognitive processing and reflective thought. Bandura identified four sources of self-efficacy in a hierarchy of significance for informing behaviour (Bandura, 1997):

(1) *Enactive mastery experience*: this source of efficacy information is especially influential because it is based on personal mastery experiences.
(2) *Vicarious experience*: seeing other perform threatening activities without adverse consequences can generate expectations in observes that they too will improve if they intensify and persist in their efforts.
(3) *Verbal persuasion*: people are led, through suggestion, into believing they can cope successfully with what has overwhelmed them in the past.
(4) *Physiological and affective states*: an individual's physiological state provides information that can influence efficacy expectation.

Self-efficacy dimensions

According to Bandura (1977, 1982) efficacy expectations vary along dimensions of magnitude, strength, and generality. Each of these dimensions has important implications for performance. '*Magnitude*' refers to the ordering of tasks by difficulty level. Patients having low-magnitude expectations feel capable of performing only the simpler of a graded series of tasks, while those with high-magnitude expectations feel capable of performing even the most difficult tasks in the series. '*Strength*' refers to a probability judgment of how certain the patient feels about their ability to perform a specific task. The third dimension, '*generality*', concerns the extent to which efficacy

expectations about a particular situation or experience generalize to other situations. For example, the self-efficacy beliefs of post-myocardial infarction patients about their endurance capabilities generated during supervised exercise testing may or may not generalize to unsupervised exercising at home (Strecher, 1986).

Self-efficacy makes a difference in how people *feel*, *think*, and *act*. In terms of feeling, a low sense of self-efficacy is associated with depression, anxiety, and helplessness. Such individuals also have low self-esteem and have pessimistic thoughts about their accomplishments and personal development. Self-efficacy levels can enhance or impede the motivation to act. Individuals with high self-efficacy set themselves higher goals and stick to them (Locke & Latham, 1990). Actions are pre-shaped by thought, and once an action has been taken, high-efficacy individuals invest more effort and persist longer than those with low self-efficacy. When setbacks occur, those with high self-efficacy recover more quickly and maintain a commitment to their goals (Bandura, 1995).

Therapeutic use of self-efficacy

Bandura, in his examination of the role of self-efficacy in therapeutic interventions, insists that self-efficacy is constructed from specific personal experience. Since it is based on experience it does not lead to unreasonable risk taking (1997), rather it leads to exploratory behaviour within the individual's capacity. It is therefore important to develop successful interventions – focusing on what the patient can do that leads the health practitioner to emphasize and prioritize therapeutic interventions that change performance directly and provide experiences of mastery, as these will have the strongest effects on efficacy expectations and, therefore, on subsequent behaviour.

The ability to sustain positive outcomes over an extended period of time requires a positive self-efficacy. Empirical research by Bandura and by others (Bandura, 1977; Bandura 1997; Schwarzer & Fuchs, 1995) has demonstrated positive correlations between therapeutic changes in behaviour and changes in self-efficacy that are held over a variety of target behaviours and treatment procedures, including studies on cardiac illness. The psychoeducational interventions based on expectancy theory respond to individual patient constructs of their illness and the potential for recovery (Bandura, 1997; Dusseldorp, Van Elderen, Maes, Meulman, & Kraaij, 1999; Linden *et al.*, 1996), and are particularly relevant for individualized care as evidenced in numerous studies with a range of conditions – cardiac patients compliance to exercise regimes (Ewart 1992; Jeng & Braum, 1997); adjustment in cancer patients (Beckham, Burker, Lytle, Feldman, & Costakis, 1997); control of chronic pain (Arnstein, Caudill, Mandle, Norris, & Beasley, 1999; Asghari & Nicholas, 2001; Lackner, Carosella, Carosella, & Feuerstein, 1996; Rejeski, Ettinger, Martin, & Morgan, 1998); self-management in arthritis patients (Lorig, Mazonson, & Holman, 1993) and in addictive behaviour (Marlett, Baer, & Quigley, l994). Bandura asserted that individual self-efficacy is situational specific and research in self-efficacy continues to suggest that future exploration of the sources of efficacy information in patients and what contributes to the high or low self-efficacy is vital for the development of effective health care intervention for specific health-related situations (Brown & Conn, 1995; Perkins & Jenkins, 1998).

Two approaches to therapeutic interventions and the opportunity to integrate

Both illness perception and self-efficacy use cognitive frameworks to encourage the practitioner to research the patient's perceptions and their understanding of their own

condition in order to predict patient response and develop therapeutic interventions that start from the patient's perspective. Where these theoretical approaches are to be seen as most divergent is in their application to therapeutic interventions, which reflects the different sources of information each approach emphasizes and the breadth of their effect in treatment. Cognitive information gained prior to the illness is seen to inform illness representation (Shaw, 1999; Wiles, 1998) and has a general effect on health behaviours, whereas self-efficacy is a product of personal experience, which is cumulative and is independently contextual to each specific health behaviour (Bandura, 1997). From these different starting-points, the design of therapeutic intervention either concentrates on providing the patient with corrective influencing communication (persuasion) to positively inform their illness beliefs in general (in the case of illness perception); or structuring and manipulating the patient's current experience to create positive experiential feedback for a specific health behaviour (in the case of self-efficacy).

There are obvious differences, though not contradictions, in the starting-points, components and subsequent focus for therapeutic design of these two theoretical perspectives, but there are some significant commonalities worth emphasizing in an attempt to produce a single integrated approach to the design of effective therapeutic interventions in CR:

(1) Patient's personal experience rather than their personality create the health beliefs they use as the basis of their subsequent health behaviours.
(2) Patients have a well-established construct of themselves based on their own experiences and this influences their understanding of their health condition.
(3) Patients' beliefs are more influential in determining coping and recovery than the severity of the illness.
(4) Understanding of patient constructs of illness and their condition is essential to the design of effective individualized care.
(5) Patients' beliefs can be influenced directly by specific and purposeful interventions designed to facilitate positive health outcomes.
(6) High perceptions of internal personal control are associated with a perceived favourable outcome to the illness.

These similarities suggest that to incorporate both illness perception and self-efficacy in an individualized care model would enable the evidence of the research from both of these theoretical perspectives to be combined to design more effective therapeutic interventions. Moreover, one specific difference of chronology between the two approaches offers a possible relationship between them, which would enable the research from each approach to be combined.

Illness perception research tends to be associated with health outcome intentions whereas self-efficacy research tends to be associated with predicting long-term behaviour changes (Petrie & Weinman, 1997; Schwarzer & Fuchs, 1996). The CR research using the illness representation model focuses on the patient's intention to change their health behaviour and there is much evidence of the potential to effect short-term behaviour as measured in attendance on CR programmes and early return to work (Cooper *et al.*, 1999; Petrie *et al.*, 2002; Petrie *et al.*, 1996; Wyer *et al.*, 2001). Research using the self-efficacy framework focuses on the maintenance of long-term health behaviour changes such as cessation of smoking or the maintenance of exercise regimes (Holman & Lorig, 1992; Jeng & Braum, 1997; McAuley, 1992; Parent & Fortin, 2000;

Schwarzer, 1994). Therefore, by combining both the patient's initial perceptions of their condition (illness perception) and their perceived confidence in their ability to adopt and maintain changes in their health behaviours over the long-term (self-efficacy), the health care practitioner can design interventions that relate to the individual's needs in terms of the effects the condition will have on the patient's particular life style, the changes they will have to make and the degree to which such changes can be made and sustained by the individual.

Researchers on illness perceptions have tended to establish predictors for health behaviours without giving much attention to the underlying cognitive processes that bring about the actual behaviour (Dracup *et al.*, 1995). This focus on the illness perception components has encouraged the examination of psychological interventions designed specifically at cognitive change in the patients' specific illness perceptions as a basis of improving rehabilitation outcomes (Petrie *et al.*, 1996). On the other hand, self-efficacy has remained focused on experiential rather than cognitive channels of communication to bring about change in the patient. Bandura's approach emphasized the importance of direct experience as the main channel of influence with patients, leading researchers to an emphasis on managing and manipulating feedback to secure behaviour change (Bandura & Jourden, 1991; Kavangh, 1983; Wells, Collin, & Hale, 1993; White, 1982; Wood & Bandura, 1989).

An integrated model

The conceptual models presented in the two figures below (Figs. 1 and 2), describe ways in which health care practitioners perceive the relationship between the cardiac event and the patient. The difference between these two models relates to the degree of emphasis on the signs and symptoms presented by the patient's condition and the range of responses that this focus provides. The first model (Fig. 1) has been called an active care model and emphasizes the direct linkage between the cardiac event or diagnosis, and the outcome. By mainly focusing on the treatment of the patient's signs and symptoms this medically-based approach gives prominence to what the practitioner can do and neglects the individual patient's ability to participate in the treatment process.

The active care model depicts the tendency of both practitioners and patients to emphasize the direct physiological relationship between the medical event and the related outcomes or consequence. The event leads to the outcome with few mediating factors other than medical intervention. This single focus can lead to the treatment of symptoms rather than the patient, reducing the possibility of individualized care interventions. All possible interventions at each stage of this cycle are principally aiming at the treatment of specific medical conditions, with health care interventions that are essentially physiological reflecting current CR practice (NHS 1998; Thompson, Bowman, Kitson, DeBono, & Hopkins, 1997b), including the health education that is made available. For example, explanation of cardiac diet is mainly focused on reduction

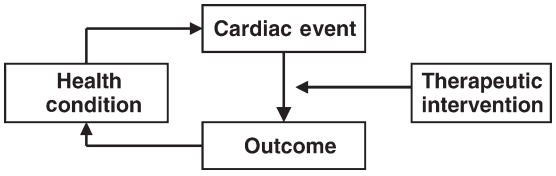

Figure 1. Active care model.

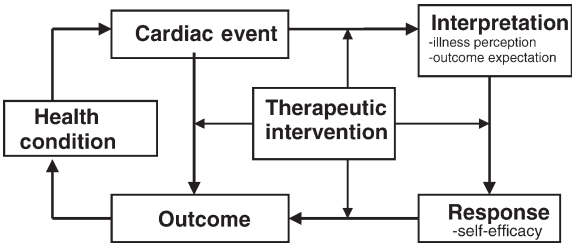

Figure 2. Interactive care model.

of fat content and weight loss and is less focused on the evaluation of the patients' views as to the relevance of this information to their own condition (IP), or the development of the patients' skills for maintaining the new diet regime (SE). This emphasis is most evident when practitioners and patients focus heavily upon the severity of the event or its consequences, and do not consider the controllability of the outcome. Such an emphasis is likely to promote a fatalistic perspective towards the outcome of the existing health condition, which could lead to a subsequent loss of empowerment for both patient and carer.

Incorporation of the constructs of both illness perception and self-efficacy provides an alternative model (Fig. 2), which removes the primacy of the event in the calculation of the outcomes and promotes a range of patient-carer interactions alongside the medical interventions emphasized in the first model. This alternative model, labelled the *interactive care model*, treats patients as individuals, with their own response to their condition and the possibility of their involvement in the shaping of their treatment process. This model illustrates the potential for a greater range of interventions, with the carer able to influence and manage the patient's beliefs and expectations to achieve more positive responses to their present condition and future recovery.

The cycle of interactions that forms the active care model (Fig. 1) appears in the interactive care model (Fig. 2), though this time the cycle forms only part of a larger sequence of interactions. The interactive care model incorporates the individual perspective to the earlier model to emphasize the mediating effects of the patient's own particular interpretation of the event (illness perception and outcome expectation) and the effect this interpretation (self-efficacy) will have on the patient. In this model the direct relationship between the event and the outcome is less dominant, because the outcome is dependent upon the beliefs that the patient brings to bear on the event in terms of their illness beliefs of the event and perception of their ability to adopt and maintain new behaviours following the event.

In the interactive care model, outcome expectation has been placed alongside the illness perception components, because, as with one of the illness perception component 'consequences', outcome expectation has been defined as a belief about the consequence of certain behaviour. Moreover, outcome expectation is also defined as a belief of a consequence of a certain 'cause' of a particular condition. For example, if diet is believed to be the cause of the cardiac event then a positive outcome expectation is that maintaining a healthy diet would lead to early recovery. Therefore, both illness perception components and outcome expectation represent the patients' views of their illness and illness effects and the effects of these illness beliefs could predict patients' beliefs about their ability to cope with specific behaviour changes (self-efficacy) in rehabilitation.

Conclusion

Research in both illness perception and self-efficacy has sought to establish the predictive value of their theoretical frameworks with the patients' health outcomes or long-term health behaviour changes to be able to guide practitioners to focus on key factors when designing each individual patient's treatment. Given the key similarities between the illness representation model and self-efficacy theory, the interactive care model suggests that there is a relationship between patients' illness perception and their self-efficacy following a cardiac event.

Illness representation offers a general perspective of an individual's initial interpretation of their illness, as the representation components are largely formed before their experience of the illness and have been shown to have a predictive value in terms of short-term patient responses; self-efficacy explores how a patient perceives their own ability to adopt and maintain health behaviours required in the treatment of their condition, and has been shown to have a predictive value in terms of long-term patient responses. There is, therefore, a chronological sequence to the focus that each theory adopts and if there is a relationship between the two then it should follow this chronology. The interactive care model proposes that illness perception components predict self-efficacy. This sequence appears theoretically logical, as the illness perception model tends to predict the intention of health behaviour change rather than the actual behaviour change, while Bandura's self-efficacy research is based on predicting actual long-term behaviour change.

These time scales provide a chronological framework for the integrated design of care interventions, suggesting the direction of the relationship – the illness representation components influence the long-term perception of the patient's self-efficacy – creating a more holistic regime to manage both the patient's initial conceptualization of their condition and to develop their perceived ability to cope with their condition and its treatment over the longer term. By incorporating both illness perception and self-efficacy into a single conceptual care model, an explicit framework has been provided for further research and its effectiveness can be evaluated by intervention research studies designed for rehabilitation care.

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Received 5 May 2004; revised version received 6 December 2004