

Further development of an illness perception intervention for myocardial infarction patients: A randomized controlled trial[☆]

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Received 20 July 2008; received in revised form 1 December 2008; accepted 2 December 2008

Abstract

Objective: To further develop and trial a brief in-hospital illness perception intervention for myocardial infarction (MI) patients. **Methods:** One hundred and three patients admitted with acute MI were randomized to receive either standard care or standard care plus an illness perception intervention, which consisted of three half-hour patient sessions and one half-hour patient-and-spouse session delivered in hospital. Patients were followed up to 6 months. The main outcome was the difference between groups in rate of return to work. **Results:** The intervention group had a faster rate of return to work than the control group, and more patients in the intervention group had returned to full time work by 3 months than in the control group. At discharge, patients in the intervention group demonstrated changes in causal attributions regarding their

MI and higher perceived understanding of their condition, which remained at the 6-month follow-up. They also reported a better understanding of the information given in hospital, higher intentions to attend cardiac rehabilitation classes, lower anxiety about returning to work, greater increases in exercise, and made fewer phone calls to their general practitioner about their heart condition at follow-up. **Conclusion:** This study replicates the findings of an earlier trial that a brief in-hospital illness perception intervention can change perceptions and improve rates of return to work in MI patients. It increases the generalizability of the intervention to the current broader definition of MI and to patients who have had previous infarcts.

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Keywords: Illness perceptions; Intervention; Myocardial infarction; Randomized controlled trial

Introduction

Myocardial infarction (MI) is a major and usually sudden illness that can have serious psychological and functional impact on patients. Three months following acute MI, up to a third of patients experience significant depression [1]. Furthermore, many fail to return to work and report impaired

functional ability often despite being physically able to work [2,3]. Many patients fail to attend offered community cardiac rehabilitation classes [4].

Research based on the common-sense model of illness [5] has shown that the way patients make sense of their heart attack can strongly influence their trajectory of recovery. In this model, patients respond to symptoms and signs of illness by forming cognitive and emotional representations of the threat, which guide coping responses. The cognitive representation of the illness consists of five main domains: *identity* (the name and symptoms that the patient identifies as part of the illness), the *cause* of the illness, the *timeline* for the illness (how long the patient thinks it will last), the amount of *control* the patient perceives they have over the illness, and the perceived *consequences* of the illness on the patient's life [6,7]. Later research has added illness *coherence* (how well the patient feels they understand the illness), perceptions of

Abbreviations: MI, myocardial infarction; IPQ, Illness Perception Questionnaire; GP, general practitioner.

[☆] This research was supported by a grant from the Heart Foundation of New Zealand.

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treatment control (how much treatment can help to control the illness), and the *emotional* representation (how much patients are emotionally affected by the illness), to assessments of illness perceptions [8].

Previous work has shown that patients' beliefs that the MI will have more serious and long-lasting consequences predict slower return to work and higher levels of disability [9]. Similarly, perceptions of greater damage to the heart predict slower return to work and greater cardiac anxiety 3 months later [10]. Causal attributions for the MI have also been linked to rate of return to work [11–13] and to lifestyle behaviors [14–16]. Patients who view their heart condition as highly symptomatic, with severe consequences, who feel that they understand their condition, feel they can control it, and who see lifestyle as a cause, are more likely to attend cardiac rehabilitation classes [17,18].

Despite the demonstrated importance of illness perceptions to health outcomes, there has only been one randomized trial investigating whether changing illness perceptions can improve patient outcomes [19]. This brief in-hospital intervention, which targeted MI patients' perceptions of their illness, successfully changed perceptions and resulted in a quicker return to work and lower levels of chest pain for patients in the intervention group. More research is needed to further develop and test illness perception interventions with larger samples and across different illnesses [20].

The current study aimed to further develop the previous illness perception intervention and to trial it with MI patients using the new, wider definition of MI [21]. This new definition is primarily based on a rise in troponin T and has resulted in more patients being diagnosed with MI. It is not clear whether the intervention works in this broader group of patients. In order to increase generalization from the previous trial, the sample also included patients who had experienced a previous MI. The hypothesis was that, similar to the previous trial, the intervention would result in improved return to work. Return to work is an important behavioral and functional measure of recovery, with associated economic and psychological benefits [22,23].

One of the additions to the intervention from the previous trial was a spouse session. The spouse is central to the recovery of the patient and their inclusion in the intervention may help to improve patient outcomes [24]. This paper reports the results for the patients. Another paper in this issue reports spouses results [25]. This trial enhanced the take-home written information from the previous trial by adding color diagrams and added take-home audio recordings of the intervention sessions for the patients.

Method

Participants

A total of 108 consecutive patients who met the inclusion and exclusion criteria were approached and informed about

the study. The inclusion criteria were that the patient had been admitted for acute MI at Auckland City Hospital, was aged less than 70, and spoke English. Exclusion criterion was the presence of a serious comorbid psychiatric or medical condition. Informed consent was gained from patients to participate. We also gained patients' consent to include their spouse/partner in the trial, and informed consent was then obtained from their spouse/partner. One hundred and three patients consented (95% participation rate). Seventy-two of these patients had a spouse or partner, of whom 57 (79%) agreed to the researchers contacting their spouse. All spouses approached agreed to take part in the study (100%).

Procedure

Approval was gained from the Auckland Ethics Committees (AKY/02/00/092). Recruitment was performed between June 2002 and June 2003. Follow-up continued until December 2003.

A participant flow chart is shown in Fig. 1. Patients meeting the eligibility criteria were approached in the ward and the study explained (EB). After informed consent was obtained, patients were randomly allocated to either a standard care control group (51 patients) or the intervention group (52 patients) (EB). The randomization sequence was generated using a computerized random number generator (KP), and allocation was kept in sealed consecutively numbered envelopes. The control group received standard hospital care. Hospital protocol is for all MI patients to be visited by a cardiac rehabilitation nurse who gives patients a booklet on cardiac rehabilitation, talks to the patients about community cardiac rehabilitation classes, and invites them to attend an 8-week outpatient community rehabilitation program. There was no blinding of group assignment.

Patients completed four questionnaires: one prior to randomization, one at hospital discharge, one 3 months following the MI, and one 6 months following the MI.

Intervention

The intervention consisted of four half-hour in-hospital individual patient sessions with a health psychologist (JT). The baseline illness perception questionnaire was used as a guide for tailoring the intervention. The first session consisted of engagement and an explanation of the intervention, an explanation of MI and associated symptoms, exploration of the patient's own ideas about the causes of their MI, and widening of their perceptions to consider other causal factors.

The second session consisted of making a worksheet for a personal action recovery plan. This involved looking at how the patient's causal factors were associated with health behaviors and debunking myths about the causes of MI and recovery, discussing the benefits and problems of changing behavior and discussing methods of change, and agreeing on

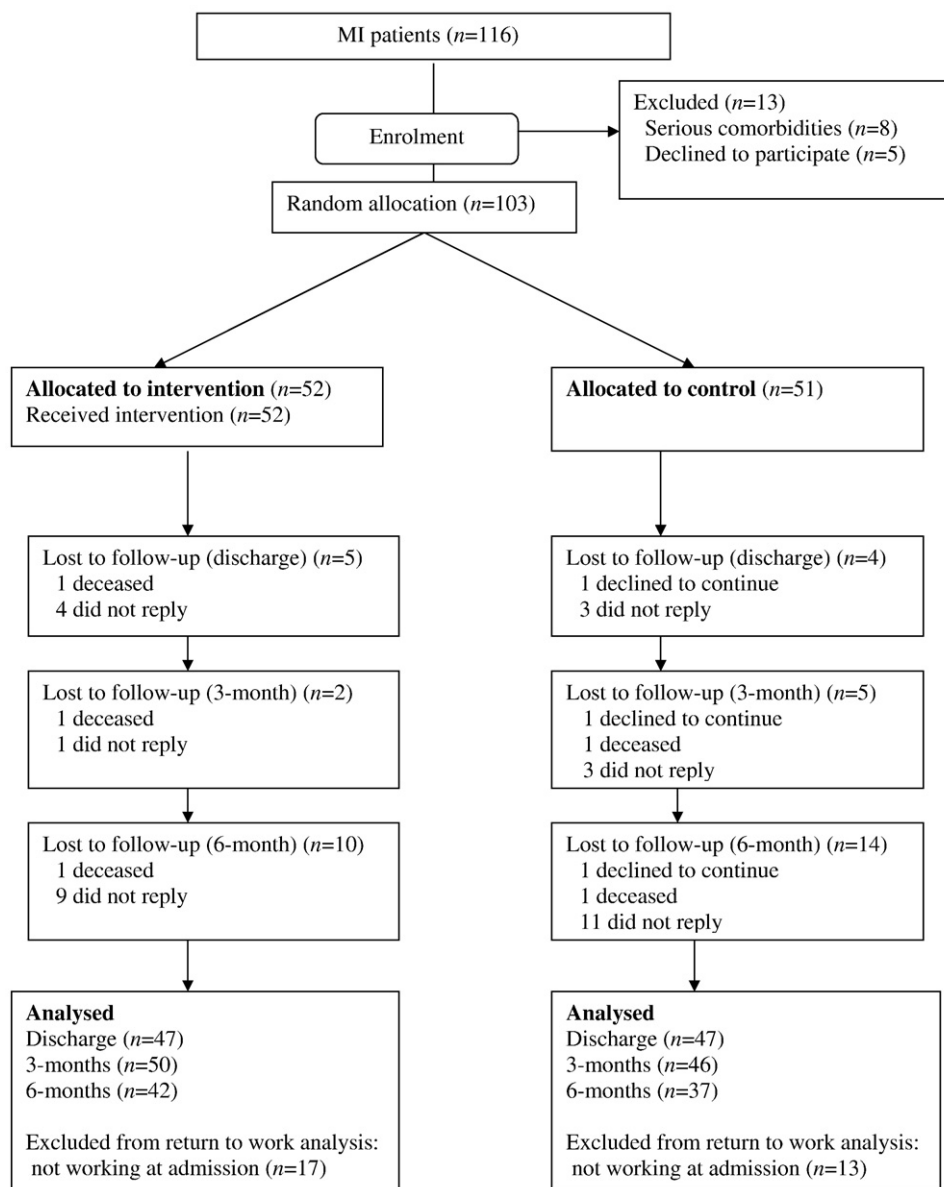


Fig. 1. Flow chart of participants.

goals for the recovery plan. Finally, the role of the spouse in rehabilitation was briefly discussed.

The third session involved both the patient and their spouse (only delivered to patients with participating spouses). This involved engagement, an explanation of MI and associated symptoms, exploration of the spouse's causal perceptions, discussion of the link between causes and the recovery plan developed with the patient, appropriate timelines to normal functioning, discussion of the spouse's role, as well as exploration and normalization of concerns about going home.

In the fourth session, going home was discussed. This elicited patient concerns about medications and discussed the benefits of medications. The session also covered the importance of pacing activity, following the structured action plan, and setting up routines. Finally, concerns

about leaving the hospital such as worry about a further MI, the importance of visiting the general practitioner, and normal symptoms of recovery were addressed. All of the sessions were audio taped, and these tapes were given to the patients so that they could listen to the sessions again at home. Patients were also given a take-home folder of information based on the sessions and their recovery plan.

Measures

Baseline

After informed consent was obtained, patients were given a questionnaire to complete that included questions about demographics and work status, and a scale to assess pre-admission health behaviors including smoking, exercise, and diet [16]. The Brief Illness Perception Questionnaire (Brief

IPQ) was used to assess patients' illness perceptions along the dimensions of consequences, timeline, identity, personal control, treatment control, emotional representation, concern, and coherence [26]. The questionnaire assesses each dimension using a single-item scale from 0 to 10. The causal scale from the Illness Perception Questionnaire-Revised (IPQ-R) was used to assess causal perceptions [27]; patients rated how much they agreed with a list of possible causes for the MI from 1 (*strongly disagree*) to 5 (*strongly agree*). Patients were also asked how anxious they were about returning to work on a scale from 0 (*not at all*) to 5 (*extremely*). Patients' medical data were collected from patient notes.

Discharge questionnaire

Patients' perceptions were measured at hospital discharge using the Brief IPQ and the IPQ-R for causal perceptions. Patients were also asked to rate their understanding of the information they received in hospital, their readiness to leave hospital, and their intentions to attend cardiac community rehabilitation classes, based on previous work [19].

Three-month follow-up questionnaire

This was posted out to patients with a stamped, self-addressed return envelope. This included the Brief IPQ, the same health behavior scale as at admission to assess health behaviors in the average week since the MI, the number of phone calls to the general practitioner or hospital related to their heart condition in the past 3 months since the MI, and whether patients attended cardiac rehabilitation classes. Patients in the intervention group only were asked to rate the usefulness of the intervention on a scale from 0 (*not at all*) to 5 (*extremely*) and whether they had referred to the take-home materials. Patients were also asked their employment status and the date they had returned to work.

Six-month follow-up questionnaire

This was posted to participants with a stamped, self-addressed return envelope. The questionnaire included the Brief IPQ and the same health behavior scale as at admission to assess health behaviors in the average week since the MI. Patients were asked their working status and the date they had returned to work if they had not returned to work at the 3-month follow-up.

Data analysis

The study was powered to detect an effect of similar magnitude to that observed by Petrie et al. [19]. We estimated two groups of at least 30 subjects each would achieve 80% power at the 5% significance level to detect a difference of 23% between 70% and 93%—the proportions returning to work in the control arm and in the intervention arm, using the log rank statistic of a survival analysis [28]. Recruitment continued until at least 34 patients who were

working at admission were enrolled into each group to allow for potential loss to follow-up.

Data were analyzed using SAS and SPSS. The groups were compared on demographic data using independent *t* tests for normally distributed data, Mann–Whitney *U* tests for nonparametric distributed data, and χ^2 tests for categorical data. Cox proportional hazards model and χ^2 analyses were used to assess differences in return to work. Analyses of covariance were used to assess differences between groups in changes in variables over time controlling for baseline values. Mixed models analysis was performed on repeated measures data. Significant main and interaction effects were further investigated using the method of Tukey. A 5% significance level was maintained (two tailed).

Results

The demographics and clinical characteristics of the sample are shown in Table 1. The groups did not significantly differ on demographic variables.

Return to work

An independent groups *t* test showed that those patients who received coronary artery bypass surgery took significantly longer to return to work (mean=68.94 days, S.D.=44.11) than those patients who did not have surgery

Table 1
Sample demographics and clinical characteristics

Variable	Control	Intervention
Gender	46 male, 5 female	45 male, 7 female
Age in years	54.9 (7.8)	54.6 (8.3)
Ethnicity (<i>n</i>)		
Caucasian	36	34
Maori/Pacific Island	7	7
Asian	8	9
Other	0	2
Marital status (<i>n</i>)		
Single	8	3
Married/de facto	31	34
Divorced/separated	9	13
Widowed	3	2
Employment status (<i>n</i>)		
Full time	27	29
Part time	8	4
Retired	6	9
Unemployed	6	6
Sickness beneficiary	4	3
Working at home	0	1
Family history of heart disease (<i>n</i>)	23	21
Current smoker (<i>n</i>)	22	24
Previous MI (<i>n</i>)	9	11
Previous cardiac rehabilitation (<i>n</i>)	3	5
Bypass surgery performed	11	16
Time in hospital (days)	8.7 (4.8)	9.4 (5.4)

Values are mean (S.D.) or *n*.

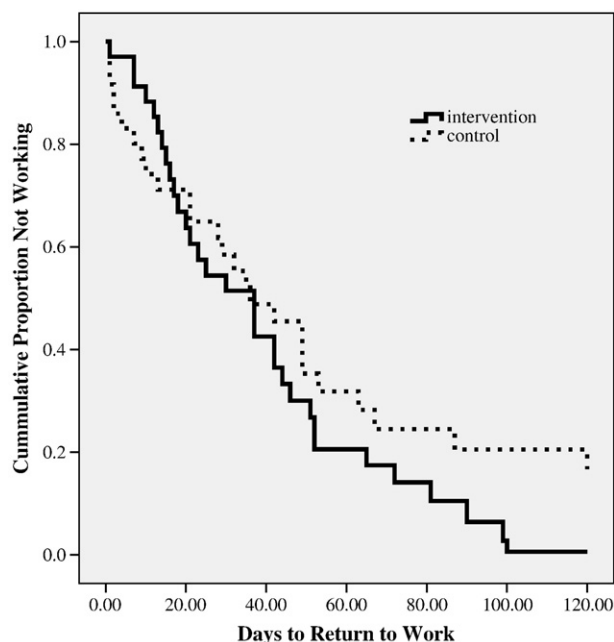


Fig. 2. Estimated rates of return to work by group.

(mean=34.60 days, S.D.=30.52) [$t(63)=3.57$, $P=.001$]. To test the hypothesis that the intervention group would return to work at a faster rate than the control group, a Cox proportional hazards model survival analysis was conducted controlling for whether or not patients received bypass surgery (Fig. 2). There was a significant difference between groups, with the intervention group returning to work faster than the control group [log rank statistic $\chi^2(1)=10.31$, $P=.001$].

A χ^2 test was performed to see how many of the patients working at admission had resumed working full time, part time, or were no longer working at 3 months. There was a significant difference [$\chi^2(2)=6.27$, $P<.05$], with a greater proportion of the intervention group being back in full-time work compared to the control group (see Table 2). The difference between groups in the proportions working or not working (either part- or full time) was not statistically significant [$\chi^2(1)=4.00$, $P=.11$].

Understanding, preparedness, anxiety, and cardiac rehabilitation

Independent t tests showed that the intervention group had a better understanding of the information they had received in the hospital than the control group [mean=8.60

(S.D.=1.86) vs. 7.50 (S.D.=2.84), $t(79)=2.21$, $P<.05$]. They also felt more prepared to leave hospital [8.86 (S.D.=1.43) vs. 7.63 (S.D.=2.75), $t(69)=2.72$, $P<.01$] and had higher intentions to attend community rehabilitation classes [7.69 (S.D.=2.52) vs. 5.89 (S.D.=3.77), $t(78)=2.70$, $P<.01$], although attendance rates did not significantly differ between groups (intervention group mean attendance=2.91 classes; control group mean attendance=2.58 classes, $P>.05$). An ANCOVA with group as a between-subjects factor and value at admission as a covariate showed that patients in the intervention group had become less anxious about resuming work after the intervention (estimated marginal mean change=-.34, S.E.=.18), whereas anxiety had increased in the control group (estimated marginal mean change=.22, S.E.=.18; $F=5.79$, $P<.05$). Consistent with these findings, more patients in the control group had made phone calls to their GP or hospital with questions related to their heart condition at the 3-month follow-up (no calls, $n=24$; one or more calls, $n=18$) than those in the intervention group (no calls, $n=36$; one or more calls, $n=7$; $\chi^2=7.23$, $P<.01$).

Illness perceptions and health behaviors

Mixed model analyses on how illness perceptions and health behaviors changed over time and between groups showed main time effects for consequences, treatment control, concern, emotional representation, coherence, worry about a future MI, and likelihood of another MI. There were also main effects for time for amount of fruit and vegetables eaten, frequency of breakfast eaten, amount of fried food eaten, use of fat reduced milk, the amount of strenuous exercise performed, and the number of cigarettes smoked per day. There was a significant time-by-group interaction for illness coherence [$F(3,252)=3.28$, $P<.05$], such that patients in the intervention group perceived understanding of their condition increased significantly over time (admission=6.90, discharge=8.50, 3 months=8.80, 6 months=8.55), whereas the control group did not (admission=7.31, discharge=7.86, 3 months=7.83, 6 months=8.0). There was also a group-by-time interaction for amount of strenuous exercise performed [$F(2,157)=6.74$, $P<.001$]. Patients in the intervention group increased the amount of exercise they reported from admission to both the 3-month and 6-month follow-up points (admission=3.40, 3 months=4.32, 6 months=4.42), whereas those in the control group did not (admission=4.08, 3 months=4.02, 6 months=4.14).

Table 2
Differences between groups in working status at 3 months

	Working full time	Working part time	Not working	Total n
Intervention	25 (75.8%, CI 59.1–88.1%)	7 (21.2%, CI 9.8–37.5%)	1 (3.0%, CI 0.1–14.0%)	33
Control	17 (51.5%, CI 34.7–68.1%)	9 (27.3%, CI 14.2–44.2%)	7 (21.2%, CI 9.8–37.5%)	33
Total n	42	16	8	66

Values are n (proportion as a percent, confidence interval).

Table 3
Differences between groups in mean changes in causal attributions at discharge controlling for baseline responses

Causal attribution	Intervention group adjusted mean difference (CIs)	Control group adjusted mean difference (CIs)	F	Significance
Stress	-.03 (-.33 to .27)	-.23 (-.52 to .05)	0.92	.34
High cholesterol	.25 (-.03 to .53)	-.24 (-.51 to .03)	6.3	.01
Hereditary	.44 (.13 to .75)	.09 (-.21 to .39)	2.52	.12
Lack of exercise	.16 (-.16 to .48)	-.39 (-.70 to -.08)	5.99	.02
High blood pressure	.20 (-.09 to .50)	.09 (-.20 to .38)	0.32	.57

Causal perceptions

To analyze differences in causal attributions between groups, change scores from admission to discharge for the top five causal attributions were computed, and between-groups ANCOVA conducted controlling for admission scores. The results are shown in Table 3. After the intervention, intervention group patients' attributions to high cholesterol and lack of exercise had strengthened compared to the control group.

Ratings of the intervention

Seventy-seven percent of the intervention group had referred to the intervention written material at home, 81% had referred to their action plan, 36% had listened to their tape at least once (range=1–12), and the mean ratings of the sessions on the 0–5 scale were 4.53, 4.35, 4.41, and 4.40, respectively, for Sessions 1–4, in terms of usefulness.

Discussion

This trial further developed and tested an illness perception intervention in MI patients. The intervention significantly improved speed of return to work and a greater proportion of the intervention group had returned to full-time work at 3 months compared to the control group. The intervention lowered patient anxiety about returning to work and improved patients' understanding of the information received in hospital. Patients who received the intervention felt more prepared to leave hospital and reported higher intentions to attend rehabilitation classes than the control group. They reported greater increases in exercise and fewer calls to the general practitioner or hospital relating to their heart condition.

In terms of illness perceptions, the intervention increased patients' sense of coherence about their condition and this remained over the course of the 6-month follow-up. The intervention also significantly strengthened patients' causal attributions for the heart attack to high cholesterol and lack of exercise relative to the control group. These changes in coherence and causal attributions gave the patients a coherent illness model on which to base their recovery and modifiable causal attributions. Causal attributions to internal and controllable factors have been linked to faster return to

work [11]. In previous research, attributions to fate and luck predicted poor prognosis and lower functioning 12 years following the MI, possibly due to fewer positive changes to work, home, and physical activities [12]. In this study, the intervention aimed to set the patients on a positive course of recovery by planning exercise schedules and a date to return to work into an action plan, which, together with reinforcing controllable causal attributions, may be a key component of the intervention in guiding behavior.

It is useful to consider why, in contrast to the previous trial, consequence, timeline, and control perceptions were not changed. One possible reason is that the intervention placed greater emphasis on diagrams of atherosclerosis and muscle damage, and explained that heart disease is a chronic condition. Another reason may be that the amount of patient information available in hospitals has increased and treatments have improved, which may have also changed perceptions in the control group. The mixed models analysis showed that consequences perceptions, treatment control perceptions, concern about the heart condition, and emotional representations improved over time across groups.

Since the previous trial, the definition of MI has changed and patients receive improved access to coronary angioplasty and bypass surgery, as well as more patient information. The definition of MI used in this trial is inclusive of patients with less severe pathology than the definition used in the previous trial [21]. Most patients diagnosed with MI today do very well with modern treatments and lifestyle modification [29]. Despite these changes, the intervention was shown to improve rates of return to work in this patient group, including those patients who had experienced previous MI.

While there was a significant difference in intentions to attend cardiac rehabilitation classes, the difference in attendance did not reach statistical significance. Cardiac rehabilitation classes are held several weeks after discharge during working hours, so these can be difficult to attend, especially for those who have returned to work.

The return-to-work survival analysis suggests that some people returned to work soon after discharge regardless of group allocation. The effects of the intervention are more evident in those patients who took some weeks off to recover, shortening the off-work period, and encouraging patients to return to work. For the 20% of patients who had not returned to work at 80 days, the intervention had an effect of about 3 weeks' difference, which is an economically and clinically relevant outcome.

There are several limitations to this study. It would have been useful to extend the measurement of health service use to 6 months and to have assessed the number of hospital admissions and outpatient visits. The number of women in the study is lower than might be expected from the published gender rates of acute coronary syndrome in New Zealand [30]. The reason for this is likely to be the criterion that participants had to be aged less than 70 years, in order to increase the proportion of patients who were in paid work. Recent data shows the mean age for women presenting with acute coronary syndrome is typically at least 5 years older than men [31]. The generalizability of the results to women, older people, and those patients not in paid work is therefore reduced.

To date, research into patients' responses to illness using the Common-Sense Model has predominantly relied on cross-sectional and longitudinal designs [32]. These designs cannot establish causality, and randomized trials are fundamental to establishing the utility of the model in improving patient outcomes. This is the second trial to test whether an illness-perception intervention can improve outcomes. It provides further evidence for the usefulness of an early illness perception intervention in improving rates of return to work in MI patients, building on the previous study [19]. It increases the generalizability of the results to a wider group, including patients with repeat MI.

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