

# SAMANTHA M. HARRIS

PSYCH 490

*Directed Individual Research with Dr. Kym Bennett*

## **Barriers to Cardiac Rehabilitation Participation:**

Predicting Enrollment in an Urban, Safety-Net Hospital

### **Introduction**

The Centers for Disease Control and Prevention (CDC) suggest that cardiovascular disease (CVD) is the leading cause of death in the United States. It is estimated that approximately 600,000 people die each year from CVD-related causes (Kochanek, Xu, Murphy, Minino, & Kung, 2011). However, these mortality rates vary among socioeconomic classes. There are more risk factors associated with CVD-related mortality in individuals of lower socioeconomic status (SES) compared to those of middle or high SES, such as less access to effective health care services, increased likelihood of sedentary lifestyles, greater exposure to tobacco, and lack of health insurance (Mead, Andres, Ramos, Siegal, & Regenstein, 2010). Although these risk factors are present, some of these are modifiable by secondary prevention efforts such as cardiac rehabilitation (CR). CR has been shown to be effective in improving clinical outcomes of patients with CVD (Dunlay et al., 2009). Specifically, CR is associated with decreased risk of subsequent cardiac events as well as cardiac-related mortality. Although CR is associated with beneficial outcomes following CVD, referral to and participation rates in CR are low (Grace et al., 2009). Among eligible CR patients, it is estimated that approximately 14% to 55% of those referred actually participate, with even lower participation rates reported among women, elderly, minorities, and economically disadvantaged populations (Dunlay et al., 2009).

Previous research has examined psychosocial, demographic, and clinical predictors of participation in CR predominantly with patients of middle to high-income status, most of whom had health insurance. For example, Lane, Carroll, Ring, Beevers, and Lip (2001) examined predictors of attendance after myocardial infarction (MI). Among 263 eligible participants, 108 (41%) attended CR. Results showed that those who did not attend CR were more likely to be female, live alone, lack employment, live in economically-deprived areas, show more symptoms of depression and anxiety, and exercise infrequently prior to MI. Additionally, Dunlay et al. (2009) investigated perceived barriers to participation in CR. Among 179 survey respondents, 115 (64.2%) attended CR. Patient and clinical characteristics associated with CR participation included younger age, male sex, lack of diabetes, more severe myocardial infarctions (MI), no prior MI, and no prior CR attendance. The psychosocial factors associated with participation included placing a high importance on CR, feeling that CR was necessary, better perceived health prior to MI, the ability to drive, and post-secondary education. Results showed that the most commonly endorsed barriers to participating in CR were the associated costs and lack of insurance coverage (27.9%), and perceived inconvenience (20.1%). Although these findings are significant in discovering factors associated with participation in CR, their sample included middle and high SES participants, and was predominantly (90%) European American. More information regarding perceived barriers to participation in CR is necessary to understand how social and psychological factors impact outcomes following a CVD diagnosis. The purpose of the current study was to examine rates of enrollment, demographic characteristics, and perceived barriers to participation in CR within a diverse sample of patients eligible for CR at a safety-net hospital. Further, I sought to investigate the relationship of demographic characteristics and perceived barriers in predicting enrollment in CR within this sample.

## Methods

### Procedure

Participants with CVD and who were eligible for CR (N = 77) were recruited from the Cardiology Department at Truman Medical Center-Hospital Hill in Kansas City, Missouri. The majority of the sample was male (64.9%, n = 50), European American (49.4%, n = 38), single (37.7%, n = 29), and not insured (26%, n = 20). The most common diagnosis was Percutaneous Coronary Intervention (PCI; 81.8%, n = 63), with MI following (63.6%, n = 49). Prior to discharge from the hospital, research staff approached patients eligible for CR and inquired about their interest in participating in the study. Once consent was obtained, the research staff administered a self-report questionnaire. Questionnaires were either completed by the participant independently, or were completed in collaboration with the staff member reading items out-loud. The questionnaire was similar to the survey used by Dunlay et al. (2009). Clinical characteristics (e.g., diagnosis, comorbidities) were accessed via medical chart review at study enrollment. Follow-up data was collected on participation in CR six months after discharge from the hospital.

### Measures

All patients who gave consent to participate were administered a 48-item questionnaire. This self-report questionnaire included items inquiring about demographic characteristics, perceived importance and necessity of participation in CR, perceived barriers to CR, and perceived health. Similar to Dunlay et al. (2009), the items to assess perceived barriers to CR were: (1) I don't have time to attend rehabilitation, (2) I have too many responsibilities, (3) I have too many medical problems to go to rehabilitation, (4) It will cause another heart attack, (5) It will be painful or too strenuous, (6) I'm afraid they will push me too hard and make me do things I'm not ready to do, (7) Seeing people sicker than me will make me nervous, (8) I'm embarrassed or shy about being in a big group, (9) It will cost

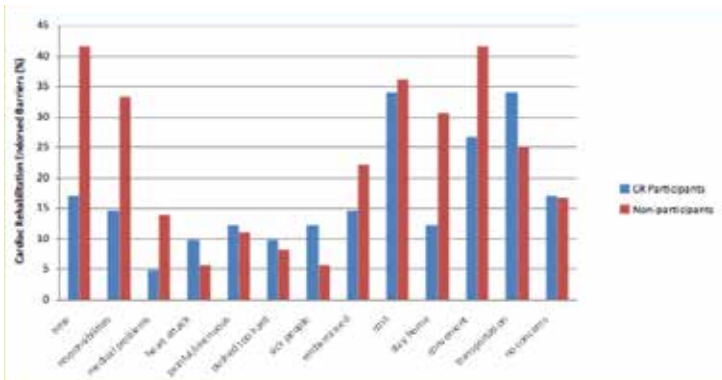
too much, insurance won't pay for it, (10) I would rather not have to leave home, I prefer staying at home with my family, (11) I'm afraid it won't be convenient; I wish I could schedule it when I want to go, (12) I don't know how I will get there, (13) I am not concerned about any of these things. Participants responded to these items on a dichotomous scale (1 = yes and 0 = no).

*Statistical Analysis.* All analyses were done using SPSS 20 (IBM Corp, 2011). CR enrollment and perceived barriers to participation were examined via descriptive analyses. Hierarchical logistic regression was conducted with demographics in Block 1 and all perceived barriers to participation included in Block 2, to predict enrollment in CR.

## **Results**

Among the participants that were referred to CR, results indicated that 41 (53.2%) enrolled, with 83.1% of the sample reporting at least one barrier to participation. An examination of demographic differences between those who did and did not enroll in CR indicated that there were no significant differences by sex, age, race, diagnosis, and education. However, having no insurance trended toward significance ( $p = .057$ ). Therefore, having no insurance was included in Block 1 of the logistic regressions performed. Figure 1 contains further information regarding barriers endorsed by CR participants and non-participants.

**Figure 1. Cardiac Rehabilitation Endorsed Barriers (%) in CR Participants vs. Non-participants**



*Note: time = I don't have time to attend rehabilitation; responsibilities = I have too many responsibilities; medical problems = I have too many medical problems to go to rehabilitation; heart attack = It will cause another heart attack; Painful/strenuous = It will be painful or too strenuous; Pushed too hard = I'm afraid they will push me too hard and make me do things I'm not ready to do; Sick people = seeing people sicker than me will make me nervous; embarrassed = I'm embarrassed or shy about being in a big group; Cost = It will cost too much, insurance won't pay for it; Stay home = I would rather not have to leave home, I prefer staying at home with my family; Convenient = I'm afraid it won't be convenient; I wish I could schedule it when I want to go; transportation = I don't know how I will get there; No concerns = I am not concerned about any of these things*

A logistic regression model with insurance status entered in Block 1 and barriers to CR participation entered in Block 2 correctly classified 70% of those who did not enroll. Results showed that those without insurance were less likely to enroll in CR ( $B = -1.42$ , Wald  $2 = 4.54$ ,  $p = .033$ ). Two barriers trended toward significance: those who reported a desire to stay at home with their family were less likely to participate ( $B = -1.53$ , Wald  $2 = 2.82$ ,  $p = .093$ ), and those reporting transportation barriers more likely to enroll ( $B = 1.28$ , Wald  $2 = 2.99$ ,  $p = .084$ ).

A trimmed model with only these three predictors correctly classified 66% of the sample (Table 1). Insurance status trended toward significance ( $B = -1.05$ , Wald  $2 = 3.52$ ,  $p = .061$ ), with participants without insurance being .35 times less likely to enroll in CR. The desire to stay at home with one's family was the only barrier that was significant ( $B = -1.371$ , Wald  $2 = 4.518$ ,  $p = .034$ ), with

those who wished to stay at home being .25 times less likely to enroll in CR.

Table 1. Logistic Regression Trimmed Model

Predictor	<i>B (SE)</i>	Wald	Exp(B)
No-insurance	-1.05 (.56)	3.5	.35
Staying home	-1.37 (.65)	4.5	.25
Transportation	.85 (.58)	2.18	2.35

*p*≤.10    *p*≤.05

## Discussion

Among this diverse inner city cohort of patients eligible for CR, over one-half of participants enrolled (53.2%). This participation rate is fairly congruent with other studies that have reported enrollment rates from 43–64% (Witt et al., 2004; Lane et al., 2001; Grace et al., 2009). These studies have also used low-SES participants in their samples. Compared to a sample with predominantly insured, European American patients, enrollment rates in our current study are lower than the 64% participation rate reported by Dunlay et al. (2009).

Approximately 78% of the sample that enrolled in CR reported at least one barrier to participation, while 80.6% of those who did not enroll endorsed one barrier. Dunlay et al. (2009) reported that 55.7% of those who attended CR reported at least one perceived barrier to participation, while 78.1% of those who did not attend endorsed at least one barrier. Overall, participants in this study endorsed at least one barrier at a rate that was similar to participants in the Dunlay et al. study. However, I noted differences in rates of endorsement for a few specific barriers between this sample and the study of Dunlay et al.: they reported that 27.9% endorsed lack of insurance, 20.1% reported perceived inconvenience, 14% lack time to attend, and 14% indicated lack of transportation as barriers to enrollment. In my sample, 26% reported lack of insurance, 33.8% endorsed perceived inconvenience, 28.6% lack time to attend, and 29.9% reported lack of transportation as barriers. Therefore, rates for these specific barriers were somewhat higher than those reported by Dunlay and colleagues.

Demographic and clinical characteristics have been suggested to predict enrollment in CR; however, these findings are not consistent across studies. Dunlay et al. (2009) found the following demographic and clinical characteristics to be significant predictors of CR participation: younger age, male sex, lack of diabetes, ST-elevation MI, receipt of reperfusion therapy, lack of prior MI, and higher education level. Although Dunlay et al. found all of these variables to be significant, I found only lack of insurance to be a predictor of CR enrollment. Another study that examined CR barriers among a low-income, underserved population also reported that lack of insurance and coverage limitations were the most frequently endorsed (Mead et al., 2010). With the current study also targeting an economically and ethnically diverse cohort of participants, the importance of insurance coverage cannot be overstated and suggests need for further research.

Among the social factors (or perceived barriers) I tested as predictors of enrollment in CR, I found the desire to stay at home with one's family to be significant, which is similar to findings reported by other researchers. For example, Grace et al. (2009) reported that females perceive transportation, family responsibilities, lack of CR awareness, and perceiving exercise as tiring or painful as significant barriers to participation in CR. My findings suggest these perceived barriers are prevalent in men as well as women following a cardiac event, allowing for greater understanding of the relationship between perceived barriers and enrollment in CR. My findings suggest that patients prefer the safety or comfort of staying at home with their families, but it is unknown whether these environments provide support for exercise initiation and maintenance to the same degree that a structured CR program would. Given the documented health benefits of CR, it is likely that all patients would benefit more from a structured CR program compared to a home-based, self-guided exercise regimen.

## **Limitations and Future Directions**

This current study is limited by having a small sample size. The study is part of a larger, on-going study and only represents current available data. Therefore, similar analyses and interpretations of the results should occur following completion of this on-going study to determine the extent of the relationships suggested here. Another limitation of this study is the tool for measurement. I used self-report questionnaires to obtain information on perceived barriers to enrollment in CR; therefore, response biases may occur. Also, with the majority of the study being male (64.9%), and European American (49.4%), this could be a potential limitation because it decreases generalizability. Future studies should continue to examine factors associated with enrollment in CR within diverse, underserved populations. Another aspect to consider with future research may be physician-patient interaction, with potentially low referral rates due to assumptions made about patients from low socioeconomic backgrounds. There is also a need to further examine the impact of lack of knowledge regarding CR and managing CVD in relation to enrolling in CR, specifically in low-income populations. Fernandez, Davidson, & Griffiths (2008) support this call for further research by reporting that lack of knowledge and awareness of heart disease and proper care is a major barrier to providing sufficient rehabilitation care. Lastly, future studies examining and developing interventions promoting participation in CR should target the variables I found to be significant predictors of enrollment: lack of insurance, transportation barriers, and desire to stay at home with one's family. CR programs could provide transportation for patients, or promote more intervention techniques that focus on perceived psychological barriers.

## **Conclusion**

The findings of this study indicate that despite known benefits from CR participation, patients who are uninsured and have a desire to stay at home with their family are less likely to enroll in CR. Previous literature has primarily examined perceived barriers among



European Americans who are middle to high SES, so the results of this study help to expand upon the knowledge of disparities in CR participation among a diverse group of underserved participants from a safety net hospital. Further research should address these perceived barriers among participants and focus on these concerns when promoting participation in CR.

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