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Financial incentives to promote cardiac rehabilitation participation and adherence among Medicaid patients

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ABSTRACT

Purpose. Cardiac rehabilitation (CR) improves medical outcomes after myocardial infarction or coronary revascularization. Lower socioeconomic status (SES) patients are less likely to participate in and complete CR. The aim of this study was to test whether financial incentives may increase participation and adherence to CR among lower-SES patients.

Methods. Patients eligible to participate in CR with Medicaid insurance coverage were approached for inclusion. Patients were placed on an escalating incentive schedule of financial incentives contingent upon CR attendance. CR participation was compared to a usual care group of 101 Medicaid patients eligible for CR in the 18 months prior to the study. Attendance (participating in ≥one CR sessions) and adherence (sessions completed out of 36) were compared between groups. The study was conducted in Vermont, USA, 2013–2015.

Results. Of 13 patients approached to be in the study and receive incentives, 10 (77%) agreed to participate. All 10 patients completed at least one session of CR, significantly greater than the 25/101 (25%) in the control condition ($p < 0.001$). Of patients in both groups who attended at least one session of CR, adherence was higher in the intervention group (average of 31.1 sessions completed vs. 13.6 in the control group, $p < 0.001$). CR completion rates were also higher during the intervention with 8 of 10 (80%) intervention patients completing all 36 sessions compared to only 2 of 25 (8%) control patients ($p < 0.001$).

Conclusions. Financial incentives may be an efficacious strategy for increasing CR participation and adherence among Medicaid patients.

1. Introduction

Cardiac rehabilitation (CR) is an individualized, structured, progressive exercise program with interventions for coronary risk factor reduction that is highly effective at reducing morbidity and mortality rates following a myocardial infarction (MI) or coronary revascularization (Lawler et al., 2011; Wenger, 2008). Participation in CR is associated with a 26–36% decrease in cardiac mortality over 2–3 years and a 31% reduction in cardiac re-hospitalizations over 12 months (Lawler et al., 2011; Heran et al., 2011).

Individuals at especially high risk of morbidity and mortality following a cardiac event should be targeted for CR participation. Lower-socioeconomic status (SES) populations are particularly high risk patients with greater rates of smoking, hypertension, diabetes, obesity and physical inactivity (Albert et al., 2006; Alter et al., 2013; Govil et al., 2009; Oberg et al., 2009). Even though this high-risk profile consists of behaviorally modifiable factors, lower-SES patients are more likely to be re-hospitalized and have higher mortality rates following an MI than more affluent patients (Alter et al., 2006, 2013; Bernheim et al., 2007; Kind et al., 2014).

Lower-SES status is also a robust predictor of CR non-participation. While overall, 19% of older adults (≥65 years) attended CR as recommended, only 3–5% of those with dual Medicare/Medicaid status (i.e., lower-SES) (Suaya et al., 2007). In a study of 322 CR eligible Medicaid patients in Washington state, only two (<1%) attended CR within the year following their MI (Oberg et al., 2009). Clearly, interventions are needed to increase CR participation in this high-risk population.

A variety of interventions have been employed to increase uptake of and adherence to CR. A systematic review noted that even in the general population evidence was weak that interventions (e.g. early appointments after discharge, nurse reminder calls) were successful at increasing CR uptake. Additionally, no recommendation could be made for programs that increased adherence (Karmali et al., 2014).

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Incentive-based interventions are highly effective at altering health-related behaviors among disadvantaged populations (Higgins et al., 2012; Meredith et al., 2014). Providing financial incentives contingent on objective evidence of behavior change, was developed as a method to encourage cocaine abstinence (reviewed in Higgins et al., 2008). Incentive-based treatments have subsequently been shown to be effective at increasing abstinence from various drugs (Lussier et al., 2006). A meta-analysis of treatments for smoking during pregnancy showed an incentive-based approach was significantly more effective at promoting abstinence than other behavioral or pharmacological therapies (Lumley et al., 2009). Similar results have been observed when targeting other health-related behaviors in lower-SES populations (Higgins et al., 2012).

The aim of the present study was to examine the feasibility and potential efficacy of financial incentives to increase CR participation and adherence in lower-SES patients.

2. Methods

Prior to study implementation we examined records of all Medicaid patients over an 18-month period hospitalized for a MI, coronary revascularization, or heart valve surgery who lived in the catchment area for the University of Vermont Medical Center CR program. The catchment area is approximately 1600 km^2, the vast majority of patients live within a 30 min drive of the clinic. A total of 113 patients met these criteria. The records were further restricted to those under age 80 to make the historical controls more comparable to the study sample, as no patient over 80 was deemed eligible for the intervention. The final control sample consisted of 101 patients. Basic demographic information on controls (sex, qualifying diagnosis, age) was drawn from clinical records as was number of CR sessions attended (36 possible).

The incentive intervention was implemented within a month after collection of the information on controls. Patients were eligible if they were (a) hospitalized for an MI, coronary artery bypass grafting, percutaneous coronary intervention, or heart valve surgery, (b) enrolled in a state-supported insurance plan for low-income individuals (Medicaid), and (c) lived within the CR program catchment area. Patients with dementia, advanced cancer, significant frailty, or other systemic disease that would preclude CR participation were excluded. Sixteen patients were identified as potentially eligible over a 4-month period. Three patients, all over the age of 80, were excluded due to criteria listed above. Thirteen patients were approached with 10 (77%) consenting to participate. Of the 3 patients who declined, 2 cited no interest in CR due to other medical issues and the third declined due to lack of transportation.

The University of Vermont Medical Center CR program is described elsewhere (Savage et al., 2009). Briefly, the program consists of 2 or 3 supervised exercise sessions per week over a 3–4 month period (maximum 36 sessions). The CR program is individualized, based on functional capacity and goals for cardiovascular risk factor reduction. Exercise modalities employed include treadmills; elliptical trainers; seated steppers; and cycling, arm and rowing ergometers. Exercise duration is gradually increased to approximately 45 min of aerobic exercise. When appropriate, resistance training is included. Patients are encouraged to attend weekly educational sessions focusing on risk factor control.

Study participants received financial incentives for completing each of the 36 exercise sessions. Participation, verified by CR staff, was defined as attending and completing the scheduled prescribed exercise. Incentives were provided immediately following the completed session in cash or check. Participation in the initial exercise session earned $20. Subsequent sessions were incentivized on an escalating schedule starting at $4 and increasing by $2 for each consecutive session up to a maximum of $70 per session. Failure to attend a scheduled session, without valid excuse, resulted in a reset of the incentive value. Following a reset, the participant could receive $4 at the next session attended, $6 at the second consecutive session attended, and would return to the level of their previous progress at the third consecutive session attended. This schedule of escalating value incentives combined with a reset contingency has been experimentally demonstrated to be more effective than a fixed schedule at promoting continuous adherence (Roll and Higgins, 2000). Maximum possible incentive earnings were $1368.

The same definition for CR attendance and adherence was used in both conditions. Attendance was defined as having attended even one session of CR and adherence as the number of sessions completed (36 possible). Basic demographics and CR attendance and adherence were compared between incentivized and control patients using Fisher's Exact Test and Wilcoxon Rank Sum test. This study was approved by the local institutional review board.

3. Results

Baseline characteristics are listed in Table 1 (top panel). Mean age was 59 years, most patients were male and qualified for CR as a result of a MI. Age, sex, and qualifying diagnosis did not differ between the study conditions. Within the patients who attended CR (Table 1, bottom panel), the two study conditions did not differ significantly on measured characteristics.

To assess attendance, participation in one or more sessions was compared between all patients approached for the intervention ($n = 13$) and historical controls ($n = 101$). This method minimizes inflation of attendance rates in the study population by accounting for those who declined the study, and would likely not attend CR. Of 13 patients approached, 10 (77%) consented and attended at least one CR session. This 77% attendance rate is significantly greater than the 25% (25/101) in controls ($p < 0.001$).

To examine adherence, number of sessions completed among those who attended at least one CR session was compared between conditions (Fig. 1). For patients who attended any CR, incentivized patients completed more sessions than controls (mean sessions completed 31.1 vs. 13.6, $p < 0.001$). Rate of completion also differed significantly with 8 of 10 (80%) incentivized patients completing all 36 sessions, compared to only 2 of 25 (8%) controls ($p < 0.001$). Incentivized patients were also compliant. Of 372 scheduled visits there were only 61 (16%) missed visits and only 9 (2%) were unexcused absences. Incentive earnings averaged $878 ± 179.3.

4. Discussion

The present results are encouraging regarding the feasibility and efficacy of financial incentives for increasing CR attendance and adherence in Medicaid-enrolled patients. Seventy-seven percent of patients offered the opportunity to participate in the incentivized intervention accepted, and the intervention resulted in greater levels of participation and adherence compared to controls.

To our knowledge, this is the first study to examine the efficacy of financial incentives for increasing CR attendance and adherence. Previous attempts at improving adherence in CR have been largely ineffective

Table 1
Characteristics of intervention and control patients.

Cardiac rehabilitation eligible	Intervention (n = 13)	Control (n = 101)	p
Age (years ± SD)	58.5 ± 9.6	58.9 ± 11.6	0.562
Gender (% male)	69.2%	59.4%	0.561
Qualifying diagnosis (% MI)	69.2%	55.5%	0.383
Attended CR (% attended)	76.9%	24.8%	<0.001

Attended cardiac rehabilitation	Intervention (n = 10)	Control (n = 25)	p
Age (years)	59.8	60.4	0.912
Gender (% male)	80%	72%	1.000
Race			
White	80%	88%	0.610
Black or mixed race	20%	12%	
Smoking status			
Current	30%	32%	1.000
Former/never	70%	68%	
BMI	32.4	32.4	1.000
Waist (cm)	109.7	102.23	0.650
Education (years, range)	12.1 (7–16)	n/a	n/a
Number of Sessions completed	31.1	13.6	<.001

Vermont, USA, 2013–2015.