Predicting adherence to phase III cardiac rehabilitation: should we be more optimistic?

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Predicting uptake and adherence to cardiac rehabilitation (CR) continues to challenge providers of the service in the UK. This study included optimism with the more traditional predictors of adherence.

The study included 61 eligible patients (37 men, 24 women) referred to an eight-week phase III CR programme. Socio-demographic data were collected including age, gender, diagnosis, employment, marital status and deprivation. Depression was measured using the Hospital Anxiety and Depression (HAD) scale. Dispositional optimism was measured using the Revised Life Orientation Test (LOT-R). Stages of change (SOC) for exercise were assessed. Attendance and completion of the eight-week CR programme were recorded for all patients. There was adherence to CR by 46 (75%; 27 men and 19 women) and non-adherence by 15 (25%; 10 men and 5 women). Dispositional optimism and SOC were found to be significant predictors of adherence (p=0.001 and p=0.038, respectively), with depression tending towards significance (p=0.0614). Socio-demographic variables were not significant.

Greater optimism is associated with attendance at phase III CR. In addition, being in a higher stage of the SOC model is also associated with adherence. These findings can enable CR staff to identify patients at risk of failing to adhere, facilitating focused interventions to encourage adherence.

Introduction

Exercise-based cardiac rehabilitation (CR) is embedded in cardiac care and can reduce cardiovascular mortality by 30% and death from all causes by 20–25%.[1,2] Phase III CR is the stage of the patient journey in the UK that is primarily delivered in a hospital setting.[3] It is acknowledged that strategies to increase adherence and participation are needed to maximise health gains from participation in CR.[3] Predicting uptake and adherence has, to date, focused on traditional measures, e.g. age.[3] New aspects are receiving some attention, these include dispositional optimism and stages of change (SOC).

Optimism

Optimists expect events to go their way, more good things will happen to them than bad, whereas pessimists, expect the opposite.[4] Carver and Scheier,[5] suggest that optimists cope better with adversity, are more successful at achieving goals, less likely to suffer depression and have better physical health. In addition, being optimistic can be predictive of lower cardiovascular and all-cause mortality.[6,7]

Figure 1. The five stages of the transtheoretical model (adapted from ref. 8)

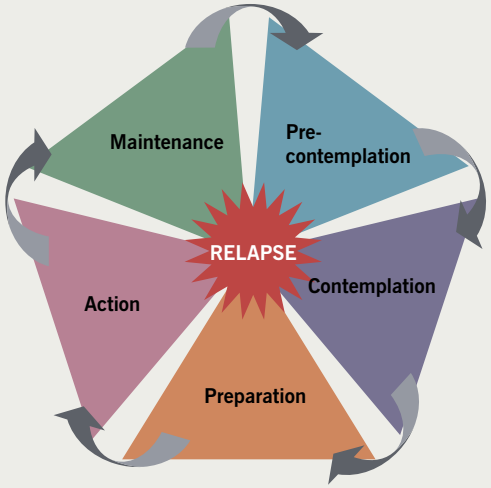
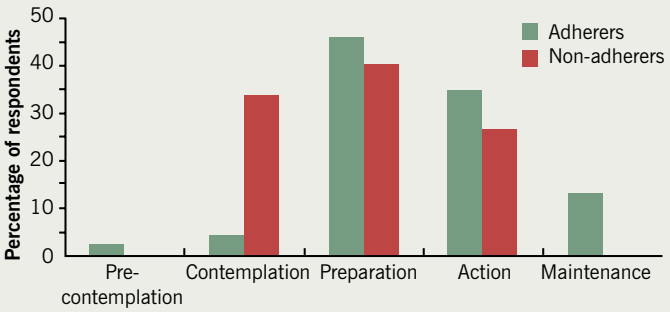


Table 1. Definitions and processes of the stages of change (adapted from reference 8)

Stage	Definition
Pre-contemplation	No intention of changing physical activity behaviour
Contemplation	Intend to change physical activity behaviour within next 6 months
Preparation	Intend to take action on physical activity in the next 6 months and have already started to make small changes
Action	Physical activity behavioural changes have occurred within the past 6 months
Maintenance	Physical activity behavioural change has been sustained for more than 6 months

Figure 3. Comparison of adherers and non-adherers by stage of change



Stages of change

The transtheoretical model (TTM) of behaviour change was first introduced by Prochaska and DiClemente.[8] It is now routinely used in CR for other health behaviour change. The SOC concept suggests that people follow a number of stages when adopting and maintaining behaviours (**table 1** and **figure 1**).

Success in behaviour change can hinge on an individual's readiness to change, their SOC and interventions offered by health professionals.[9,10]

Traditional predictors

Traditional predictors include depression, socio-demographics, age, gender, employment status, marital status and socio-economic status. Non-completion has been associated with depression, older patients, women, single unemployed and lower socio-economic status.[11]

Materials and methods

Participants

Sixty-one subjects were recruited with varying diagnoses including: myocardial infarction (MI), angina, heart failure, coronary artery bypass graft (CABG), angioplasty and valve replacement. They attended CR once or twice weekly for eight weeks following American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) guidelines.[12] Only data for those who commenced the programme were used.

Outcome measures

Demographic data included age, gender, marital status, diagnosis, employment status and deprivation (using Depcat scores[13]). Dispositional optimism was measured using the Revised Life Orientation Test (LOT-R), which was validated by Scheier and colleagues.[14] SOC was measured using a questionnaire, adapted from Marcus *et al.*[15] Depression was measured using the Hospital Anxiety and Depression (HAD) scale.[16]

Results

Descriptive statistics of the sample

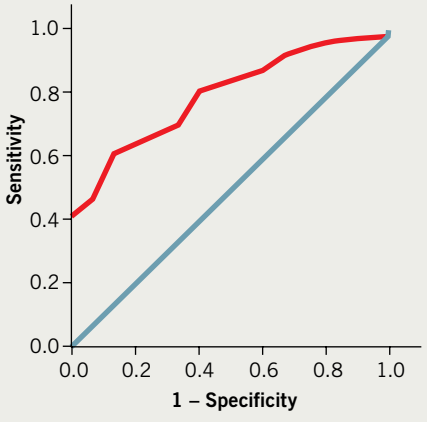
Sixty-one participants with a mean age 61.1 ± 9.5 years, 37 males (61%) and 24 females (39%). Forty-six (75%) completed phase III CR and 15 subjects (25%) did not complete.

Predictors

Demographics

Mean age of completers was 60.6 ± 11.8 years and 61.2 ± 8.8 years for non-completers, which was not significant (p=0.829). Two-thirds of the non-adherers (67%) were male. There was no significant difference between the two groups due to gender (p=0.583). No significance was found for diagnosis, employment and marital status (p=0.560, p=0.310 and p=0.163, respectively) or deprivation (p=0.457).

Figure 2. Receiver operating characteristic (ROC) curve for Revised Life Orientation Test (LOT-R) scores



Dispositional optimism

Non-completers were less optimistic (12.9 ± 2.5) than those who completed (16.5 ± 3.6; p=0.001). A receiver-operator characteristic (ROC) curve[17] was used to investigate the ability of the LOT-R score to discriminate between those who would adhere to CR. **Figure 2** represents the ROC curve for the LOT-R score based on completion. Based on the criteria of the point on the ROC curve furthest away from the line of equilibrium, yielding the best trade-off between sensitivity and specificity,[18] patients scoring below 16 should be considered at risk of non-completion.

Stage of change

Significance was found (p=0.038) for SOC between groups. **Figure 3** suggests the higher the SOC (that is, towards action and maintenance stages), the less likely a patient will drop out.

Depression

The mean depression score for this sample was 3.7 (± 3.0). Non-adherers (4.8 ± 2.8) were more depressed than those who attended CR (3.3 ± 2.97). The data would appear to suggest that depression may be a predictor of adherence. However, depression only tended towards significance (p=0.0614).

Discussion

Demographic variables

None of the demographic factors examined were found to be predictors of adherence to phase III CR. In a recent study, a similar non-significant relationship between adherence and age was observed.[19] This is a positive finding for older participants who can accrue the benefits.[20] Poor relationships between diagnosis and adherence have been observed in previous studies.[21,22] This study would suggest that regardless of diagnosis, patients are taking up and adhering to exercise-based CR.[2]

Employment status did not predict adherence, however, other studies have found that unemployment contributes to non-adherence.[23,24] On examination of the sample, the majority of subjects were retired (57.4%; 53% in the non-adherence group), which possibly makes attendance easier. No relationship with marital status or deprivation and adherence was found. This is a positive finding as many aspects of cardiac care will often see lower socio-economic groups not accept.[11]

Optimism

The findings concur with the only other study examining optimism and adherence to CR.[19] Pessimists perceive that regardless of what they do, the outcome will be the same and, therefore, reduce their efforts and quit. This is a common misconception of cardiac patients. Misconceptions are beliefs that are false, and can result in over-cautious or inappropriate behaviours.[20] It is recommended that staff should screen for optimism/pessimism, identify and address cardiac misconceptions, which have been shown to influence adherence to phase III CR.[25,26] For this data set, 87% of patients scoring less than 16 were non-compliant. We would suggest that patients scoring less than 16 should receive additional support to overcome misconceptions and improve uptake and attendance at CR. The area under the ROC curve is the probability that a test will discriminate between patients with and without a condition.[27]

Stage of change

The findings would suggest that SOC has a positive effect on adherence, and those further towards action and maintenance stages were more likely to adhere. A study by Bock *et al.*,[28] did not find a relationship between SOC and adherence, possibly due to differing subject nationality, gender, health services and diagnosis distributions. They found that younger and employed subjects were more likely to drop out. Other studies have found significant positive relationships between exercise adherence and the SOC model with coronary heart disease (CHD) patients.[29] Currently, CR services in the UK routinely use SOC.[20] Professionals should consider using SOC to identify patients who are less likely to adhere, allowing them to focus on these patients.

Depression

Depression measures tend towards significance in predicting adherence with the phase III CR programme, this is consistent with previous studies.[22,25,30] These other studies used the Beck Depression Inventory (BDI), whereas this study used the HAD scale, as recommended by the national guideline.[20]

In conclusion, healthcare professionals need to be aware of barriers and factors that impinge on adherence to CR programmes to maximise uptake and adherence. We found no relationship between traditional demographic factors and adherence. Our main finding is that optimism and SOC are factors that should be incorporated into assessment of patients prior to phase III. Thus, clinicians can be proactive in identification of 'high-risk' non-adherers to maximise the benefits of participation

Acknowledgement

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Conflict of interest

None declared.

Key messages

- Optimism may be a better predictor of uptake and adherence to phase III cardiac rehabilitation than other traditional measures
- Stages of change for exercise of action and maintenance were good predictors of uptake and completion of phase III cardiac rehabilitation

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