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Coronary heart disease patients' perception of their symptoms and sense of control are associated with their quality of life three years following hospital discharge

Margaret O Lau-Walker, Martin R Cowie and Michael Roughton

Background. Recent intervention studies have attempted to address cardiac rehabilitation patients' illness beliefs to improve care. Their findings were mainly limited to short-term behaviour changes such as return to work or attendance on rehabilitation programmes. Evidence about what aspects of the patients' illness beliefs influence long-term quality of life in cardiac rehabilitation remains sparse.

Objective. To examine the association between coronary heart disease patients' illness beliefs and their quality of life three years after hospital discharge.

Design. A longitudinal prospective survey.

Methods. Coronary heart disease patients ($n = 253$) completed validated questionnaires at three points. Patients' illness beliefs were measured twice: before hospital discharge and nine months after discharge – using the Illness Perception Questionnaire. Quality of life was assessed as the outcome measure at three years after discharge, using the Health Survey SF36v2 questionnaire. Demographic, illness characteristics and cardiac rehabilitation attendance were also assessed.

Results. Two multiple regression analyses were performed with each of the SF36v2 physical and mental health summary scores as outcome variables. Analysis of baseline data showed 43% of the variance in the physical health summary score at three years was accounted for by a perceived lower number of symptoms, belief that the illness was controllable, admission as an emergency and no previous history of cardiac illness; 22% of the variance in the mental health summary score was accounted for by perceived lower number of symptoms and no previous history of cardiac illness. Repeat analysis using the data collected nine months after discharge showed similar findings.

Conclusion. Coronary heart disease patients' perception of their symptoms and sense of control at time of discharge were significantly associated with their quality of life three years after discharge.

Relevance to clinical practice. This study promotes the use of the assessment of patients' illness beliefs as a routine practice to improve care.

Key words: nurses, nursing, patient belief, quality of life

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Introduction

Current cardiac rehabilitation guidelines and research endorse the need to improve patients' psychological care and suggest that individualised support will improve the effectiveness of cardiac rehabilitation (Thompson *et al.* 1997, NHS 1998, Department of Health 2000, Scottish Intercollegiate Guidelines Network (SIGN) 2002, Sniehotta *et al.* 2006). Psychological interventions improve functional outcome by reducing cardiac symptoms and help recovery and early return to work (Petrie *et al.* 2002). Psychological interventions, however, have no definitive effect on other physical outcomes or mortality (Knight *et al.* 2006, SIGN 2007). It remains unclear what the factors are that support cardiac patients to maintain their lifestyle changes and long-term quality of life (Rees *et al.* 2005). The recent SIGN (2007) on Acute Coronary Syndromes suggests that patients' beliefs about cardiac illness can cause related negative emotions affecting treatment compliance and rehabilitation and to provide effective patient support, these illness beliefs need to be addressed.

The illness representation model (IRM) (Leventhal *et al.* 1984) is prominent in research related to the development of individualised care and is based on the premise that individuals interpret the events that affect them and construct responses and future actions from a rational basis that is unique to each individual patient. These decisions and the subsequent behaviour based on them need to be understood by healthcare professionals to provide an effective framework for long-term care support in rehabilitation. The IRM was formed from empirical data collected in patient interviews. The model suggests that patients' previous experience with illness is organised in a complex memory structure and this is then used to cluster and organise illness knowledge. The model is described as a self-regulating model with three recurring stages. In the first stage, patients actively process their cognitive representations of the health threat and the emotional reactions to it. In the second stage, the representations formed steer the development of action plans for coping with the problem and the emotion. In the third stage, appraisal of the coping response determines whether the action taken moved the individual closer to or further from the goals specified by the representation. In this way, the three recurring stages guide an individual's coping or adaptive behaviour (Leventhal *et al.* 1984).

The IRM is widely used to explain how people interpret and cope with current and potential health events or threats (Petrie & Weinman 1997). Leventhal emphasised the need to look at a patient's everyday beliefs and procedures for coping with health threats rather than their personality and is consistently described as having five components: identity, cause, timeline, consequences and control/cure. Using these components to research patient perceptions and behaviours, the illness representation theory has been seen as an important framework to predict the patients' capacity to cope and to develop interventions to facilitate self-management in chronic illness.

Research using the IRM provides evidence of the importance of patients' illness beliefs in the management of their recovery in a variety of illnesses and rehabilitation contexts (Leventhal *et al.* 1980, Petrie & Weinman 1997). In cardiac rehabilitation, a small number of intervention studies have attempted to address patients' illness beliefs to improve outcomes, mainly focusing on short-term behaviour changes such as return to work or attendance on rehabilitation programmes (Petrie *et al.* 1996, 2002, Cooper *et al.* 1999). Few studies have addressed which aspects of illness beliefs most influence the long-term health outcomes in cardiac rehabilitation (Bennett & Carroll 1994, Linden *et al.* 1996, McGee *et al.* 1999). The current promotion of the use of cognitive therapy and motivational interview techniques in facilitating health behaviour changes in cardiac rehabilitation (Coats *et al.* 1995, SIGN 2002) would benefit from a more precise understanding of the specific illness beliefs that influence long-term health outcomes. The consistency of numerous research findings identifying the illness representation framework as a predictor of health outcomes has led to the creation of a psychometrically sound Illness Perception Questionnaire (IPQ), (Weinman *et al.* 1996, Moss-Morris *et al.* 2002). This instrument was used in this study to examine coronary heart disease (CHD) patients' perception of their illness.

While patients are likely to place the importance of the limitations imposed by their illness on their day-to-day activities, which adversely affect quality of life over and above the severity of their medical condition (Wenger *et al.* 1984), doctors tend to focus on the specific adverse signs and symptoms thought to be generated by the severity of disease or its prognosis (Brown *et al.* 1999) or even significantly underestimate patients reported symptoms of their physical illness (Calkins *et al.* 1991). This lack of a shared focus is likely to lead to a sub-optimal improvement of the patients' quality of life after cardiac illness. Patients perceive the physician to be the healthcare professional who can best teach them about most aspects of their illness post-MI when compared with nurses, although the physician is not always the preferred information provider (Scott & Thompson 2003). A more precise understanding of the relationship between specific illness beliefs that influence patients' health status in the long-term could provide both nurses and physicians with evidence to develop effective communication and treatment to promote patient's quality of life. To date information about what factors help cardiac patients to maintain their long-term lifestyle behaviour changes remains sparse. An examination of the relationship between patients' perception of their illness and their health related quality of life in a three-year follow-up study could be of value.

This study sought to examine a cohort of CHD patients' illness beliefs up to three years after their cardiac diagnosis. We investigated the relationship between the patients' illness beliefs regarding their cardiac condition following their cardiac diagnosis and their quality of life three years later. Health Survey SF36v2 (SF36v2) was used to measure the patients' quality of life. It consists of a set of 36 generic questions and has been used to assess patient's quality of life in a range of diseases. SF36v2 has been validated for use in the UK has been developed to assess patients' general health status and was used as patient outcome measures in this study (Garratt *et al.* 1993, Ware *et al.* 2000, Garrett *et al.* 2002).

Hypothesis

Patients' illness beliefs at the time of hospital discharge are associated with their quality of life three years after hospital discharge. Patient's demographic (age, gender, employment and living arrangements) and illness characteristics (diagnosis, history of previous cardiac illness and admission via emergency or elective route) were also assessed.

Methods

A prospective longitudinal survey of a cohort of 253 consecutive patients admitted to two hospitals in southern England with a discharge diagnosis of myocardial infarction or angina were recruited for this study over a period of 11 months. The primary aim of the study was to assess the association between patients' illness beliefs and their quality of life. Patients' demographic, illness characteristics and attendance at a cardiac rehabilitation programme were also included in the multiple regression analysis.

Patients completed two prevalidated questionnaires, the IPQ and SF36v2. They completed the IPQ twice, firstly in hospital before discharge (T1) before attendance at any organised rehabilitation programme and then at nine months after hospital discharge (T2) when they were likely to be managing on their own, away from any active rehabilitation programme. Three years after hospital discharge (T3), they completed the SF36v2 which assess their quality of life. Patient's demographic (age, gender, employment and living arrangements) and illness characteristics (diagnosis, history of previous cardiac illness and admission via emergency or elective route) were also recorded at baseline.

Participants

The sample size of the survey was derived from the simple rule of thumb equation that $n > 50 + 8m$ (m being the number of independent variables) for multiple regression analysis) (Tabachnick & Fidell 2001). The equation assumes a medium-size effect between independent and dependent variables and the significant level of $\alpha = 0{\cdot}05$, 80% power. It was estimated that a sample size of 130 patients was sufficient for 10 independent variables to be entered into the multiple regression model simultaneously. We had a return of 140 completed questionnaires at T3 and the sample was sufficient as only a maximum of nine independent variables were required to be entered into the multiple regression model simultaneously in the analyses.

Patients aged 18 or above, with a confirmed diagnosis of myocardial infarction or angina and who were admitted to one of two participating local hospitals in southern England were included in the study. Patients unable to complete the questionnaire unaided were excluded from the study. Three hundred questionnaire packs were issued directly to cardiac patients by clinical staff over a period of 11 months, 253 were returned completed while the patients were in-patients. The only recorded reasons for not participating were that patients had eyesight problems or were too confused at the time to fill in the questionnaire.

Of the 253 participants at T1, 194 (77% at T2) completed the follow-up questionnaire nine months later. Five returnees were removed from the sample because they did not confirm a cardiac diagnosis and the decision was made to exclude them from the analysis. Of the 54 non-returnees at T2, five had died, four had moved; there was no information for the remaining 45. Of the 194 T2 participants, 140 (72%) completed the second follow-up questionnaire at T3, three years after hospital discharge. Of the 54 non-returnees at T3, six had died, three had moved and there was no information for the remaining 45.

Procedure

Cardiologist consultants and nursing directors in the target hospitals gave approval to access cardiac patients for the study. Ward staff distributed coded questionnaire packs to patients who had been admitted to hospital with a diagnosis of angina or myocardial infarction before their hospital discharge. A researcher visited each hospital daily to check and support the data collection process and answer queries from staff and patients. The T1 questionnaire packs consisted of:

- a letter from the researcher inviting patients to participate in the study;
- a participant information sheet to enable patients to make an informed decision about participation;
- a consent form;
- a questionnaire to collect patients' illness perceptions and demographic and medical data;
- a stamped return addressed envelope.

The T2 and T3 follow-up questionnaires packs were administered by mail, with a four-week postal reminder to non-respondents nine months and three years, respectively, after completion of the initial questionnaire. The content of the T1 and T2 questionnaire packs were the same, while the T3 questionnaire pack included the SF36v2 quality of life measure instead of the IPQ, given the concern of the length of the questionnaire. All three questionnaire packs and the research protocol for this study were approved by the Local Research Ethics Committees.

Measures

Independent variables

Patients' illness beliefs were measured using the well-validated IPQ (Weinman *et al.* 1996) based on the IRM. It consists of five components:

- 'Identity': 10 questions to assess the frequency of various symptoms a patient may experience in his/her illness;
- 'Timeline': three questions to assess the individual's belief about the duration of the illness and whether it will be acute, chronic, episodic or cyclical in nature;
- 'Consequences': seven questions to assess individual perceptions about the effects of physical, social, economic and emotional consequences;
- 'Control/cure': six questions to assess individual perceptions about the degree of control the individual feels they have over the illness and whether they believe it to be curable;
- 'Causes': a list of 10 items each representing a specific causal belief. The 10 items can be divided into two groups 'internal causes – five items' – causes resulting from the individuals' own behaviour (e.g. poor diet or lack of exercise) and 'external causes – five items' – causes that cannot be the result of the individuals' behaviour (e.g. heredity or poor medical care) (Weinman *et al.* 1996).

Dependent variables

Quality of life was assessed using the SF36v2 questionnaire which measures health-related quality of life in eight domains providing a summary score for physical health and one for mental health.

The Physical Health Summary Component (21 items) represents four domains:

- physical functioning (10 items);
- role limitation because of physical problems (four items);
- bodily pain (two items);
- general health perception (five items).

The Mental Health Summary Component (14 items) represents the four domains:

- vitality/energy (four items);
- social functioning (two items);
- role limitation because of emotional problems (three items);
- Mental Health (five items).

Analysis

Multiple regression analyses, employing longitudinal data, were used to assess the influence of cardiac patients' IPQ scores both initially in hospital (T1) and at nine months (T2), on their SF36v2 quality of life physical health and mental health summary scores measured three years from their hospital discharge. The primary aim of the study was to assess the association between patient illness beliefs and their quality of life. The demographic, illness characteristics and attendance at a cardiac rehabilitation programme were also included in the analyses as controls.

All variables were first tested using simple regression analysis and then a forward selection method employed to select the variables for inclusion in a multiple regression model. Entry into the multiple regression model was determined by testing whether a variable improved the F-statistic for the model by an amount corresponding to $p < 0{\cdot}05$. In the multiple regression analysis, each of the independent variables was evaluated in terms of its independent predictive power, over and above all the other independent variables entered in the model. All regression results are reported as beta coefficients along with 95% confidence intervals. Normality probability plots and residual scatter plots were used to test the normality assumptions for the multiple regression models. All analyses were performed using SPSS version 11.0 (SPSS Inc., Chicago, IL, USA).

Results

Patients' demographic, illness characteristics and their illness representation components scores at baseline are listed in Table 1. The average age of the participants was

65 years; 79% were male; 50% had acute myocardial infarction and 50% had angina; 61% had no previous history of cardiac illness; 55% had admitted to hospital via an emergency route; 16% lived on their own; 38% were in employment (the not in employment categories include patients who have retired) and 57% subsequently attended the hospital outpatient cardiac rehabilitation programme (Table 1).

Association between illness beliefs at time of discharge and physical quality of life three years after discharge

Univariate regression analysis of T1 data suggested that higher physical quality of life three years after hospital discharge was associated with patients who were younger, male, in employment, had no previous history of cardiac illness, were admitted as an emergency admission rather than elective, reported a lower number of symptoms and felt their cardiac condition was controllable (Table 2a). On multivariate analysis, 43% of the variance in the physical quality of life summary score at three years after hospital discharge was accounted for by the following four variables: 'identity', 'control/cure', 'emergency admission' and 'history of cardiac illness' (Table 2a).

Table 1 Summary of patients' demographic, illness characteristics and Illness Perception Questionnaire (IPQ) scores at baseline (n = 253)

Demographic	*n*	Frequencies (Per cent)
Gender		
Male	253	195 (78·6)
Female		53 (21·4)
Age (years), mean (SD) = 65·3 (10·8); Range = 43–93		
<65	248	109 (43·1)
>65		144 (56·9)
Living arrangement		
Live on your own	249	40 (16·1)
Not on your own		209 (83·9)
Employment status		
Employed	249	94 (37·8)
Not employed		155 (62·2)
Illness characteristics variables		
Cardiac diagnosis		
Angina	223	112 (50·2)
Myocardial infarction		111 (49·8)
Previous cardiac history		
No	248	151 (60·9)
Yes		97 (39·1)
Route of admission		
Emergency admission	246	136 (55·3)
Elective admission		110 (44·7)

Association between illness beliefs nine months after discharge and physical quality of life three years after discharge

Univariate and multivariate regression analyses of the data collected at nine months after hospital discharge (T2) indicated that the same three factors ('identity', 'control/cure' & no previous history of cardiac illness), found in the baselines (T1) analysis (Table 2a), were also factors that made a significant contribution to the physical quality of life summary score three years after hospital discharge. In addition, patients' age were also found to be significant in the multiple-regression model, with older patients having a lower quality of life. Overall, 53% of the variance in the physical quality of life summary score was accounted for by these four variables (Table 2b).

Association between illness beliefs at time of discharge and mental quality of life three years after discharge

Univariate regression analysis showed that mental quality of life was associated with several factors (Table 3a). On multivariate analysis only 'identity' and 'history of cardiac illness' were significantly associated with the mental quality of life summary score, accounting for 22% of the variance in the model. Patients who perceived a lower number and frequency of cardiac symptoms and those who did not have a previous history of cardiac disease had better mental quality of life three years after discharge.

Association between illness beliefs nine months after discharge and mental quality of life three years after discharge

Analysis of the T2 measures (Table 3b) show that 'identity', 'control/cure' and 'internal causes' were significantly associated with mental quality of life summary scores at three years after hospital discharge, accounting for 32% of the variance in the model. Patients who perceived a higher number and frequency of cardiac symptoms, felt their cardiac condition was not controllable and who believed the causes of their cardiac problems were influenced or results of their behaviour, had a lower mental quality of life summary scores three years after hospital discharge. Of these three variables, only 'identity' (at the time of discharge from hospital T1 and at nine months after hospital discharge T2) was significantly associated with mental quality of life three years following hospital discharge (Table 3a,b). Inspection of the regression diagnostic plots gave no reason to doubt the assumptions underpinning the multiple regression models.

Table 2 Regression analysis for Illness Perception Questionnaire (IPQ) and patient characteristics on Physical Health Summary Component at baseline and nine months

	Coefficient (95% CI)	*p*-value	Adjusted R^2
a) Physical Health Summary Component – baseline results			
Univariate regression			
Age	−0·22 (−0·42, −0·02)	0·028	0·029
Male	6·42 (1·45, 11·38)	0·012	0·04
Living alone	−2·79 (−8·27, 2·69)	0·315	0
Employed	5·84 (2·08, 9·6)	0·003	0·06
Angina	−1·17 (−5·17, 2·84)	0·564	−0·005
History	−7·74 (−11·69, −3·79)	< 0·001	0·096
Emergency admission	3·99 (0·19, 7·78)	0·039	0·025
Identity	−13·56 (−16·81, −10·32)	< 0·001	0·338
Timeline	−0·56 (−3·18, 2·07)	0·676	−0·006
Consequences	−1·57 (−4·42, 1·28)	0·277	0·001
Control/Cure	6·64 (3·34, 9·93)	< 0·001	0·101
External causes	−0·13 (−4·11, 3·86)	0·950	−0·008
Internal causes	−1·81 (−4·75, 1·13)	0·225	0·004
Multiple regression			
Identity	−11·99 (−15·12, −8·87)	< 0·001	0·428
Cure/control	4·07 (1·34, 6·8)	0·004	
Emergency admission	3·19 (0·27, 6·1)	0·033	
History	−3·83 (−7·09, −0·56)	0·022	
b) Physical Health Summary Component – nine-month results			
Univariate regression			
Age	−0·22 (−0·42, −0·02)	0·028	0·029
Male	6·42 (1·45, 11·38)	0·012	0·04
Angina	−1·17 (−5·17, 2·84)	0·564	−0·005
History	−7·74 (−11·69, −3·79)	< 0·001	0·096
Emergency admission	3·99 (0·19, 7·78)	0·039	0·025
Attend cardiac rehabilitation (CR)	3·82 (0·06, 7·58)	0·046	0·023
Identity	−16·51 (−19·66, −13·36)	< 0·001	0·446
Timeline	−2·78 (−5, −0·56)	0·014	0·038
Consequences	−2·98 (−5·64, −0·32)	0·028	0·029
Control/Cure	7·84 (5·19, 10·49)	< 0·001	0·201
External causes	−1·61 (−4·95, 1·73)	0·341	0
Internal causes	−0·68 (−3·22, 1·87)	0·600	−0·005
Multiple regression			
Age	−0·71 (−0·31, −0·03)	0·017	0·534
Identity	−14·04 (−17·19, −10·89)	< 0·001	
Cure/Control	3·69 (1·45, 5·94)	0·001	
History	−2·61 (−5·58, 0·35)	0·083	

Overall, the analysis of the patients' illness beliefs measured at T1 before discharge and at T2 nine months after discharge provided consistent findings, which strengthen the suggestion that patient illness belief predicts their quality of life three years after hospital discharge. Three factors – low frequency of symptoms, no previous history of cardiac illness and the belief that the illness is controllable are associated with better physical and mental quality of life three years after hospital discharge with 'identity' accounting for the highest percentage of variance in both physical and mental quality of life at three years (Tables 2 and 3).

Discussion

Previous research has suggested that patients' 'perceived symptoms' have influenced patients short-term decision making about seeking medical help or making decisions about their treatment (Baumann & Leventhal 1985, Meyer *et al.* 1985, Johnson & King 1995, Siegel *et al.* 1999, Pattenden *et al.* 2002). Other research taking short-term health outcomes as an indicator suggests that patients with the stronger belief that their condition is controllable are likely to attend cardiac rehabilitation (CR) programmes and to return to work early (Petrie *et al.* 1996, 2002, Cooper *et al.*

Table 3 Regression analysis for Illness Perception Questionnaire (IPQ) and patient characteristics on Mental Health Summary Component at baseline and 9 months

	Coefficient (95% CI)	*p*-value	Adjusted R^2
a) Mental Health Summary Component – baseline results			
Univariate regression			
Age	−0·04 (−0·22, 0·15)	0·69	−0·006
Male	4·26 (−0·33, 8·84)	0·068	0·018
Living alone	−2·06 (−7·06, 2·95)	0·418	−0·003
Employed	3·78 (0·29, 7·28)	0·034	0·027
Angina	1·47 (−2·27, 5·19)	0·439	−0·003
History	−6·11 (−9·76, −2·46)	0·001	0·07
Emergency admission	−0·59 (−4·11, 2·92)	0·739	−0·007
Identity	−9·37 (−12·67, −6·07)	< 0·001	0·188
Timeline	−0·89 (−3·28, 1·49)	0·461	−0·004
Consequences	−2·87 (−5·44, −0·31)	0·029	0·029
Control/Cure	3·64 (0·52, 6·76)	0·023	0·032
External causes	−0·8 (−4·45, 2·82)	0·658	−0·006
Internal causes	−4·05 (−6·66, −1·45)	0·003	0·059
Multiple regression			
Identity	−8·51 (−11·84, −5·19)	< 0·001	0·22
History	−4·27 (−7·71, −0·82)	0·015	
b) Mental Health Summary Component – nine-month results			
Univariate regression			
Age	−0·04 (−0·22, 0·15)	0·690	−0·006
Male	4·26 (−0·33, 8·84)	0·068	0·018
Angina	1·47 (−2·27, 5·19)	0·439	−0·003
History	−6·11 (−9·76, −2·46)	0·001	0·07
Emergency admission	−0·59 (−4·11, 2·92)	0·739	−0·007
Attend cardiac rehabilitation (CR)	0·42 (−3·09, 3·94)	0·813	−0·007
Identity	−11·78 (−15·16, −8·4)	< 0·001	0·261
Timeline	−2·19 (−4·27, −0·12)	0·038	0·025
Consequences	−4·86 (−7·23, −2·49)	< 0·001	0·105
Control/Cure	4·78 (2·13, 7·42)	< 0·001	0·082
External causes	1·13 (−1·97, 4·23)	0·471	−0·004
Internal causes	−3·06 (−5·37, −0·75)	0·010	0·043
Multiple regression			
Identity	−9·85 (−13·34, −6·36)	< 0·001	0·315
Control/Cure	3·14 (0·67, 5·62)	0·013	
Internal causes	−3·02 (−5·03, −1·02)	0·003	

1999). The value of the current study is the examination of associations between illness belief components and quality of life in the long term.

This study suggests that three illness belief components are significantly associated with a cardiac patient's physical and/or mental quality of life three years after their discharge from hospital. The three components are: the number and frequency of the symptoms patients attributed to their cardiac condition ('identity'), their belief regarding the extent to which their cardiac condition could be controlled ('control/cure'), both of which contributed importantly to both physical and mental quality of life; while beliefs about the 'causes' of their cardiac condition make a significant contribution to mental, but not physical, quality of life. These findings suggest that patients who attribute more symptoms to their condition and have less sense of control over their condition, are likely to have poor physical and mental quality of life in the long term. This might indicate that these patients are less able to manage their symptoms as effectively as those with a higher sense of control, who identify fewer symptoms and healthcare support should be differentiated to address these differences in perception.

Effective support for CHD patients needs to focus on the understanding of the patient's perspective and what specific aspect of the patient's beliefs influences their long-term quality of life. Facilitation to support patients to be more positive about managing their illness generally and to cope with the consequences resulting from their illness, however, will not in itself necessarily promote an improved quality of life in the long term. Rather, interventions designed to improve patients' quality of life could benefit from directly improving patients' ability to manage their symptoms and increase their sense of control about their illness. Clinical interventions to support patients in the management of their illness symptoms, changing their perception of their illness identity and increasing their sense of control of their illness are more likely to lead to improved patients' quality of life in the long term.

Beliefs about the causation of the illness make a significant contribution to mental, but not physical, quality of life. Indeed, those individuals who viewed their lifestyle behaviour as unlikely to have caused their cardiac condition nine months after discharge had a better general mental health status three years later. This might suggest that the patients who do not 'blame' themselves for the development of their heart problems might enjoy better mental health, though this in itself has been found to have serious implications for their commitment to effect or sustain long-term lifestyle changes (Petrie *et al.* 2002). The promotion and support of cardiac patients' long-term health behaviour change might be improved, if the change in patients' beliefs about the cause of their illness over time is anticipated and managed by cardiac rehabilitation healthcare practitioners. When practitioners encourage patients to maintain health behaviour changes they need to reinforce the belief in internal causes of the condition to avoid the danger that once patients no longer view their health behaviour contributed to their cardiac illness they are less likely to maintain their lifestyle or health behaviour changes.

Finally, though some of the patients' demographic and illness characteristic factors recorded in this study made a small but significant contribution to their quality of life three years after hospital discharge, the strength of these relationships reduced over time, which is in contrast to the findings on patients' illness beliefs. In current clinical practice, patients' illness beliefs are not routinely recorded or assessed unlike illness characteristics such as diagnosis, history of illness and route of admission. Indeed, patients' illness beliefs are often seen as something 'special' that require a specialist practitioner to extract the relevant information. Few practitioners view patients' illness beliefs as important in informing the planning of care. This study suggests that illness beliefs could influence patients' long-term quality of life and, therefore, to be effective in supporting patients' long-term care, it would be useful if healthcare practitioners such as doctors, nurses, physiotherapists, dieticians and occupational therapists are more aware of patients' illness beliefs and, more importantly, use this information to inform the planning of care and support.

Limitations

While the findings of this study have identified statistically significant associations between patients' illness beliefs in their quality of life three years later, the evidence for causal association would be strengthened by an experimental interventional study with a control group. Interpretation of the findings also needs to be cautious as data were collected using self-reported questionnaires rather than the measure of patients' actual behaviour. The study population was predominantly white (97·9%), reflecting the demographics of the catchment area of the two hospitals. An ageing patient cohort with a serious medical condition could have contributed to a high a drop out rate at three years from the initial data collection. However, comparison of demographic and illness characteristics between respondents and non-respondents at T2 showed no significant difference and at T3 showed no significant difference except for gender. A higher proportion of responders were male compared with the non-responders (83–72%, respectively, $p = 0{\cdot}05$ at T3). Gender as a characteristic was not found to be significant in the multiple regression analysis. The association of social support and quality of life was not the primary objective of this study and their relationship has not been assessed.

Conclusion

Patients who perceived a lower frequency of symptoms and have a higher sense of control of their illness, have a better physical and mental quality of life three years after hospital discharge. These associations are stronger than for those with demographic variables, illness characteristics or attendance at CR programme. Interventions that provide continued support to patients in the management of their perceived symptoms and that promote a patient's sense of control are likely to promote patients' quality of life in the longer term.

Implication for clinical practice

This study suggests that the patient's perception of symptoms is the most important illness belief component in the management of chronic illness and for the improvement of quality of life in the long-term, which provide a useful focus for the conduct of cognitive therapy and motivational interview that aim to promote individuals' positive health beliefs. Study findings recommend that the design of interventions to provide continued support to patients in the management of their perceived symptoms, promote patients' sense of control and understand the causes of the illness are important illness components that promote individuals' quality of life in the long term. Awareness of the importance of the management of patients' perception of their symptoms, rather than just managing patients' actual displayed clinical symptoms, are likely to improve the communication between healthcare professionals and patients. The more effective the support for patients to manage their perceived symptoms, the more likely is their increased sense of control, which is likely to optimise their long-term quality of life following hospital discharge.

Contributions

Study design: MLW; data analysis: MLW, MR and manuscript preparation: MLW, MC.

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