

Illness perception, self-care behaviour and quality of life of heart failure patients: a longitudinal questionnaire survey

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Abstract

Objectives: To examine the associations between illness perception, self care behaviour, and quality of life in patients admitted to hospital with a primary diagnosis of heart failure (HF), and the changes in these at 2 and 6 months after discharge.

Design: Longitudinal questionnaire-based study.

Setting: Three London hospitals with specialist heart failure services.

Participants: A convenience sample of 88 patients (70% male, mean age 70) admitted to hospital with a primary diagnosis of heart failure were recruited prior to discharge. Participants were over the age of 18, able to understand English, and with the cognitive ability to complete the questionnaires. Thirty-eight patients did not provide follow-up data: 21 (24%) died during the six month follow-up period, and 17 (19%) did not return their post-discharge questionnaires.

Methods: The Revised Illness Perception Questionnaire, the Self-Care Heart Failure Index, Hospital Anxiety and Depression scale, and the Minnesota Living with Heart Failure (MLHF) Questionnaires were completed prior to discharge from hospital, and two and six months after discharge.

Results: HF symptoms improved over time (MLHF score co-efficient [95%CI] -0.915 [-1.581, -0.250], $P < 0.001$). Patients appeared to believe that many of the causes of their illness were outside their control. Although self care maintenance (e.g. weighing daily) improved over time, this did not translate into increased involvement in self care management (e.g. adjusting diuretic dose) or the ability to act on changes in symptoms. Self care confidence was lower in those who reported a more negative emotional impact of their illness, but was higher in those who had high scores on illness coherence.

Conclusions: Six months following hospital discharge, patients' symptom control had improved. Many continued to believe that their illness was outside their control, and although self-care maintenance improved this was not associated with greater self-care management, particularly if the patient's emotional state was negative, and their understanding of their condition was poor. Our data suggest that a more participative person-centred approach, tailoring the disease management programme to address the patient's illness beliefs and emotional state, assisting the individual to identify barriers and solutions, may help increase self-care confidence and management.

Keywords: Heart failure; Quality of life; Illness perception; Self-care; Disease management

What is already known about the topic?

- Heart failure is a chronic condition that undergoes intermittent decompensation: symptom control can be improved by self-monitoring and self-management, where appropriate
- Providing education is not sufficient to ensure adequate self management and behaviour change
- Understanding a patient's perception of their illness facilitates a more tailored approach to an individual's anxieties, and possible misconceptions about their illness and treatment

What this paper adds?

- Many patients may think that their heart failure is caused by factors outside their control
- There is a strong association between a patient's emotional representation of their illness (anxiety, depression and emotional symptoms) and their attitude towards self care
- Patients' confidence in self-care and self care monitoring increase in the six months after hospital admission, but self-care maintenance does not
- The effectiveness of a heart failure disease management programme may be improved by taking a more person-centred approach: using a more formal assessment of an individual's beliefs, behaviour and emotional state to tailor the healthcare professional's input.

Background

Heart failure is one of the most common reasons for bed occupancy, emergency medical admission and readmission to hospital (NICOR 2012). The most recent national audit in England by The National Institute For Cardiovascular Outcomes Research (NICOR) reports a median length of stay of 9 days, a 12% inpatient mortality, and a mortality of around 35% at 12 months in those who survive to leave hospital (NICOR National audit 2012). Additionally, the readmission rate is high with 51% of patients either dead or readmitted at 10 months after discharge (NICOR 2012). Access to a HF management programme runs at around 50% of all patients, with access poorer in older patients.

In the high-risk period following hospital discharge, guidelines from the National Institute for Health and Clinical Excellence (NICE) suggest that patients should be followed up, and supported to self-care, if that is what they wish to do (NICE 2003 and 2010). International guidelines, such as those from the European Society of Cardiology (McMurray et al 2012), suggest that multidisciplinary management programmes are fundamental to improving patient outcomes, with structured follow-up and patient education, optimization of medical treatment, psychosocial support and improved access to care. There is emphasis on co-ordination of care, and the provision of 'adequate' patient education, with special emphasis on adherence and self-care, and patient involvement in symptom monitoring and flexible diuretic use (McMurray et al 2012).

At policy level, many healthcare systems are keen to empower people living with long-term conditions, such as heart failure, to self-care if they so wish. It is recognised that a patient's 'journey' with a long-term condition involves the development of an understanding of their needs for internal resources and external support, so that the condition and its management can be integrated into their lives in such a way that their quality of life is maximised (Dept of Health 2006).

The impact of any long-term condition on an individual, and that individual's ability to optimise self care, are related to many factors, including: a) the perception or actual severity and nature of the underlying condition; b) the short, medium and long-term impact of the condition on the individual's ability to undertake normal activities of daily living; c) the persons' beliefs, understandings and expectations around the condition, and the perceived role health and social care can play in providing a cure, care or support; d) how much the patient participates in or avoids self-caring as a result of these beliefs; e) the effect of symptoms, loss of control and loss of role on a patient's morale and

mental health and the way in which they want to live their lives; and f) healthcare professionals' beliefs and expectations in providing care, cure or support. (Dept of Health 2006).

It is increasingly recognised that a more person-centred approach – working to support self-care where appropriate and desired – requires a change in professional role for doctors and nurses. Currently, there is a tendency for professional guidelines to focus on identifying an illness or medical problem, deciding how to treat it, and making sure a treatment regime is followed. In contrast, increasingly confident and well-informed patients living with a long-term condition are recognised as an 'expert' in their own right – they know more about living with their condition than anyone else – and the relationship between the patient and professional is considered a meeting between two experts, sharing knowledge. (Tuckett D 1985). A motivational style of discussion can then help modify the way people seek help by challenging their beliefs about their health and condition, and treatment, supporting them to identify barriers and solutions as they move towards optimal self-care. A more 'person-centred' approach may improve the outcome and experience of care for patients, with evidence for benefit for a range of conditions, including coronary disease (Ekman 2012), asthma (Effing 2007) and diabetes mellitus (Warsi 2004).

There is growing evidence that an individual's health related beliefs are modifiable and contribute to positive patient outcomes (Broadbent et al 2009). Effective patient education should address individual beliefs about illness and its treatment, and provide strategies to promote patient confidence to manage self-care (Bandura, 1997, Lorig et al, 1999, Mullen et al, 1992, Baker et al 2005).

Self-care management for heart failure includes maintenance of weight, diet, physical activity, symptom management, and compliance with medication, and requires confidence and the ability to manage specific symptoms. Little is known about why some people master heart failure self-care and others do not: teaching patients about heart failure does not necessarily translate into behavioural change sufficient to avoid hospitalisation (Artinian et al, 2002, Sneed and Paul, 2003, Moser et al 2008).

As disease management programmes move towards a more person-centred approach, we wished to increase our understanding of changes in individual's illness beliefs, self-care, emotional state, and quality of life after admission to hospital with heart failure.

Aim

The aim of this study was to describe the association between heart failure patients' perception of their illness and how they maintain their self-care after discharge from hospital.

Objectives

- To explore the association between a heart failure patient's perception of illness and their quality of life at 6 months after discharge from hospital
- To explore the association between a heart failure patient's perception of the symptoms, causes, consequences, and length of illness, and their attitude towards self-care management

Methods

A prospective, longitudinal survey was carried out with heart failure patients who were admitted to one of the three participating hospitals in central London, England (Charing Cross Hospital, Chelsea and Westminster Hospital, and the Royal Brompton Hospital). Each of these hospitals had a heart failure multidisciplinary team, and managed patients according to the relevant national (NICE 2010) and international guidelines (McMurray et al 2012). After informed consent, the participants completed a set of validated questionnaires (Revised Illness Perception Questionnaire [IPQ-R] (Moss-Morris et al, 2002), Hospital Anxiety and Depression Questionnaire [HAD] (Zigmond and Snaith, 1983), Self-Care Heart Failure Index [SCHFI] (Riegel et al 2004), and the Minnesota Living with Heart Failure Questionnaire (Rector and Cohn, 1992)) three times: initially in hospital prior to discharge, and then at two and six months after discharge. If the post-discharge questionnaires were not returned after an initial mailing, the patient was telephoned and a second set of questionnaires was sent. The study enrolled patients over a period of 15 months (January 2009 to March 2010). Patients' demographic data were collected.

Ethical approval was obtained from the Royal Brompton and Harefield & NHLI Ethics committee (Ref 07/Q0404/2) and the study was registered with the Research and Development Departments at each hospital.

The Questionnaires

The Illness Perception Questionnaire (IPQR)

This questionnaire is a quantitative measure of seven cognitive and emotional 'representations' of illness. (Moss-Morris et al, 2002) A score is derived from a number of statements rated on a five-point Likert scale. The items are: Timeline Acute, Timeline Cyclical, Consequences, Personal Control, Treatment Control, Illness Coherence, and Emotional Representation. In addition an identity score is calculated from a number of symptoms listed that the patient attributes to their illness. A third section addresses the patients' perception of the causes of their illness.

High scores on the identity, timeline, consequences, and cyclical dimensions represent strongly held beliefs about the number of symptoms attributed to the illness, the chronicity of the condition, the negative consequences of the illness, and the cyclical nature of the condition, respectively. High scores on the personal control, treatment control and coherence dimensions, represent positive beliefs about the controllability of the illness and a personal understanding of the condition (Moss-Morris et al 2002). Emotional representation incorporates negative reactions such as fear, anger, and distress (Broadbent 2006) and asks patients to rate statements such as 'I get depressed when I think about my illness', and 'My illness makes me feel afraid'.

The Self-Care Heart Failure Index

This questionnaire has seventeen items, which are scored to form three scales: self-care maintenance (monitoring behaviours that potentially prevent heart failure exacerbation), self-care management (the ability to recognize and respond appropriately to symptoms) and self-care confidence (perceived ability to engage in self-care). (Riegel et al 2004) Higher scores indicate a great degree of self care.

The Hospital Anxiety and Depression Scale (HADS)

The HADS scale is a 14-question scale which gives a score for both depression and anxiety (Zigmond and Snaith, 1983) The scores are categorised into borderline (8-11) and probable (more than 11) anxiety and depression.

The Minnesota Living with Heart Failure Questionnaire (MLWHF)

The MLWHF Questionnaire provides a heart failure-specific quality of life score, with subscores for both emotional and physical symptoms (Rector and Cohn, 1992). Higher scores indicate poorer quality of life. It uses a 6-point Likert scale to assess 21 effects of symptoms, functional limitations, and psychological distress.

Sample size

The sample size was calculated using assumptions to detect a certain strength of association between IPQ 'control and cure' and self-efficacy based on a regression model. Based on a previous study (Lau-Walker 2007) of patients with acute coronary syndromes, we expect the relationship between illness representation component 'control and cure' and mean general self-efficacy to be described by a regression line with a Beta coefficient of 0.2, with an SD for the illness representation control component of 0.7 and an SD for mean general self-efficacy of 0.6. Based on these estimates 139 patients would be required in order to achieve 80% power, testing at 5% significance level. (Reference: Sampsi_reg option, Stata version 10, Statacorp, Texas USA) Allowing for an expected mortality of 20% at 6 months, and 20% drop-out we would then need 190 patients.

However due to difficulties recruiting the final total was 88. All the hospitals had heart failure specialist teams of doctors and nurses with chronic disease management programmes to reduce the need for in-patient admissions but their patients were often deemed too sick to participate or had been admitted for implantation of electrical devices rather than exacerbation of symptoms. The original intention had been to recruit patients over one year. This was extended to 18 months but it was felt that to extend it longer could mean that the first patients were receiving different interventions to the last patients as more resources were provided in the community.

Inclusion criteria

Patients admitted with a primary diagnosis of decompensated heart failure, aged over 18, fluent in English, and able to understand the questionnaires, were eligible for the study. Patients admitted for palliative care or device implantation were not approached.

Exclusion criteria

Patients below the age of 18 years of age

Patients unable to understand English sufficiently to answer the questionnaires

Patients with cognitive impairment which prevented them from completing the questionnaires.

Sampling and follow-up

The records of 278 patients with an admission diagnosis of heart failure (in any coded position) were reviewed. Eighty-one of these patients were not admitted with a primary diagnosis of heart failure and were therefore excluded. Five patients had a complex or unclear diagnosis, two patients were post partum and 20 patients were for palliative care only. Of the remaining 170 patients, 24 patients declined to take part, 11 said they did not understand the questionnaires and 21 could not read or write English. Three had no permanent address to send the follow-up questionnaires to, and one was being nursed in isolation. A further 22 patients were confused during their initial admission, leaving a sample of 88 patients who completed the baseline questionnaires. By six months after discharge, 21 (24%) had died, and 17 (19%) did not return their follow-up questionnaires, despite a reminder.

Analysis

Categorical data were presented as percentages and comparisons done using the chi-squared or Fishers exact test. Continuous variables were presented as mean (SD) and comparisons done using t tests. Linear regression was used to assess the strength of relationship between IPQR and Self Care variables with other variables. The variables that showed a significant association were then put in a multiple regression model to assess the variables that were independently associated with the IPQR AND Self Care variables. Missing data from the questionnaires were dealt with in accordance with individual questionnaire instructions. All data were analysed using Stata version 10.1.

Results

Demographic data

The characteristics of the patients recruited at baseline are shown in Table 1. The average age was 70.5 years, and 70% were men. The median length of stay was 8 days. The majority of patients (62%) lived with a partner or family. At time of discharge, 36 (40%) were in NYHA Class II, 25 (28%) were in NYHA Class III, with 9% in either NYHA Class I or IV. Using the HADS scale, 23% of patients were 'probably' depressed at baseline, and a similar proportion of patients were 'probably' anxious.

Follow-up data

By six months after discharge, 21 (24%) had died, and 17 (19%) did not return their follow-up questionnaires, despite a reminder. There were no statistically significant differences in baseline characteristics between those for whom there was no six months follow-up data and those who did complete the six month set of questionnaires (data not shown).

Changes in physical and emotional quality of life

The heart failure-specific quality of life improved from baseline to six months: MLWHF score improving from 57.2 ± 20.7 to 45.7 ± 27.0 ($P < 0.001$). This improvement was due to improvement in the physical aspects of quality of life (coefficient -0.915 [-1.581 to -0.250] $P < 0.001$), with no significant change in emotional aspects of quality of life (coefficient -0.012 [-0.325 to 0.301] $P=0.94$).

There was no significant change in the proportion of patients suffering 'probable' anxiety or depression over the time period with 10/ 50 (20%) depressed and 10/50 (20%) anxious at 6 months compared to 20/ 88 (23%) for both at baseline.

Similarly, there was no significant change in the emotional representation of heart failure across the three time points (coefficient 0.097 [-0.170 to 0.363] $P=0.47$).

Changes in illness perception

The majority of patients suggested that the causes of their heart failure were outside of their control, and this did not change between the time points. The four highest rated causes were: 'ageing' (agreed or strongly agreed 64% at Baseline, 55% at 2 months, 48% at 6 months), 'chance or bad luck'

(45% at baseline, 45% at 2 months, 50% at 6 months), 'hereditary' (41% at baseline, 36% at 2 months, 42% at 6 months) or 'stress or worry' (36% at baseline, 34% at 2 months and 25% at 6 months).

There were no significant changes in the perception of the consequences of heart failure, but the belief that the illness could be controlled by the individual or by treatment declined over time: personal control baseline mean score 19.3 ± 4.7 , dropping to 18.0 ± 4.7 at 2 months, and 18.4 ± 4.6 at 6 months ($P=0.015$), and treatment control mean score at baseline 17.4 ± 2.9 , dropping to 17 ± 3.1 at 2 months, and 16.5 ± 3.3 at 6 months ($P=0.001$).

Patients' perception of the chronicity of their illness increased by 2 months after discharge: baseline timeline acute/chronic mean score 19.8 ± 4.2 , increasing to 22.9 ± 4.2 at 2 months, and 22.8 ± 5.3 at 6 months ($P<0.0001$).

Changes in self care

The self care maintenance score improved by 2 months and was maintained at 6 months (baseline mean score 54.2 ± 12.1 , 2 months 61.2 ± 11.9 and 6 months 61.2 ± 13.1 ; $P<0.0001$). However this was not accompanied by any significant change in either self-care management ($P=0.78$) or self-care confidence ($P=0.45$).

Associations between illness perception and emotional quality of life

On univariate analysis, there was a strong association between emotional representation on the IPQR and the MLWHF emotional score (Adj $R^2=0.52$, $P<0.0001$ at baseline and Adj $R^2=0.51$, $P<0.0001$ at 2 months) and between emotional representation on the IPQR and the HADs anxiety score (Adj $R^2=0.45$ at 2 months, Adj $R^2=0.65$ at 6 months, both $P<0.001$).

There was a strong association between the perception of the consequences of heart failure and the emotional (or physical) quality of life at six months (MLWHF emotional score, Adj $R^2=0.37$ $P<0.0001$, MLWHF physical score Adj $R^2=0.38$ at 6 months, $P<0.0001$). This association was also seen with the HADS at 6 months: Adj $R^2=0.33$ for both Anxiety and Depression, $P<0.0001$)

There was also a strong negative association between those with a strong emotional representation and self care confidence at 6 months ($p < 0.0001$ Adj R^2 0.36) suggesting those patients more emotionally affected by their illness have a lower confidence in their ability to self care.

Conversely, those patients who were able to make sense of their illness had less emotional symptoms at 6 months (Illness Coherence on IPQR negatively associated with MLHF emotional score Adj R^2 = 0.20, $P = 0.01$ and with HADS anxiety score and depression score [$R^2=0.24$ and 0.30, respectively, both $P < 0.0001$]). In addition, self care confidence was positively associated with illness coherence (Adj $R^2=0.22$ $P=0.001$).

Associations between illness perception and self care

Self care confidence is associated with illness coherence at both 2 and 6 months (Adj R^2 0.25, $p < 0.0001$; Adj R^2 0.22, $p = 0.001$, respectively) and negatively associated with emotional representation at 6 months (Adj R^2 : 0.36, $p < 0.0001$). There was no difference in self care maintenance or management by the HADS categories, for either anxiety or depression (Table 3), and little evidence for an association with self care confidence either (except at 6 months). However, at 2 and 6 months those who were probably anxious or depressed had higher identity scores on IPQR (patients reported a larger number of symptoms they attributed to the heart failure), and also higher scores for the perception of the consequences of their illness, and lower scores for illness coherence.

Discussion

Our data show that for those patients surviving at least six months from a hospital admission for heart failure, their physical quality of life improves substantially. They are also, at least in our centres which had heart failure management programmes, more likely to state that they perform self-care maintenance (e.g. monitoring themselves by daily weighing, and assessing the degree of their symptom control) but this is not reflected in increased self-care confidence or management (actions to maintain their health such as changing diuretic dosage or lifestyle changes). Emotional quality of life does not improve, and a high proportion (around 20%) are either anxious or depressed throughout this time period. A high prevalence of depression has been reported previously in patients with heart failure. (Rutledge 2006).

Face validity is given to our findings by the strong association between anxiety or depression and a poor emotional quality of life, and high emotional 'representation' of their illness. Those who score higher for anxiety or depression are less likely to perceive their heart failure and its effects as 'coherent', or to express confidence about self care.

Self-care is recognised as a complex behaviour that may be influenced by a combination of behavioural factors such as depression, anxiety, attitudes, and self-efficacy (Horowitz et al 2004). In focus groups of patients with heart failure, Mead and colleagues (2010) reported that for many patients psychosocial issues (such as feelings of depression or anxiety) associated with their condition were to them as serious as the illness itself. In particular, anxiety and stress over the lifestyle changes they needed to make, 'overwhelmed' them to the point that they sometimes stopped taking their medications or following their doctor's advice.

Other studies have also reported that heart failure patients who are anxious or depressed have more negative beliefs about their heart failure, which is associated with poor coping behaviours (Albert and Zeller (2009) and Hallas et al (2010)).

Interestingly, there was little change in the patient's beliefs about the cause of their illness through the time period, with many giving causes outside their control as the most likely reasons for the development of heart failure. Others have reported a strong link between an individual's personal and cultural beliefs about their illness and self-care and compliance (Baker et al 2005, Van der Wal 2006).

Previous work from our group (Mulligan 2012) examined patients' beliefs and adaptation to heart failure at the time of first diagnosis and then over the next six months in the South East of England. Patients in that study, as in this study, increasingly realised that their condition was a chronic illness, and that it was unlikely to be cured or completely controlled by treatment, although satisfaction with treatment remained high during that period. That study also reported a high prevalence of anxiety and depression during the six months from first diagnosis.

We found that 'illness coherence' was higher in those with a better emotional score on the MLHF questionnaire, and was associated with self care confidence: patients who can make sense of their illness appear to have more confidence to manage it and a better emotional reaction to their ill-health.

Implications and recommendations for practice

Although recent professional disease management guidelines list a large number of topics that need to be covered with people with heart failure, and mention the need to support and empower those who wish to move towards self-care, much remains to be learned about the best model for helping patients to manage their long term condition(s). (Jaarsma and Luttik 2011). More intensive interventions by a multidisciplinary team do not necessarily translate into better outcome for patients (Jaarsma T et al. 2008). The Heart Failure Society of America recommends (2010) that patients should enter individualised multi-disciplinary disease management programmes which 'attack' barriers to behaviour change and promote self care through education and problem solving and motivational counselling. No specific behavioural strategy is endorsed. Others have called for a more 'person-centred' approach, with power shared between the patient and professional in a more participative manner.

Patients' perceptions of the causes of their heart failure affect their attitude towards their illness and ability to self care and therefore need to be discussed on a one-to-one basis. Increasing illness coherence (better understanding of the nature of heart failure, making sense of the chronic condition, and how to monitor and manage it) may improve mood and increase self-care confidence. It is important that any programme takes into account health beliefs, motivation and the patient's individuality (Helman 2000). The patients who have cited reasons they believe as outside their control as the main cause of their heart failure may be less likely to change their health behaviour (Petrie and Weinman 1997).

It is generally acknowledged that psychological assessment and support is a vital part of disease management, although few resources are generally targeted in this direction. Our work would suggest that there is considerable unmet need in this area.

The European Society of Cardiology has recently issued guidelines on self-care management of heart failure (Lainscak et al 2011). This guideline recommends that patients should have tailored education on self-care maintenance and management, and our research suggests that a discussion on health beliefs and perception of their illness is an important component of this. The guideline recommends routine screening for barriers to self-care, the setting of 'mutual' goals, and the detection and treatment of co-existing depression are essential (Lainscak 2011). The theoretical underpinning of such recommendations includes Bandura's Social Cognitive Theory (1997) and Prochaska and DiClemente's Stages of Change Theory (1983). Programmes that focus on developing self-efficacy by using motivational interview techniques, coupled with providing information, encouraging behaviour changes, learning from others, and psychosocial support, have been shown to be effective at improving quality of life in heart failure patients (Brodie et al 2008) and in reducing risk factors in cardiac surgical patients (Goodman 2007). Such an approach is focused on the individual, assessing the patient's motivation and confidence to make behaviour changes. Patients are encouraged to review the barriers to moving from one stage to another. This involves two way communication between the patient and the professional, rather than the latter providing information without due regard for the patient's beliefs and social setting. Barnason and colleagues (2011) have recently reviewed interventions, identifying those that were based on an individual cognitive behavioural approach promote self efficacy and confidence most effectively.

Limitations

Our study is observational, and we can therefore only report associations and changes over time. More definitive evidence for the importance of addressing emotional state and illness belief when attempting to empower patients to self-care would come from randomised controlled trials. Our study is also relatively small, and may not be able to describe weak associations between various measures of illness perception, emotional state, and self-care.

We had difficulty in recruiting patients because of the nature of the illness, and once recruited there was a high drop-out rate due to death. Such difficulties have been reported before in studies targeting patients with advanced heart failure (Fitzsimons and Strachan 2011; Brodie 2008)

The three hospitals involved in this research had specialist heart failure services, so our results may not be generalisable to a district general hospital setting without such a programme. The study

participants were exposed to several health care professionals with an interest in heart failure at various time points, and it is likely that the amount of targeted education and support may well have been more than is typical for more general hospitals or services. Also, we recruited patients during admission to hospital; a different picture may emerge from studies in people who have heart failure but have not been hospitalised.

Conclusions

If more people living with heart failure are to be empowered to self-care, disease management programmes for heart failure should take into account a person's illness beliefs and emotional state when providing education and support. Ensuring a patient can make sense of their illness, understands it is something they can influence, and has underlying anxiety and depression detected and treated will increase the proportion of people who not only self-monitor, but who feel confident to self-manage, taking actions to control the heart failure and its impact on their quality of life. Education is not sufficient on its own: a more person-centred approach is required if patients and professionals are to optimise outcomes. Working with the healthcare professional, the individual living with heart failure should thereby feel supported to gain confidence, identifying barriers to self-care and solutions to such barriers.

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Tables

Age (mean & SD)(years)	70.5 ± 12.8
Median length of stay	8 days (inter-quartile range 2-50)
	n (%)
Gender (Males)	62 (70)
Living Arrangement	
On Own	25 (28)
With partner	33 (37)
With family	22 (25)
Other	5 (6)
Missing	3 (4)
NYHA Class	
I	4 (4)
II	36 (40)
III	25 (28)
IV	4 (4)
Depression	
Normal (< 8)	56 (64)
Borderline (8-10)	12 (14)
Case (>= 11)	20 (23)
Anxiety	
Normal (< 8)	44 (50)
Borderline (8-10)	24 (27)
Case (>= 11)	20 (23)

Table 1: Demographic data

Variable	Coefficient (95% CI)	p
Depression	0.013 (-0.201, 0.227)	0.91
Anxiety	-0.105 (-0.310, 0.100)	0.32
Self care Maintenance	0.962 (0.436, 1.490)	< 0.0001*
Self care Management	-0.111 (-0.896, 0.673)	0.78
Self care Confidence	0.295 (-0.470, 1.060)	0.45
Identity	-0.033 (-0.155, 0.089)	0.60
Timeline Acute	0.482 (0.270, 0.695)	< 0.0001*
Timeline Cyclical	-0.040 (-0.202, 1.226)	0.63
Consequences	0.046 (-0.170, 0.261)	0.68
Personal Control	-0.247 (-0.447, -0.048)	0.015*
Treatment Control	-0.234 (-0.370, -0.097)	0.001*
Illness Coherence	0.055 (-0.129, 0.239)	0.56
Emotional Representation	0.097 (-0.170, 0.363)	0.47
Minnesota – Physical	-0.915 (-1.581, -0.250)	0.001*
Minnesota - Emotional	-0.012 (-0.325, 0.301)	0.94

* Statistically significant

Table 2: Change in means between time points

Time	Identity					
M (SD)	Normal	Border Line	Case (Anxious)	Normal	Border Line	Case (Depressed)
Baseline	4.73 (2.37)	5.88 (2.23)	7.25 (1.92) ***	5.16 (2.40)	5.42 (2.61)	7.00 (1.95)
2 months	4.19 (2.99)	6.50 (3.14)	8.00 (2.41) ***	4.20 (3.18)	5.71 (2.50)	7.56 (2.68) ***
6 months	3.93 (3.12) *	7.11 (2.32)	7.90 (3.31) ***	4.24 (3.24)	6.33 (2.92)	7.70 (3.40) ***
	Consequences					
Baseline	18.85 (3.65)	21.08 (4.28)	22.35 (2.59) ***	19.34 (3.76)	19.75 (3.98)	23.10 (2.83) ***
2 months	20.72 (6.25)	21.60 (3.86)	23.64 (2.84)	20.93 (6.47)	20.57 (4.16)	22.94 (2.95)
6 months	18.79 (3.57) *	22.49 (4.04)	23.80 (4.16) ***	19.24 (4.18)	20.55 (3.78)	24.24 (3.03) ***
	Illness Coherence					
Baseline	17.47 (4.58)	16.42 (4.77)	16.60(3.47)	17.82 (4.57)	14.91 (3.73)	15.75 (3.61)
2 months	18.45 (4.25)	16.90 (4.95)	16.91 (4.57)	18.32 (4.54)	17.71 (2.93)	17.00 (4.86)
6 months	19.17 (3.31)	17.00 (4.58)	14.70 (4.47) ***	18.97 (3.48)	18.78 (3.42) **	13.70 (4.20) ***
	Treatment Control					
Baseline				17.70 (2.70)	17.38 (3.80)	16.80 (2.95)
2 months				18.03 (2.86)	15.54 (3.32)	15.63 (2.96) ***
6 months				17.00 (2.82)	15.67 (4.92)	15.7 (2.98)
	Emotional Representation					
Baseline	15.09 (4.62) *	18.63 (4.62) **	22.45 (4.35) ***	14.96 (4.14) *	21.33 (3.03)	23.16 (3.98) ***
2 months	16.53 (4.43) *	20.40 (2.76)	23.91 (2.34) ***	16.5 (4.54)	19.57 (3.55)	22.75 (2.84) ***
6 months	14.55 (3.60) *	20.89 (2.57)	24.70 (3.65) ***	15.14 (4.05)	19.89 (4.59)	23.90 (4.20) ***
	Self Care Maintenance					
Baseline	52.44 (13.47)	55.63 (10.56)	56.50 (10.43)	53.30 (12.84)	52.5 (10.16)	58.88 (10.71)
2 months	59.60 (11.75)	61.75 (11.90)	65.23 (12.67)	60.23 (12.47)	58.93 (8.02)	63.91 (12.55)
6 months	60.90 (14.32)	57.5 (11.99)	65.83 (8.92)	60.95 (14.52)	56.39 (8.67)	66.94 (10.21)
	Self Care Management					
Baseline	56.10 (19.65)	61.33 (18.09)	59.92 (19.22)	58.07 (19.61)	56.30 (14.06)	60.79 (20.77)
2 months	55.60 (23.00)	58.84 (15.66)	73.67 (16.15)	57.06 (23.88)	56.30 (15.09)	67.02 (18.39)
6 months	58.66 (21.80)	59.42 (15.56)	66.26 (14.36)	60.88 (21.60)	51.60 (14.26)	69.50 (11.42)
	Self Care Confidence					
Baseline	63.97 (19.91)	55.43 (14.68)	59.84 (16.36)	61.66 (18.25)	58.03 (17.19)	59.63 (18.50)
2 months	67.63 (17.40)	63.38 (16.31)	60.65 (17.02)	67.83 (17.66)	64.93 (15.58)	60.99 (16.60)
6 months	70.03 (15.66)	57.45 (16.65)	50.87 (15.45) ***	69.31 (15.82)	55.14 (17.66)	55.04 (16.89)

Table 3: One-way ANOVAs comparing Illness Perception Questionnaire (IPQ) and Self Care

(SC) data with Hospital Anxiety and Depression Score diagnostic groups: Anxiety – Mean

(SD) and Depression – Mean (SD)

* Significant difference between Normal and Borderline cases in relation to the IPQ or SC category

** Significant difference between Borderline and depressed/anxious cases

*** Significant difference between Normal and depressed/anxious cases

The level of significance is < 0.05