

BARRIERS TO PARTICIPATION IN
CARDIAC REHABILITATION:
A RURAL PERSPECTIVE

by

Rebecca Chloe Echeverri

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Dr. Charlene Winters, chair

Approved for the Department of Nursing

Dean Elizabeth Nichols

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ABSTRACT

Cardiovascular disease is a significant health problem in rural states and complicated by the lack of access to specialized health care services such as cardiac rehabilitation programs. Researchers have documented that education, counseling, and behavioral interventions are important elements of cardiac rehabilitation (CR) that lead to decreased mortality and increased quality of life. Despite the known benefits of participation, only 10-20% of eligible persons in the United States participate in CR. While evidence exists to partially explain participation in cardiac rehabilitation programs, a major limitation of most studies reported in the literature is that they were conducted primarily in large urban areas. As a result, findings from these studies cannot be generalized to rural dwellers resulting in limited research examining participation in cardiac rehabilitation amongst rural persons. The purpose of this study was to explore rural persons' perceptions of community level barriers to participation in cardiac rehabilitation programs. A non-random convenience sample of persons admitted to a regional acute care hospital in south central Montana for treatment of an acute coronary event or exacerbation of a chronic cardiovascular condition were asked to participate in the study. Participants completed surveys containing questions regarding rurality and perceived community level barriers to participation in CR. Comparisons of rural and non-rural persons were statistically significant in the areas of distance and access to resources. These results suggest that rural persons may perceive distance and lack of access to resources as more of a barrier to participation in cardiac rehabilitation. The implications for nursing include identifying new ways to deliver specialized health care services that increase accessibility to rural persons such as flexible scheduling, home classes, and the use of distance technology.

CHAPTER 1

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of death in Montana with 229.4 deaths per 100,000 population attributed to this disease (Montana Department of Public Health and Human Services [DPHHS], 2003). Significant morbidity and mortality are associated with CVD including sudden death, heart failure, and stroke (American Heart Association [AHA], 2005). The human and financial cost of CVD can be devastating to rural states like Montana and Wyoming where limited financial and health resources are available. According the AHA (2005), the estimated total cost of CVD in the United States (US) is over \$393 billion.

While the risk factors for CVD are well established and primarily preventable, the prevalence remains high and is in many cases increasing. According to 2002 data, over 50% of the population of the US had elevated cholesterol, 32.3% had hypertension, and 22.5% smoked (AHA, 2005). Montana and Wyoming residents also demonstrated significant risk factors and an increasing prevalence in CVD since 1990. Over 29% of Montanans and 30.5% of Wyoming residents have elevated cholesterol, 26.8% of Montanans and 22.4% of Wyoming residents have hypertension, and 21.9% of Montanans and 22.2% of Wyoming residents are smokers (Montana DPHHS, 2003; Wyoming Department of Health [WDH], 2003). In 2003, the Montana DPHHS and the WDH released reports regarding the burden of cardiovascular disease, making the prevention and treatment of CVD a priority public health objective.

Risk-reduction is a primary goal in treating and preventing CVD (Does & Zlabek, 2005; Kang, Koh, Cha, Park, Baik, et al., 2005; Moredich, Kark, & Keresztes, 2005; Tuomilehto, 2005). Risk-reduction strategies include smoking cessation, exercise, lowering cholesterol by diet and medications, and managing hypertension and diabetes effectively. A major component of risk-reduction strategies in persons with CVD is CR, especially following an acute coronary event. The goals of CR are to promote a return to health, improve quality of life, and reduce the complications of CVD (Benz-Scott, Ben-Or, & Allen, 2002; Child, 2004; Kardis, Bruce, Michaels, & Barnett, 2005; Stewart, Badenhop, Brubaker, Keteyian, & King, 2003; Tod, Lacey, & McNeill, 2002; Witt, Jacobsen, Weston, Killian, Meverden, et al., 2004). Participation in CR may be more difficult for individuals who have greater travel distances and decreased access to CR programs such as those living in a rural setting. The purpose of this study was to achieve a better understanding of perceived community level barriers to rural persons' participation in CR programs.

Background and Significance

Researchers have documented that education, counseling and behavioral interventions are important elements of CR which lead to decreased mortality and an increased quality of life (Bergman & Bertero, 2001; Stewart, Badenhop, Brubaker, Keteyian, & King, 2003; Witt et al., 2004). The key components of CR include baseline assessment, nutritional counseling, risk factor management, psychosocial management, physical activity counseling and exercise training (Stewart, Badenhop, Brubaker, Keteyian, & King, 2003). Based on documented positive outcomes, the AHA

recommends CR for persons with CVD who are hospitalized for myocardial infarction (MI), percutaneous coronary intervention (PCI), coronary artery bypass graft (CABG) surgery, or heart failure (HF) (Leon, Franklin, Costa, Balady, Berra, et al., 2005).

CR is comprised of four phases. Phase I takes place while the client is still hospitalized and involves risk factor analysis, in-hospital education, and discharge teaching. Phase II begins approximately one week after hospital discharge and lasts approximately 12 weeks. Clients attend classes three days a week and focus on risk factor modification and exercise. Classes are supervised and coordinated by registered nurses and exercise specialists. After successful completion of phase II individuals begin phase III, which includes ongoing classes with the same frequency, but with a decreased level of monitoring and supervision. The goal of phase III is to assist the client in recovery and attainment of a long-term commitment to a healthy lifestyle. Phase IV focuses on achievement of risk factor management without consistent supervision, and is often supplemented with support group attendance and intermittent physician office visits (Child, 2004).

Rural populations face many challenges related to their health including decreased access to health care providers and social services, as well as other goods and services needed for healthy living (Arcury, Gesler, Preisser, Sherman, Spencer, et al., 2005; Averill, 2003; Galambos, 2005; Hartley, 2004; Vlahov, Galea, & Freudenberg, 2005). In 2000, all 56 counties in Montana were defined as either rural or frontier with an average of 6.2 persons or fewer per square mile.

There are only 25 communities (23 out of 56 counties) with outpatient CR programs, leaving a significant geographical area without these services (MT DPHHS,

2003). Similarly, Wyoming is a very rural state with less than 500,000 total population; over 47 % of its counties are designated as frontier (US Census Bureau, 2005). There are only 23 CR programs to service the entire state of Wyoming and only 31.4% of residents reported attending a rehabilitation program after being discharged from the hospital after an acute coronary event (WDH, 2003). Montana and Wyoming have significant areas without adequate numbers of healthcare providers resulting in 67% of Montana counties and 25% of Wyoming counties being designated as health professional shortage areas by the Health Resources and Services Administration (HRSA) (2005). Decreased numbers of healthcare providers combined with distance and isolation can negatively influence access to healthcare services for those living in rural areas potentially impacting participation in CR.

Despite the effectiveness of CR, these services are consistently underutilized across the U. S. It is estimated that only 10% to 20 % of the over two million eligible persons in the US participate in a CR program after an acute coronary event (Leon et al., 2005; Centers for Disease Control and Prevention [CDC], 2003). Many potential barriers to participation in CR programs have been identified in the literature, including lack of physician referral and support, financial constraints, conflict with work schedules, and lack of motivation and commitment (Benz-Scott, Ben-Or, & Allen, 2002; Evenson & Fleury, 2000; Tod, Lacey, & McNeill, 2002).

Research findings indicate that persons living in rural areas may have differing definitions of health and be less likely to participate in preventative behaviors when compared with those living in more urban areas (Gamm, Hutchison, Dabney, & Dorsey, 2003; Lee & Winters, 2004; Long & Weinert, 1998). Rural-dwellers define health as the

ability to work, be productive, and participate in activities that they enjoy (Lee & Winters, 2004; Long & Weinert, 1998). Strong values of hardiness and self-reliance exist amongst rural populations and they may be more likely to seek healthcare from informal networks and resist seeking help from those they view as outsiders (Long & Weinert, 1998). Differences in health perceptions and behaviors among rural-dwellers may contribute to a reluctance to seek health care until they are acutely symptomatic and unable to manage their health problems through the use of informal networks such as friends and family (Long & Weinert, 1998). Health beliefs common to rural dwellers combined with distance, isolation, and a shortage of health care providers and services may negatively influence access to healthcare services for those living in rural areas. These issues may influence participation in CR and should be considered when examining potential barriers in rural dwellers. While evidence exists to partially explain participation in CR programs, a major limitation of most studies reported in the literature is that they were conducted primarily in large urban areas and cannot be generalized to rural dwellers (Tod, Lacey, & McNeill, 2002) resulting in limited research examining participation in CR amongst rural persons.

Research Question

The research question addressed by this study was: Does rurality affect perceptions of community factors as barriers to participation in CR? The research hypothesis for this study was: Rural persons will perceive community factors as more of a barrier to participation in CR than persons living in a non-rural setting.

Conceptual Framework

The conceptual framework used for this study was the socioecologic framework (Sallis & Owen, 1997), which examines phenomena from different socioecologic perspectives and categories. The socioecologic framework is built upon a broad model that draws upon numerous fields of research including ecology and sociology. Ecology is the study of relationships between living beings and the environments in which they exist (Stokols, 1996). Sociology is the study of “the ways of acting, feeling, and thinking common to a society” (Pinikahana, 2003, p. 175). A socioecologic framework considers the interaction of the individual with his or her social and physical environment, which makes it an ideal framework to study the multidimensionality of health behaviors (Parker, Baldwin, Israel, & Salinas, 2004). At the center of the socioecologic framework is the belief that individuals cannot exist or act in isolation and that health behaviors are influenced by multiple factors, including both intrapersonal (internal) and environmental (external) characteristics (Stokols, 1996). Influences on participation in cardiac rehabilitation are complex and may be explained by many different layers within the socioecologic framework including intrapersonal, interpersonal, institutional, community, and public policy (Evenson & Fleury, 2000; Sallis & Owen, 1997; Whittemore, Melkus, & Grey, 2004).

Much of the study of human behavior has focused on *intrapersonal influences* which include personal attributes, psychological characteristics, and patterns of behavior (Sallis & Owen, 1997; Stokols, 2000). Examples of intrapersonal influences that may be potential barriers to participation in CR include lack of motivation, fear, and health

beliefs. *Interpersonal influences* are aspects of relationships with others that affect health behaviors and include physician and family support. *Environmental influences* include institutional, community, and public policy factors. Distance to health care services and work, and factors affecting transportation are illustrations of potential environmental influences. Examples of *policy* influences include personal finances and availability of health insurance. A dynamic relationship exists between the intrapersonal, interpersonal, environmental, and policy factors that influence persons' response to health issues and health promotion behaviors (Parker, Baldwin, Israel, & Salinas, 2004; Stokols, Allen, & Bellingham, 1996).

Within the socioecologic framework individuals are presumed to play an active role in their health and well-being. By gaining a better understanding of environmental influences, CR personnel will be able to more effectively facilitate healthy behaviors (McLeroy & Crump, 1994). Using the socioecologic framework allows for the interpretation of the multifaceted barriers to participation in cardiac rehabilitation (Evenson & Fleury, 2000; Whitemore, Melkus, & Grey, 2004). This study sought to examine environmental influences with a specific focus on community factors.

Assumptions

Three assumptions underlie this work. First, because Montana and Wyoming are rural states in which all counties are designated as either rural or frontier and CVD is the leading cause of death in both states, it is assumed that there is a large number of residents with CVD living in rural settings in these areas. Secondly, it is assumed that the socioecologic model is an appropriate framework for the purpose of this study. Lastly, it

is assumed that participants will be able to provide information regarding their perceptions of barriers to participation in CR.

Definitions

1. *Urban*. Urban was defined as a community with a population equal to or greater than 50,000
2. *Rural*. Rural was defined as a community with a population of 10,000 or less and 15 or more miles from a community with a population of 50,000 or greater.
3. *Health*. The definition of health was defined as “the ability to work, to be productive, and to do usual tasks” (Long & Weinert, 1998).
4. *Cardiac Rehabilitation*. Cardiac rehabilitation was defined as the “coordinated, multifaceted interventions designed to optimize physical, psychological, and social functioning, in addition to stabilizing, slowing, or even reversing the progression of the underlying atherosclerotic processes, thereby reducing morbidity and mortality” (Leon et al., 2005, p. 369).
5. *Barrier*. A barrier was defined as an influence that decreases the likelihood of participation in a CR program.
6. *CVD*. CVD was defined as disease involving the heart and or blood vessels that impairs normal function (AHA, 2005).
7. *Health Perceptions*. Health perceptions were broadly defined as subjective beliefs, attitudes, or ideas about health and illness.

CHAPTER 2

REVIEW OF LITERATURE

A review of the literature pertaining to factors influencing participation in cardiac rehabilitation (CR) revealed that few studies specifically addressed these factors in rural-dwellers. Chapter 2 will contain a summary of the literature findings regarding CR, barriers to participation, and rural health as related to the socioecologic framework.

Cardiac Rehabilitation

In 2005, the AHA published a scientific statement regarding the importance and effectiveness of CR programs in providing preventive care to populations with CVD (Leon et al., 2005). CR provides not only an exercise program to promote cardiovascular health, but also comprehensive strategies geared towards risk factor modification. These strategies include, but are not limited to nutritional counseling; stress management; support for lifestyle changes; social support; vocational counseling; and aggressive management of hypertension, lipids, weight, diabetes, and smoking (Child, 2004; Leon et al., 2005; Stewart, Badenhop, Brubaker, Keteyian, & King, 2003). Historically, CR was recommended for persons who recently had a MI or CABG surgery; however this has been expanded to include those who have undergone a PCI or have chronic CVD, including HF and peripheral vascular disease (PVD) (Leon et al., 2005).

Numerous studies demonstrated the effectiveness of CR in reducing mortality, morbidity, and modifiable risk factors (Bankier, Littman, Rees, Ebrahim, & Ades, 2002;

Kardis, Bruce, Michaels, & Barnett, 2005; Stewart, Badenhop, Brubaker, Keteyian, & King, 2003; Witt et al., 2004). CR has been shown to reduce mortality 20-30%, which is similar to the benefits associated with cardiac drugs and surgery (Jackson, Leclerc, Erskine, & Linden, 2005). Participants in CR also demonstrated a significant reduction in total cholesterol and systolic blood pressure, and show improvements in perceived quality of life (Aoun & Rosenberg, 2004; Aude, Hill, & Anderson, 2006; Haskell, 2003; Kardis, Bruce, Michaels, & Barnett, 2005; Taylor, Brown, Ebrahim, Jolliffe, Noorani, Rees, et al., 2004; Warrington, Cholowski, & Peters, 2003). The effectiveness of CR in persons with CVD is significant and supported extensively in the literature; however, many factors can influence access and utilization of these services

Participation in Cardiac Rehabilitation

Despite empirical evidence supporting its effectiveness and efficiency, the majority of eligible persons in the US do not participate in CR programs (Jackson, Leclerc, Erskine, & Linden, 2005; Leon et al., 2005; CDC, 2003). Many researchers have investigated the potential reasons for the underutilization of CR services by examining patterns of participation and potential barriers. Contributing factors identified in these studies can be categorized using a socioecologic framework into intrapersonal, institutional, public policy, and community factors.

Intrapersonal

Health beliefs and personal characteristics including lack of motivation, fear, the belief that CR is not needed, multiple comorbidities, and age have played an important role in health behaviors (Evenson & Fleury, 2000; Sanderson, Phillips, Gerald, DiLillo,

& Bittner, 2003). Lack of motivation, fear, or the belief that CR is not needed have been shown to negatively influence the likelihood of participation (Cooper, Jackson, Weinman, & Horne, 2005; Evenson & Fleury, 2000). Persons who were highly motivated and believed that participation would result in positive outcomes were more likely to participate in a CR program (Cooper, Jackson, Weinman, & Horne, 2005; Evenson & Fleury, 2000). A lack of understanding or misconceptions about the role of exercise and risk factor modification in persons with CVD also impacted beliefs about the necessity of CR following an acute coronary event such as MI, PCI, or CABG surgery (Cooper, Jackson, Weinman, & Horne, 2005). Persons with multiple comorbidities or illness were less likely to participate and more likely to drop out of a CR program due to decreased functional capacity or complications (Sanderson, Phillips, Gerald, DiLillo, & Bittner, 2003). In several studies age impacted participation in a non-linear manner, with the elderly and those younger than 55 less likely to participate (Gallagher, McKinley, & Dracup, 2003; Jackson, Leclerc, Erskine, & Linden, 2005); however a study conducted on rural dwellers found older age to be a facilitator to participation (Johnson, Weinert, & Richardson, 1998).

Another significant intrapersonal factor consistently found to influence participation in CR was gender, although this factor was also widely affected by interpersonal, organizational, and policy factors. For example, women were less likely to participate in CR and participation was found to be influenced by lack of physician referral, role resumption, and lack of spousal support (Beswick, Rees, West, Taylor, Burke, Griebisch, et al., 2005; Evenson & Fleury, 2000; Gallagher, McKinley, & Dracup, 2003; Jackson, Leclerc, Erskine, & Linden, 2005; McSweeney & Coon, 2004). Women

who were married were less likely to participate than those who were not married and many reported experiencing a lack of motivation, feeling too tired or sick, or that they were doing well without the program (Benz-Scott, Ben-Or, & Allen, 2002; Gallagher, McKinley, & Dracup, 2003; Jackson, Leclerc, Erskine, & Linden, 2005). In a qualitative study conducted by McSweeney and Coon (2004), women reported that social support and motivation were important facilitators of participation. Contributing to the underutilization of CR by women were financial concerns and a lack of insurance coverage, which may be felt more strongly by women who statistically experience a lower socioeconomic status (Halm, Penque, Doll, & Beahrs, 1999; Missik, 2001). Research findings indicated that women were consistently underrepresented in CR programs, although they experience the same benefits as their male counterparts (Benz-Scott, Ben-Or, & Allen, 2002; Beswick, Rees, Griebisch, Taylor, Burke, West, et al., 2004; Bittner & Sanderson, 2003; Gallagher, McKinley, & Dracup, 2003; McSweeney & Coon, 2004).

Interpersonal

Interpersonal factors are characterized by relationships with family, friends, neighbors, and healthcare providers and include physician referral and support, family support or conflict, and social support. The impact of these relationships on participation in CR was significant in all studies reviewed. One important interpersonal factor consistently identified was physician referral and support (Benz-Scott, Ben-Or, & Allen, 2002; Bittner & Sanderson, 2003; McSweeney & Coon, 2004). Despite empirical evidence and strong recommendations from organizations such as the AHA, physicians continue to under-refer qualified persons for whom CR is indicated

(Leon et al., 2005). Those least likely to be referred were women and those without health insurance. Physician support was identified as an important facilitator to participation in numerous studies signifying the importance of their role in health maintenance and the need for programs to market to and collaborate with physicians (Cooper, Jackson, Weinman, & Horne, 2005; Evenson & Fleury, 2000; Jackson, Leclerc, Erskine, & Linden, 2005; Johnson, Weinert, & Richardson, 1998).

Other interpersonal factors affecting CR participation included family support or conflict (Evenson & Fleury, 2000; Jackson, Leclerc, Erskine, & Linden, 2005). Family obligations and role resumption following an acute coronary event were identified as barriers while spousal support, and the encouragement of friends and family were strong facilitators of participation (Evenson & Fleury, 2000; Johnson, Weinert, & Richardson, 1998). Social support was especially important for rural-dwellers who were more likely to participate in CR if they had a strong support network, despite the presence of other barriers (Johnson, Weinert, & Richardson, 1998).

Institutional

Institutions are defined as organizations or groups of people intentionally structured to accomplish a common goal or set of goals (Stokols, 1996). Institutions such as employers, church, and health care organizations often exert a daily influence on persons' lives. Factors associated with institutions can have significant influences on health behaviors both as facilitators and barriers. The most common institutional factor that influenced participation in CR was employment (Evenson & Fleury, 2000; Jackson, Leclerc, Erskine, & Linden, 2005; Johnson, Weinert, & Richardson, 1998). For men, returning to work was a barrier to participation in a CR program; however in a study

conducted by Gallagher, McKinley, and Dracup (2003), employment was a positive predictor of attendance for women. In rural settings, those who were not employed were more likely to participate in a CR program (Johnson, Weinert, & Richardson, 1998), a finding that may have resulted from scheduling conflicts and long commuting distances.

Public Policy

Policy related factors, including finances, insurance coverage, and Medicare reimbursement were found to be significant predictors of participation (Beswick, et al., 2005; Evenson & Fleury, 2000; Jackson, Leclerc, Erskine, & Linden, 2005). Lack of insurance and lower socioeconomic status were associated with a decreased rate of physician referrals and subsequent decreased rate of enrollment in CR. High socioeconomic status was an independent facilitator to participation in CR (Jackson, Leclerc, Erskine, & Linden, 2005).

Community

Distance to program was found to be a barrier in numerous studies (Benz-Scott, Ben-Or, & Allen, 2002; Beswick, et al., 2004; Beswick, et al., 2005; Evenson & Fleury, 2000; Jackson, Leclerc, Erskine, & Linden, 2005; Sanderson, Phillips, Gerald, DiLillo, & Bittner, 2003). Distance implies a certain degree of separation between persons and healthcare resources and may be described in terms of space or time (Henson, Sadler, & Walton, 1998). Isolation refers to the experience of being set apart from others and may be related to distance. Geographic isolation may increase the impact of community related barriers in rural populations. The results of one study examining rural residents' use of CR programs indicated that persons with greater

traveling distances may be less likely to participate in a CR program (Johnson, Weinert, & Richardson, 1998). Further complicating this issue for rural-dwellers is the lack of available transportation systems and potential hazardous road conditions.

Failure to participate in a CR program is likely a result of the interrelationship of multiple factors. These factors can be intrapersonal, interpersonal, institutional, community, or public policy. There are; however, few studies in the literature regarding perceived barriers to CR participation in rural persons with CVD. A review of the literature regarding rural health concludes this chapter.

Rural

At the heart of rural nursing theory is the recognition that while many health issues and experiences may be similar in those living in urban and rural areas, differences in health perceptions and needs may exist supporting the need for research that specifically addresses this group (Arcury et al., 2005; Lee & Winters, 2004; Winters & Mayer, 2002). Lee and Winters (2004) found that rural-dwellers related their level of health to their ability to function and “do the things you want to do” (pg. 7). Recognized characteristics of rural-dwelling included greater spatial distance between people and services, agricultural or land/nature focused economic structure, recreational and work activities that are seasonal in nature, and informal or face-to-face interactions that recognize that most residents are either related or acquainted (Bushy, 2005; Long & Weinert, 1998). Rural-dwellers are often seen as self-reliant and more comfortable seeking health care through informal rather than formal networks (Long & Weinert,

1998). These factors signify the potential differences in health behaviors and experiences of rural-dwellers when compared to those living in more urban settings.

Arcury, et al. (2005) found that geography and spatial behavior influenced utilization of health care services. While distance was not a significant factor in the number of chronic and acute care visits, issues affecting mobility were found to play a significant role in access and utilization of health services. Access can be affected by numerous variables including having a driver's license and vehicle for travel. While those living in urban areas may have other alternatives for transportation to healthcare, rural-dwellers have fewer options if no longer able to drive. Arcury, et al (2005) concluded that there is continuing inequity in the utilization of healthcare resources by persons living in rural areas.

Geographical differences noted by researchers at the National Center for Statistics (Eberhardt, Ingram, & Makuc, 2001) showed that rural-dwellers ranked poorly on a majority of population health indicators including health behaviors, mortality, morbidity, and maternal and child health measures. These differences further highlight health disparities in rural populations. Other findings pertinent to cardiovascular health include an increased rate of smoking, inactivity, poor nutritional habits, and obesity (Eberhardt, Ingram, & Makuc, 2001). While geographical differences can be identified that may affect access and utilization of general healthcare services, it is unclear how these influence CR participation in rural-dwellers. This study focused on the influence of community factors as barriers to participation in CR for rural dwellers.

Summary

CR promotes cardiovascular health through regular exercise and ongoing support for risk factor modification. Despite the effectiveness of such programs they continue to be underutilized by eligible individuals with CVD who could benefit from participation. A review of the literature ascertained numerous potential barriers to participation in CR, which can be categorized as intrapersonal, interpersonal, institutional, public policy, or community-related. Only two studies were found in which researchers specifically examined these factors in rural-dwellers (Johnson, Weinert, & Richardson, 1998; Yates, Bracklow-Whitton, & Agrawal, 2003). There is a growing body of knowledge regarding rural nursing theory (Long & Weinert, 1998; Lee & Winters, 1994) which identifies potential differences in health beliefs and behaviors. While these differences may have been established, the extent of their impact on participation in CR needs further examination.

CHAPTER 3

METHODS

Design

The study utilized a comparative correlation design. The dependent variables explored were community level barriers to participation in cardiac rehabilitation (CR) identified through a review of literature using the following key words: cardiac rehabilitation, barriers to participation, and rural health. The specific dependent variables examined in this study were distance, access to healthcare and other resources, transportation, employment conflicts, and health seeking behaviors. The independent variable was degree of rurality.

Population and Sample

A non-random convenience sample of persons admitted to a regional acute care hospital in south central Montana for treatment of an acute coronary event or exacerbation of a chronic cardiovascular condition during a 14 week period of time were asked to participate in the study. Adults, 21 years and older who could speak, read and write English and admitted with a diagnosis of CVD (MI, HF, and angina) or for a cardiac related intervention (PCI, CABG surgery, and valve surgery) were eligible for the study.

Setting

The study was conducted at a 300 bed regional healthcare center which provides a variety of inpatient and outpatient services to a large geographical area including central, south-central, and eastern Montana and northern Wyoming. Inpatient services include general medical-surgical services, cardiac catheterization laboratory, cardiovascular surgery, cardiac intensive care, and telemetry. In addition to the inpatient services, this healthcare center also provides a variety of outpatient services including four primary health care clinics and four outreach clinics in surrounding rural communities; outpatient rehabilitation, including CR; a diabetes center; and emergency services, including a flight program.

Procedures for Data Collection

Hospital staff, including registered nurses and exercise physiologists, working in CR at the health care center where the study was conducted, screened and consented participants following a thorough orientation to the study provided by the primary investigator (see Appendix C). Staff approached all eligible participants during a 14 week period of time from October to January and provided an explanation of the study. Interested persons were given a questionnaire and cover letter that included an explanation of the study, procedures to maintain confidentiality, contact information for the primary investigator and faculty sponsor, and instructions to complete the questionnaire (see Appendices A and B). Willingness to complete the questionnaire was

deemed as consent and no signed consents were obtained. Completed questionnaires were collected by the hospital staff, placed in a designated folder located on the hospital unit, returned to the primary investigator, and then stored in a locked file cabinet in the office of the primary investigator at Montana State University, College of Nursing, Billings Campus. The primary investigator was not directly involved in the data collection to eliminate potential bias or coercion. No identifiable data were collected from participants to maintain the anonymity of their responses.

Instruments

The five-part questionnaire used for this study included 1) the MSU Rurality Index, 2) the Medical Outcomes Study (MOS) Short Form 12 (SF-12), 3) questions from the MOS Social Support Survey regarding tangible support, 4) questions specifically written by the primary investigator to examine community level barriers to participation in CR, and 5) standard demographic questions. The questionnaire was eight pages long and took approximately 30 minutes to complete. The first section of the questionnaire solicited information necessary to determine rurality using the MSU Rurality Index, an instrument designed to assign a quantitative measure of rurality to each participant in the study based on a rural/urban continuum that avoids artificial categorization (Weinert & Boik, 1995). An interval level score for degree of Rurality is assigned to each participant which is calculated utilizing the participant's county of residence as reported in the US Census and the distance in miles to emergency care as self-reported by the study participant (Weinert & Boik, 1995).

The MOS SF-12® survey (RAND Corporation) was utilized to gather health status information about the participants in the study. The SF-12® is a brief self-administered survey that is widely accepted and psychometrically sound with similar test-retest reliability ($RC = 0.75$) validity ($R = 0.94$), and responsiveness when compared to the longer SF-36® ($RC = 0.81$) (Bohannon, Malhanian, Lee, & Ahlquist, 2004; Hurst, Ruta, & Kind, 1998). The shorter version was used in this study in an attempt to minimize the length of the questionnaire while still obtaining valid and reliable health status information. In addition, four questions from the MOS Social Support Survey regarding tangible support were included to gather additional information about participants.

The third part of the questionnaire included 17 questions regarding potential community level barriers to participation in CR. The variables examined were distance, access to healthcare and other resources, transportation, employment, and health seeking behaviors. Questions were developed to examine the perceptions of the study participants regarding these variables using a 7-point Likert scale. This scale ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Questions about related variables were placed in random order and reverse coding was used to assist in determining reliability of the responses. Face validity of developed questions regarding community levels barriers to participation in CR was determined through extensive expert review by members of the principal investigator's thesis committee.

Demographic information was collected in the final section of the questionnaire. Items used in this section were congruent with items used by the US Census Bureau and

included age, gender, race, marital status, living situation, employment status, income level, and educational background.

Human Subjects Consideration

The study was approved by the Montana State University Institutional Review Board (IRB) and the Billings IRB Executive Committee. Permission was also obtained from the directors of the hospital units where data collection occurred.

Statistical Analysis

The dependent variables in this study were community level barriers to participation in CR which included: 1) distance, 2) access to resources, 3) transportation, 4) employment, and 5) health seeking behaviors. The independent variable in this study was rurality.

The SF-12® was utilized as a means of gathering health status information about the participants. Results from the SF-12® questions were scored using software provided by QualityMetric.

Community barriers to participation in CR were explored by asking participants to indicate their level of agreement with statements concerning barriers to participation. A total of 17 questions were posed which included four questions for the variables of distance and access to resources and three questions for the variables of transportation, employment, and health seeking behaviors. One question per variable was negatively worded to aid in the interpretation of the validity of the results. The mean responses to

questions regarding each variable were calculated and compared using Statistical Package for the Social Sciences (SPSS).

The degree of rurality was not calculated using the MSU Rurality Index due to participant misinterpretation of the question asking about their county of residence. Instead, the participants were dichotomized as rural or non-rural based upon the size of the city or town that the participant lived in or lived closest to. Participants living in or closest to a city or town with 10,000 or fewer people were categorized for the purpose of analysis as rural and participants living in or closest to a city or town with more than 10,000 people were categorized as non-rural.

CHAPTER 4

RESULTS

Sample Demographics

The study was conducted for a predetermined 14 week period of time from October 2006 to January 2007. Sixty-four participants completed questionnaires during the data collection period. Table 1 and 2 contain demographic data for the sample.

The majority of participants were male (67.2%; $n = 41$), white (90.6%; $n = 58$), older ($M = 68.69$ years), educated (57.8%; $n = 37$), married (60.9%; $n = 39$), and lived with a spouse or significant other (64.1%; $n = 41$). Four participants did not indicate their race, four did not indicate their marital status, and five did not indicate their living arrangement. There were 30 participants (47%) who reported living in a city or town with 10,000 or fewer people and 34 participants (53%) who reported living in a city or town with greater than 10,000 people. An equal number of participants reported living in cities or towns with less than 1,000 people (17.2%, $n = 11$) and in cities or towns with more than 10,000 people (17.2%, $n = 11$).

The highest level of education reported was four or more years of college (28.1%, $n = 18$) with most participants reporting that they had attended one to three years of college (29.7%, $n = 19$). Four participants (6.3%) did not indicate their education level. Most participants (23.4%, $n = 15$) reported an income level of \$20,000 to \$34,999. Incomes ranged from less than 10,000 (7.8%; $n = 5$) to greater than \$75,000 (7.8%; $n = 5$). Ten participants (15.6%) did not provide information regarding income. Thirty-two

of the participants (50%) indicated that they were retired and 12 participants (18.8%) indicated that they were employed for wages.

Table 1
Age, Gender, Race, Marital Status, Living Arrangement, and Size of City/Town of Sample (N = 64)

Response		Number of Cases	% of Total Sample
Age	40-50	3	4.7
	51-60	12	18.8
	61-70	18	28.1
	71-80	19	29.7
	Other	12	18.8
Gender	Male	41	67.2
	Female	20	32.8
	Did not indicate	3	4.7
Race	White	58	90.6
	American Indian or Alaska Native	2	3.1
	Did not indicate	4	6.3
Marital Status	Married	39	60.9
	Divorced	9	14.1
	Widowed	7	10.9
	Never married	3	4.7
	Other	2	3.1
	Did not indicate	4	6.3
Living Arrangement	Live alone	15	23.4
	Live with spouse or significant other	41	64.1
	Live with family member	3	4.7
	Did not indicate	5	7.8
City/Town Population	<1,000	11	17.2
	1,001-2,500	7	10.9
	2,501-5,000	8	12.5
	5,001-10,000	8	12.5
	10,001-30,000	9	14.1
	30,001-50,000	3	4.7
	50,001-100,000	6	9.4
	>100,000	11	17.2

Table 2
Education, Income, and Employment Status of Sample (N = 64)

Response		Number of Cases	% of Total Sample
Education	Grade 1-8 (some elementary/middle school)	5	7.8
	Grade 9-11 (some high school)	5	7.8
	Grade 12 or GED	13	20.3
	College 1-3 years (some college or tech school)	19	29.7
	College 4 or more years	18	28.1
	Did not indicate	4	6.3
Income	<10,000	5	7.8
	10,000-19,999	13	20.3
	20,000-34,999	15	23.4
	35,000-49,999	7	10.9
	50,000-74,999	9	14.1
	75,000 or greater	5	7.8
	Did not indicate	10	15.6
Employment	Employed for waged	12	18.8
	Self-employed	11	17.2
	Homemaker	3	4.7
	Retired	32	50
	Unable to work	3	4.7
	Did not indicate	3	4.7

Community Level Barriers to Participation

Calculated means for the community level factor subscales of distance, access to resources, transportation, employment, and health-seeking behaviors were compared utilizing an independent samples t-Test. Table 3 contains the results of the comparison of means to determine differences between the rural and non-rural group.

Table 3
T-Tests Comparing Rural and Non-rural Participants' Mean Responses Regarding Perceptions of Community Level Barriers to Participation in Cardiac Rehabilitation (N = 64)

Dependent variable		<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>P*</i>
Distance	Rural	4.241	1.386	2.270	49	.028
	Non-rural	3.427	1.143			
Access to Resources	Rural	3.029	0.963	2.895	50	.006
	Non-rural	2.289	0.879			
Transportation Issues	Rural	2.926	1.436	-0.326	52	.746
	Non-rural	3.062	1.620			
Employment Conflicts	Rural	2.877	1.199	1.125	52	.266
	Non-rural	2.506	1.220			
Health-seeking behaviors	Rural	3.966	1.142	-1.516	53	.135
	Non-rural	4.423	1.090			
Mean Community Barriers	Rural	3.412	0.8523	1.428	44	.160
	Non-rural	3.072	0.7604			

*Two-tailed *p* values

Statistically significant results on comparison of rural and non-rural mean responses were observed for the factors of distance and access to healthcare and other resources. As predicted, an independent samples t-Test showed that rural persons ($M = 4.24$, $SD = 1.386$) perceive the variables of distance as more of a barrier to participation in cardiac rehabilitation (CR) than non-rural persons ($M = 3.427$, $SD = 1.143$), $t(49) = 2.70$, $p = .028$. Access to resources was also perceived as more of a barrier by rural persons ($M = 3.029$, $SD = 0.963$) than non-rural persons ($M = 2.289$, $SD = 0.879$), $t(50) = 2.895$, $p = .006$. Statistically significant findings for the community level factors of transportation, employment, health-seeking behaviors, or overall mean of community level factors were not observed.

An observed increase in means was demonstrated on comparison of rural and non-rural participants in the subscales of employment factors and overall community factors, although this difference was not statistically significant. An observed decrease in means was demonstrated on comparison of rural and non-rural participants in the subscales of transportation factors and health-seeking behaviors, which was an interesting finding; although not statistically significant. These results suggest that living in a rural area may affect perceptions of community level factors as barriers to participation in CR.

CHAPTER 5

DISCUSSION

The conceptual framework used in this study was the socio-ecologic framework, which recognizes the inherent interaction of the individual with both the social and physical environment. Factors influencing health behaviors are classified as intrapersonal, interpersonal, institutional, community, and public policy. This study specifically focused on the community level factors that may influence participation in cardiac rehabilitation (CR) as identified in the literature. These factors included 1) distance, 2) access to resources, 3) transportation, 4) employment, and 5) health seeking behaviors.

The purpose of this study was to achieve a better understanding of perceived community level barriers to rural persons' participation in CR programs. The research question addressed by this study was: Does rurality affect perceptions of community factors as barriers to participation in CR? The hypothesis for this study was that rural persons will perceive community factors as more of a barrier to participation in CR than persons living in a non-rural setting.

The findings of this study indicated that there was a significant difference in the perceptions of distance and access to healthcare resources as barriers to participation in CR between rural and non-rural persons. In particular, persons living in or closest to a city or town of 10,000 or fewer people demonstrated a statistically significant increase in mean scores related to the community level barrier of distance. These findings support

those from two previous studies examining the effect of distance on CR participation in rural persons (Johnson, Weinert, & Richardson, 1998; Yates, Braklow-Whitton, & Agrawal, 2003). Johnson, Weinert, and Richardson (1998) conducted a study of 254 adults living in rural areas to identify the factors that influenced the use of CR services by rural residents. These researchers identified that a greater degree of rurality and inaccessibility of CR programs was negatively correlated with participation in CR ($r = -0.27, p = .001$). Another study conducted by Yates, Braklow-Whitton, and Agrawal (2003) compared the characteristics of participants and nonparticipants in CR. These researchers found that nonparticipants lived significantly farther away ($M = 27.3$) than participants ($M = 10.7, t(220) = 5.46, p < .05$).

The significant findings from this study regarding rural persons perceptions of distance and access to healthcare resources as barriers to participation in CR are consistent with the findings from other studies which have identified barriers for other preventive health services in rural populations (Arcury et al., 2005; Strickland & Strickland, 1996; Stuijbergen, 1999; Zhang, 2003). Arcury, et al. (2005) surveyed 1,059 adults in rural Appalachian North Carolina using a cross-sectional design to examine the importance of geography and spatial behavior as predisposing and enabling factors in rural health care utilization. These researchers found that the distance traveled for routine check-ups was significantly associated with the number of visits, with those persons with a 1 km larger distance having 5% fewer regular check-up visits than persons with a shorter distance to care.

Another study conducted by Stuijbergen (1999) examined the barriers and health behaviors of in a sample of 807 persons with multiple sclerosis living in rural ($n = 204$,

25%) and urban ($n = 603$, 75%) environments. Respondents were asked to indicate how often specific barriers kept them from taking care of their health using a 4-point scale with 1 = “never” and 4 = “routinely.” The findings from this study indicated that rural residents ($M = 2.22$, $SD = 1.05$) reported the lack of convenient facilities as a more frequent barrier than urban residents ($M = 1.88$, $SD = 0.95$, $t = -4.12$, $p < .01$). In addition, Zhang (2001) studied the difference in access to health care services between different population groups in rural areas of the US. A sample of rural persons ($N = 17,412$) was divided into four different classifications based on the urban influence codes developed by the Economic Research Service of the US Department of Agriculture (USDA). The findings of Zhang’s study indicated rural persons living in a county that was adjacent to a metropolitan statistical area (MSA) had better access to health care services than rural residents who lived in a county not adjacent to an MSA.

Distance has previously been identified by researchers as a barrier to participation in CR for non-rural persons as well (Benz-Scott, Ben-Or, & Allen, 2002; Beswick, et al., 2004; Evenson & Fleury, 2000; Jackson, Leclerc, Erskine, & Linden, 2005; Sanderson, Phillips, Gerald, DiLillo, & Bittner, 2003). A meta-analysis of 32 studies examining CR referral and adherence predictors conducted by Jackson, Leclerc, Erksine, and Linden (2004) found that a long distance to a CR program was one of the strongest negative predictors of CR participation. Distance to a CR program was identified as a barrier in each of the five studies examining CR participation that were reviewed by these researchers. Benz Scot, Ben-Or, and Allen (2002) conducted a review of 23 studies to identify patient, provider, and programmatic factors that may influence women’s referral to, enrollment in, and completion of outpatient CR. These researchers identified that

place or residence in relation to CR program location was an important factor that may be a barrier to participation. The findings from previous studies were not supported by the results of the study reported here in which non-rural persons did not identify distance to be a barrier to participation in CR ($M = 3.427$, $SD = 1.143$).

Furthermore, community level factors of employment, transportation, and health-seeking behaviors explored in this study were not identified as barriers by rural persons significantly more than non-rural persons. However, while not statistically significant, the mean for employment related barriers to participation in CR was slightly higher in the rural group when compared to the non-rural group. This difference might be related to the nature of rural employment, which is more likely to be agriculturally based than in non-rural settings (Bushy, 2005; Newhouse, 2005) and may result in unique challenges related to participating in an ongoing CR program such as the lack of paid work leave or flexible work schedules. It should be noted that the majority of the participants in this study were reported to be retired, which might account for the lack of significance in the findings related to employment.

Issues related to transportation were not identified as significant in this study. In fact, the non-rural participants ($M = 3.0617$, $SD = 1.619$) rated this as more of a barrier than the rural participants ($M = 2.9259$, $SD = 1.436$), although an independent samples t-Test did not indicate statistical significance ($t(52) = -0.326$, $p = .746$). Rural persons may have learned to adapt to the challenges related to transportation as this is something that is present in their day to day lives and may not identify transportation as a significant barrier to participating in CR.

Several qualitative studies have identified characteristics related to health-seeking behaviors in rural persons (Chafey, Sullivan, & Shannon, 1998; Lee & Winters, 2004; Long & Weinert, 1998) that may influence perceptions of community level factors as barriers to participation in CR. Rural persons have been reported to value autonomy and self-reliance (Chafey, Sullivan, & Shannon, 1998), be more likely to utilize informal networks for health related needs (Grossman & McNerney, 1998), and define health as the ability to work and be active (Lee & Winters, 2004); which may ultimately influence health-seeking behaviors, especially regarding preventive services. However, this study found no significant difference in health-seeking behaviors as barriers to participation in CR between rural and non-rural persons.

While this study specifically focused on the community level factors of the socio-ecologic framework, it is important to recognize the inherent influence of multiple levels of factors. The statistical analysis conducted did not specifically compare the results of the participants' perceived health status and level of tangible social support, which reflect other levels of the socio-ecologic framework (intrapersonal and interpersonal) and were not directly related to the research question for this study. It is important to remember that factors related to the other levels of the socio-ecologic framework may ultimately influence participation in CR by either assisting rural persons to overcome community level barriers or increasing the impact of these barriers.

Study Limitations

The study was conducted in one community hospital, in one western state in the US, over a limited period of time. It is important to note that one potential bias of this study is that individuals who participated may be different from the general population or persons living in other rural areas of the US; therefore, the results may not be generalized to all rural populations

Another limitation to this study was the relatively small sample size ($n = 64$). While two community level factors demonstrated statistical significance; three other factors demonstrated differences in means, but not at a statistically significant level. The lack of significance may be attributed to the size of the sample population and insufficient power.

Lastly, a portion of the research questionnaire was comprised of questions that were specifically written for this study. One limitation regarding the use of these questions was that they have not undergone rigorous testing to demonstrate validity and reliability.

Implications

Research

Previous research in urban settings has consistently identified lack of transportation and physical access as specific barriers to participation in CR. There has been limited research in the areas of barriers to participation in CR in rural populations; however the results of two previous studies indicated that distance to CR program, lack

of transportation, poor weather conditions, and employment conflicts were important community level barriers (Johnson, Weinert, & Richardson, 1998; Yates, Braklow-Whitton, & Agrawal, 2003). In this study, only distance and access to resources were found to be significant. Additional research is needed with a larger sample of rural persons to identify barriers that are specific to rural populations. Furthermore, more research is needed to specifically examine the affect of other levels of the socio-ecologic framework as barriers to participation in CR in rural persons, including how factors from different levels influence each other and individual health behaviors. Additional information about community level barriers to participation will assist health care providers when planning and implementing CR programs in rural areas. .

The questions used to identify participant perceptions of community level factors as barriers to CR participation developed for this study have not undergone psychometric testing. One recommendation for future research is the further testing of this questionnaire to establish reliability and validity.

Education

It is important for healthcare providers to understand the factors that contribute to participation in CR. The results of this study support previous research findings regarding the impact of distance and access to healthcare resources for persons living in rural areas and should be integrated into formal and informal nursing education, especially in states with predominantly rural populations. Integrating knowledge of potential barriers to participation into the plan of care and education provided to patients and their families during discharge teaching in the acute care setting is also important.

Practice

Distance and access to health services should be considered when planning, implementing, and evaluating CR programs in geographical regions that contain significant rural populations. Currently, the method of delivering CR programs continues to follow a conventional approach even in rural states. Traditionally, CR classes are offered on-site three days a week, requiring travel to and from the CR program location. CR program coordinators should consider utilizing a more flexible scheduling structure that would allow rural persons living significant distances away to attend less frequently (1-2 times per week). Nurses also need to consider the impact of other levels of the socio-ecologic framework when planning and implementing CR programs as what might be helpful for one individual may not be effective for another.

In addition, strategies to deliver CR using distance technologies must be considered when designing programs for rural persons. Using distance technology to deliver health services has been shown to improve physiological and psychological outcomes, as well as decrease readmissions and overall health care costs (Dollard, Smith, & Thompson, 2004). Services that might be utilized include telephone contact, home visits, and computerized education and support.

Southard, Southard, and Nuckolls (2003) conducted a randomized, clinical trial ($N = 104$) evaluating the effectiveness of an internet-based program CR program that provided risk factor education and management training, as well as monitoring services. These researchers found that the internet-based intervention group ($n = 53$) experienced

fewer cardiovascular events (15.7%) than the group who received usual care (4.1%, $p = .053$), which resulted in a cost savings of \$1418 per patient. More research into the use of internet-based CR programs is needed, but this study presents compelling evidence to support the consideration of these programs in areas with significant rural populations.

Some evidence indicates that patients may prefer to have a choice between a hospital-based versus home-based CR program (Dollard, Smith, Thompson, & Stewart, 2003; Harris, Record, Gilbert-Arcari, Bunnell, et al., 2003; Wingham, Hasanain, Sweeney, & Evans, 2006). In a qualitative study exploring influences on choice between hospital or home-based CR; Wingham, Dalal, Sweeney, and Evans (2006) found that participants who chose home-based CR were more likely to live rurally and perceived transportation issues to be a barrier to attending CR classes. The availability of a home-based CR program has also been shown to double participation rates in certain populations (from 11% to 22%) (Harris, et al, 2003) and participation in a home-based CR program has been shown to demonstrate similar or superior patient outcomes when compared to a conventional program (Dollard, Smith, Thompson, & Stewart, 2003; Harris, Record, Gilbert-Arcari, Bunnell, et al., 2003; Wingham, Hasanain, Sweeney, & Evans, 2006). Expanding CR services to include internet or home-based programs would improve access to the resources provided in a traditional CR program for rural persons and help these persons overcome distance as a barrier to participation in CR.

Conclusion

The results from this study suggest that the community level factors of distance and access to healthcare resources are perceived as more of a barrier to participation in

rural persons than in non-rural persons. Researchers have consistently demonstrated the benefits of participation in CR for patients with CVD, including decreased mortality and morbidity, and improved quality of life. Persons living in rural settings may have increased barriers that negatively affect their ability to participate. It is important to identify new and inventive ways to address these barriers to increase access to important healthcare resources such as CR for rural populations with CVD.

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APPENDICES

APPENDIX A

QUESTIONNAIRE COVER LETTER

FACTORS AFFECTING PARTICIPATION IN CARDIAC REHABILITATION
Rebecca Echeverri, BSN, RN
Participant Explanation Form

I am a graduate nursing student interested in learning more about people's ability to attend cardiac rehab. Cardiac rehab is a supervised program of exercise, education, and encouragement done on an out-patient basis. A typical rehab program is 3 days per week for about 4-12 weeks. Please take 20 minutes to complete the attached survey. The person who gave you the survey will return to pick it up.

If you decide to complete the survey, you will help nurses better understand the factors that affect people's ability to participate in cardiac rehab. Your participation is strictly voluntary and anonymous. Your answers will be grouped with other peoples' answers and reported as part of a research study I am doing. Your name will not be made public. While people often feel better when sharing information about themselves, some may feel uncomfortable doing that. If you feel uncomfortable, you may stop at any time. If you do not wish to complete the survey, tell the person who gave you the survey that you do not wish to fill it out.

You are welcome to contact me, Rebecca Echeverri, BSN, RN, should you have any concerns or questions about the survey. I can be reached at (406) 657-1731. You may also contact my instructor, Dr. Charlene Winters at (406) 243-4608. If you have concerns about your rights as a research participant, please contact Dr. Mark Quinn, the Chairman of the Institutional Review Board at Montana State University at (406) 994-5721.

Thank you for your time.

Sincerely,

Rebecca Echeverri, RN, BSN

MSU-College of Nursing
MSU-Billings Campus Box 574
1500 University Dr.
Billings, MT 59101
(406) 657-1731
recheverri@montana.edu

APPENDIX B

RESEARCH QUESTIONNAIRE

**FACTORS AFFECTING PARTICIPATION IN CARDIAC REHABILITATION
Study Questionnaire**

Answer the following questions to the best of your ability by entering the information requested in the blank provided. Please provide only one answer per question.

1. How far must you travel for EMERGENCY medical care? *In answering this question think about a potential emergency such as a serious cut from broken glass. How far (ONE WAY) must you travel to get assistance such as stitches? Please try to be as accurate as possible when recording the distance, for example 8 city blocks or 3 ¾ miles, etc.*

Number of miles (one way) _____ miles.
Approximate travel time (one way) _____

2. In what county do you live?

For the following questions, place an “X” next to the answer that best matches your response. Mark only one answer per question.

3. Please describe your source of emergency care (For example: nurse practitioner, hospital, physician’s office, etc).

- _____ Physician office (MD)
- _____ Nurse Practitioner office (NP)
- _____ Physician’s Assistant office (PA)
- _____ Hospital emergency department (ER)
- _____ Other (Please list) _____

4. Where would you describe yourself as living? Check the answer that best corresponds with your living situation.

- | | |
|--|------------------------------------|
| _____ On a farm/ranch | _____ In a medium size city |
| _____ In a rural area (not a farm/ranch) | _____ In a large city |
| _____ In a small rural town | _____ In a suburban area |
| _____ In a small town | _____ In a major metropolitan area |

5. Which best describes the size of the city/town you are currently living in or is closest to you?

- | | |
|------------------------------|--------------------------------|
| _____ Less than 1,000 people | _____ 10,001-30,000 people |
| _____ 1,001 to 2, 500 people | _____ 30,001-50,000 people |
| _____ 2,501 to 5,000 people | _____ 50,001-100,000 people |
| _____ 5,001-10,000 people | _____ More than 100,000 people |

For the following questions, place an "X" next to the answer that best matches your response. Mark only one answer per question

6. Which of the following cities or towns with a cardiac rehabilitation program is closest to you?

- | | | |
|---------------------------------------|--------------------------------------|--|
| <input type="checkbox"/> Billings | <input type="checkbox"/> Glasgow | <input type="checkbox"/> Polson |
| <input type="checkbox"/> Bozeman | <input type="checkbox"/> Glendive | <input type="checkbox"/> Powell, WY |
| <input type="checkbox"/> Buffalo, WY | <input type="checkbox"/> Great Falls | <input type="checkbox"/> Red Lodge |
| <input type="checkbox"/> Butte | <input type="checkbox"/> Hardin | <input type="checkbox"/> Ronan |
| <input type="checkbox"/> Casper, WY | <input type="checkbox"/> Kalispell | <input type="checkbox"/> Sheridan, WY |
| <input type="checkbox"/> Cody, WY | <input type="checkbox"/> Libby | <input type="checkbox"/> Sidney |
| <input type="checkbox"/> Columbus | <input type="checkbox"/> Lewistown | <input type="checkbox"/> Thermopolis, WY |
| <input type="checkbox"/> Dillon | <input type="checkbox"/> Livingston | <input type="checkbox"/> Whitefish |
| <input type="checkbox"/> Havre | <input type="checkbox"/> Miles City | <input type="checkbox"/> Worland, WY |
| <input type="checkbox"/> Gillette, WY | <input type="checkbox"/> Missoula | <input type="checkbox"/> Other (please list) _____ |

7. What is the distance (in miles) from your home to the closest city or town with a cardiac rehabilitation program that you selected in question 6?

- 0-20 miles
- 21-50 miles
- 51-100 miles
- 101-200 miles
- Greater than 200 miles

8. For what reason(s) are you currently hospitalized?

- | | |
|---|--|
| <input type="checkbox"/> Heart attack | <input type="checkbox"/> Heart failure |
| <input type="checkbox"/> Chest pain | <input type="checkbox"/> Cardiac stent |
| <input type="checkbox"/> Coronary artery bypass graft surgery | <input type="checkbox"/> Cardiac balloon angioplasty |
| <input type="checkbox"/> Valve surgery | <input type="checkbox"/> Other (Please list) _____ |

9. In general, would you say your health is excellent, very good, good, fair, or poor?

- Excellent
- Very Good
- Good
- Fair
- Poor

The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

10. First, moderate activities such as moving a table, pushing a vacuum cleaner, bowling or playing golf. Does your health now limit you a lot, limit you a little, or not limit you at all. Please check the response that best corresponds with your answer.

- Limited a lot
 Limited a little
 Not limited at all

11. Climbing several flights of stairs. Does your health now limit you a lot, limit you a little, or not limit you at all?

- Limited a lot
 Limited a little
 Not limited at all

12. During the past four weeks, have you accomplished less than you would like as a result of your physical health?

- No
 Yes

13. During the past four weeks, were you limited in the kind of work or other regular activities you do as a result of your physical health?

- No
 Yes

14. During the past four weeks, have you accomplished less than you would like to as a result of any emotional problems, such as feeling depressed or anxious?

- No
 Yes

15. During the past four weeks, did you not do work or other regular activities as carefully as usual as a result of any emotional problems such as feeling depressed or anxious?

- No
 Yes

16. During the past four weeks, how much did pain interfere with your normal work, including both work outside the home and housework? Did it interfere not at all, slightly, moderately, quite a bit, or extremely?

- | | |
|-------------------------------------|--------------------------------------|
| <input type="checkbox"/> Not at all | <input type="checkbox"/> Quite a bit |
| <input type="checkbox"/> Slightly | <input type="checkbox"/> Extremely |
| <input type="checkbox"/> Moderately | |

These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

17. How much time during the past 4 weeks have you felt calm and peaceful? All of the time, most of the time, a good bit of the time, some of the time, a little of the time, or none of the time?

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little of the time
- None of the time

18. How much of the time during the past 4 weeks did you have a lot of energy? All of the time, most of the time, a good bit of the time, some of the time, a little of the time, or none of the time?

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little of the time
- None of the time

19. How much time during the past 4 weeks have you felt down? All of the time, most of the time, a good bit of the time, some of the time, a little of the time, or none of the time?

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little of the time
- None of the time

20. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities like visiting with friends, relatives etc? All of the time, most of the time, some of the time, a little of the time, or none of the time?

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little of the time
- None of the time

People sometimes look to others for assistance. How often is each of the following kinds of support available to you if you need it? Circle one number for each item.

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
21. Someone to help you if you were confined to bed	1	2	3	4	5
22. Someone to take you to the doctor if you needed it	1	2	3	4	5
23. Someone to prepare your meals if you were unable to do it yourself	1	2	3	4	5
24. Someone to help with daily chores if you were sick	1	2	3	4	5

There may be things that might make it harder for you to attend and follow the guidelines of a cardiac rehabilitation program. For the following statements please indicate the extent of your agreement or disagreement by circling the appropriate number (only one number for each statement).

	Strongly disagree	Disagree	Some-what disagree	Neither agree or disagree	Some-what agree	Agree	Strongly agree
25. The distance to a cardiac rehabilitation program might make it harder for me to attend	1	2	3	4	5	6	7
26. It may be hard to attend cardiac rehabilitation because of the type of work I do	1	2	3	4	5	6	7
27. It may be harder to follow the recommended diet because I do not have easy access to healthy foods	1	2	3	4	5	6	7
28. I prefer to seek help for my health needs from people I know	1	2	3	4	5	6	7
29. I will be able to find a way to get to cardiac rehabilitation classes without too much difficulty	1	2	3	4	5	6	7
30. Not having a cardiac rehabilitation program in my community might make it harder for me to attend	1	2	3	4	5	6	7

	Strongly disagree	Disagree	Some-what disagree	Neither agree or disagree	Some-what agree	Agree	Strongly agree
31. It might be difficult to get the medications I need for my heart problems because of where I live	1	2	3	4	5	6	7
32. I readily trust healthcare providers who are not from my community	1	2	3	4	5	6	7
33. If I were to attend cardiac rehabilitation in January poor road conditions would have made it harder for me to attend	1	2	3	4	5	6	7
34. Not having a reliable vehicle might make it harder for me to attend cardiac rehabilitation classes	1	2	3	4	5	6	7
35. My job will not interfere with my ability to attend cardiac rehabilitation	1	2	3	4	5	6	7
36. Not having a place to exercise close to my home might make it harder for me to attend cardiac rehabilitation	1	2	3	4	5	6	7
37. I would rather attend a cardiac rehabilitation program that is staffed by people from my community	1	2	3	4	5	6	7
38. The cost of gas or car repairs might make it harder to attend cardiac rehabilitation	1	2	3	4	5	6	7
39. It will be hard to take time away from my work to attend cardiac rehabilitation	1	2	3	4	5	6	7
40. Not having a heart specialist in my community will not make it harder for me to attend cardiac rehabilitation	1	2	3	4	5	6	7
41. I will be able to easily access everything I need to follow cardiac rehabilitation guidelines	1	2	3	4	5	6	7

For the following questions please mark the answer that **best** corresponds with your response.

42. How old were you on your last birthday?

_____ years

43. What is your sex?

_____ Male

_____ Female

44. Which of these groups would you say **best** represents your race?

_____ White

_____ Black or African American

_____ American Indian or Alaska Native

_____ Asian

_____ Native Hawaiian or Other Pacific Islander

45. Which of the following **best** describes your ethnicity?

_____ Hispanic of Latino

_____ Not Hispanic or Latino

46. Which of the following best describes your education?

_____ Never attended school or only attended kindergarten

_____ Grades 1 through 8 (some elementary/middle school)

_____ Grades 9 through 11 (some high school)

_____ Grades 12 or GED (high school graduate)

_____ College 1 year to 3 years (some college or technical school)

_____ College 4 years or more (college graduate)

_____ College 4 or more years (graduate school)

47. Which of the following best describes your current employment situation?

_____ Employed for wages

_____ Homemaker

_____ Self-employed

_____ Retired

_____ Out of work for more than 1 year

_____ Unable to work

_____ Out of work for less than 1 year

48. Which of the following best describes your annual household income from all sources?

_____ Less than \$10,000

_____ \$25,000 to less than \$34,999

_____ \$10,000 to less than \$15,000

_____ \$35,000 to less than \$49,999

_____ \$15,000 to less than \$19,999

_____ \$50,000 to \$74,999

_____ \$20,000 to less than \$24,999

_____ Over \$75,000

49. What is your marital status?

_____ Married

_____ Separated

_____ Divorced

_____ Never married

_____ Widowed

_____ Member of an unmarried couple

50. Which best describes your living arrangement?

- Live alone
- Live with spouse or significant other
- Live with family member
- Live with friend or roommate

APPENDIX C

STAFF INSTRUCTIONS

Rebecca Echeverri, BSN, RN, Primary Investigator
CNS Graduate Student, Montana State University
Charlene Winters, DNSc, APRN, BC, Faculty Advisor

Factors Affecting Participation in Cardiac Rehabilitation Staff Instructions

I am conducting a study to investigate community factors affecting participation in cardiac rehabilitation for persons who will be discharged from the hospital following an acute coronary event or exacerbation of a chronic cardiac condition. The research tool being utilized for this study is comprised of 50 questions regarding:

- overall health status
- available support for healthcare needs
- degree of rurality
- perceptions of community level barriers to participation in cardiac rehabilitation

Your assistance is needed to distribute and collect the questionnaires to prevent any potential influence that I might have on study participation or responses. Patient participation in the study is completely voluntary and anonymous. **No names, medical record/account numbers, birthdates, or other identifying information should be written on the questionnaires.**

As many eligible participants as possible should be given the opportunity to complete the questionnaire if they choose to do so. Eligibility criteria for this study are as follows:

- Current hospitalization with a diagnosis that would meet the criteria for referral to outpatient cardiac rehabilitation. Diagnoses include percutaneous coronary intervention (PCI), myocardial infarction (MI), coronary artery bypass surgery (CAB), valve surgery, heart failure (HF), or unstable angina.
- Age 21 or older
- Able to read and comprehend English

Questionnaires are to be distributed to willing participants when you provide their discharge instructions. A brief explanation of the study and purpose of the questionnaire should be provided at this time (see speaking notes). Completed questionnaires will be placed in a designated folder on 3 Tower. I will pick up the completed questionnaires from the 3 Tower folder on a weekly to biweekly basis. I will provide you with copies of the questionnaire for the binder that is carried by the person covering the floor and the file cabinet located in the 3 Tower conference room. Extra copies can also be kept at the Heart and Lung Wellness Center office in a convenient location.

If you have any questions or concerns please contact me by phone or email. My contact information is:

- Home: 248-4587
- Cell: 670-7863
- email: recheverri@montana.edu

You may also contact my faculty advisor, Dr. Charlene Winters at: (406) 243-4608.
Thank you for your willingness to assist me in my research!

Rebecca Echeverri, BSN, RN