GENDER DIFFERENCES IN THE RESPONSE TO RESISTANCE TRAINING IN CARDIAC PATIENTS

By Rulla Sika

We recommend acceptance of this thesis in partial fulfillment of the candidate's requirements for the degree of Master of Science in Clinical Exercise Physiology.

The candidate has completed the oral defense of the thesis.

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UNIVERSITY OF WISCONSIN-LA CROSSE

Graduate Studies

GENDER DIFFERENCES IN THE RESPONSE TO RESISTANCE TRAINING IN CARDIAC PATIENTS

A Manuscript Style Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science

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ABSTRACT

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Women often have reduced self-efficacy for physical activity and particularly for activities that require muscular strength. It is unclear whether normal cardiac rehabilitation programs, which have only minimal resistance training, adequately treat this deficit in self-efficacy. The purpose of this study is to observe changes in self-efficacy in male and female patients across the duration of a cardiac rehabilitation program. Male and female patients enrolled in a Phase II rehabilitation program were assessed for self-efficacy for activities involving walking distance, lifting, carrying, holding and common household tasks near the beginning, mid point and end of their, individually tailored program. The main finding of this study is that women have lower self-efficacy scores prior to and throughout CR. Both genders improved at the same rate with no interaction. Men finished above the arbitrary 85% value for expected self-efficacy for the overall self-efficacy, lifting, carrying, and holding scores while women were below the 85% value for all activities.

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I would like to thank Dr. Carl Foster, my thesis chairperson for his guidance and patients. Thank you Carl for the numerous hours spent steering me through this process. You were the momentum beneath this project that kept it going when I did not think it was possible. Thank you for having faith in my ideas and me.

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I would also like to thank the rest of the Cardiac Rehabilitation staff at Gundersen Lutheren Medical Center. You brought this project into your program seamlessly and I could not have finished without all of your hard work. Words cannot express how grateful I am to have worked with such a wonderful team.

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INTRODUCTION

Cardiovascular disease is the leading cause of death among men and women in the United States, attributable to 1 in every 2.9 deaths in 2006.[1] Contrary to popular belief, more women than men are diagnosed with cardiovascular disease each year. However, fewer women participate in cardiac rehabilitation (CR) programs even though both sexes have been shown to achieve similar clinical benefits.[2,3]

A traditional CR program consists of several elements. According to ACSM's Guidelines for Exercise Testing and Prescription,[4] these include patient monitoring to detect change in clinical status, returning the patient to premorbid vocational and/or recreational activities, helping the patient develop a safe and effective exercise program, and finally to provide the patient and family with education regarding cardiovascular risk factors and sedentary prevention. In most programs, a major emphasis is placed on the exercise portion of the rehabilitation sessions. Patients participate in both aerobic exercises and resistance training (RT). RT is an important part of a CR program and has been shown to increase muscular strength, increase cardiovascular endurance, and modify coronary risk factors (i.e hypertension and hyperlipidemia), while also helping to maintain interest in the workouts.[5]

There are many determinants of participation and success in CR programs including distance from home, transportation, scheduling, support systems (family, friends, and professionals), and pain during exercise.[6] One important determinant of both participation and clinical outcome is self-efficacy. Self-efficacy theory states that human

actions are guided by highly specific estimates of the ability to perform a certain behavior.[7] In short, self-efficacy is how confident a person is that they can perform a certain task which dictates if they will even attempt the task. For example, in the CR setting a patient may have the skills to perform a certain exercise, and be objectively able to do that exercise, but might not have the confidence to try the exercise.[8] Self-efficacy is an important tool and goal for CR because it helps predict whether an activity will be attempted.[7,9] Participation in CR has been shown to increase self-efficacy for a number of activities, mostly those involving ambulatory activity.[10] It is less clear how much activities that require muscular strength and endurance are improved by participation in CR, and even less clear if men and women respond to the same degree. Given that many activities of daily living (ADL's) require muscular strength and endurance, this lack of information represents a practice limitation of CR programs.

This study was designed to evaluate gender differences in self-efficacy for RT in CR patients. Compared with a CR program without RT, men who weight train and improve their strength have improved their self-efficacy scores for activities similar to their training. For example, subjects who increased leg strength, felt more confident in doing leg-related work like walking up stairs.[11] RT is additionally an important part of a CR program because it helps the patient return more safely to their ADL's. In 2003, Kuykendall[12] found that patient goals for CR are heavily related to functional, recreational, and house/yard work. All of these ADL's would reasonably improve upon completion of an effective RT program.

Upon entering an outpatient CR program, women have lower self-efficacy scores than men.[13] It was hypothesized that men would have higher self-efficacy than women

both on entering and completion of a RT program and will have greater improvements in self-efficacy during the part of the program where RT is included.

METHODS

The subjects for this study were from Gundersen Lutheran Medical Center (GLMC) in La Crosse, WI. Subjects included 18 men and 17 women who participated in a Phase II CR program at the hospital. The research participants followed the previously set RT program at GLMC. This study was approved by the Institutional Review Board for the Protection of Human Subjects from the University of Wisconsin-La Crosse and from the Institutional Review Board at GLMC. Subjects provided informed consent prior to participation (Apendix A). Subjects participated in the CR Phase II program for 4-12 weeks following the admitting clinical episode, depending on the needs of the patient.

Outcome information was obtained from questionnaires (Appendix B). Each subject completed the questionnaire at the beginning, middle, and end of their CR program. The middle questionnaire was administered the day the patient was to start RT, but prior to the RT session. The questionnaire was designed based on principles set out by Bandura[7] and a previous self-efficacy questionnaire used in 1995 by Foster.[10] Each questionnaire included 30 questions related to ADL tasks, such as walking and lifting heavy objects. Questions were representative of everyday tasks that involve muscular strength. Accompanying each question was a picture of the corresponding task in a booklet.

Participants were asked to place a self-efficacy score next to each question. Scores were scaled from 0-100%. If participants did not believe they could complete the task they scored that question 0%. If they felt certain that they could complete the

activity in the question, the score was 100%. Percentages were separated into groups with appropriate matching word phrases (0-10% not at all confident, 10-30% a little confident, 30-60% moderately confident, 60-100% extremely confident). Upon completion of the questionnaire, each section's (walking distance, lifting objects, carrying objects, holding objects, and tasks) percentages were averaged. Following the principals outlined by Foster,[10] a reference line was established at 85% self-efficacy with the assumption that patients ideally should leave CR with an objective exercise capacity of $\geq$ 85% and, should accordingly leave CR with an accompanying subjective score of $\geq$ 85% self-efficacy.

Upon beginning RT, each subject was given one-on-one instruction by a staff member. Patients were oriented in proper form, appropriate progression in resistance, and how to record their RT sessions. GLMC asks the Phase II patients to perform 10 exercises including: chest press, bent row, shoulder raise, bicep curl, tricep extension, shoulder shrugs, front pull, calf raises, ball squats, and ball crunches. Exercises were done using dumbbells ranging from 1 to 30 lbs or with resistance bands. Patients were able to pick from 4 resistance bands, each representing a different levels of resistance. Subjects performed 1 set of 10-12 repetitions per exercise while keeping their Rating of Perceived Exertion (RPE) between 11-13 on the 6-20 Borg Scale.

In general, patients performed RT 1 or 2 times a week during their Phase II rehabilitation time. Each RT session usually required between 5-10 minutes. In order for patients to begin RT they had to be 5-6 weeks post coronary artery bypass graft (CABG) surgery, 3-4 weeks post-MI or 3-4 weeks post percutaneous coronary intervention. If a patient was in CR due to stable angina, they began RT when the staff felt they were

ready. Midway through data collection, GLMC began a new type of CABG called minimally invasive direct coronary artery bypass surgery (MiDCAB). No set guidelines were given to the CR staff from the physician as to when patients could begin RT following MiDCAB. The GLMC CR staff began RT when they felt the patient was ready, usually around week 4 into the program. Regardless of the number of weeks in the program, patients were also required to be stable related to conventional criteria prior to beginning to lift weights.

RESULTS

Men had a mean age of 61.8 (± 11.92) years with an average BMI of 32.9 (± 7.94). Women had a mean age of 71.6 (± 8.15) years with an average BMI of 26.3(± 5.47). According to ACSM,[4] a BMI of 33 is categorized as Class I obesity with a high disease risk relative to normal weight and waist circumference. A BMI of 27 is categorized as overweight with an increase disease risk. Disease risk is associated with type 2 diabetes, hypertension, and cardiovascular disease.

Comparison between the 4 and 8 week time points as made using a two-way ANOVE (Groupd x time) with repeated measures. Alpha was set at .05 to achieve significance.

Results indicated a significant main effect for trials with an overall improvement with all participants. Between genders, a significant gender effect was found, with women having lower self-efficacy scores compared to men. No interaction effect was found, meaning both men and women improved at the same rate throughout the RT program.

Table 1 represents all self-efficacy scores for men and women. Scores were listed for each task at the beginning of cardiac rehabilitation (pre-CR), directly prior to RT (pre-RT), and upon the day of graduation from CR (post-CR). Standard deviations are listed next to each percentage.

Self-efficacy scores were also placed into a graph form (Figures 1- 6). Scores were graphed at the beginning of cardiac rehabilitation (pre-CR), directly prior to RT (pre-RT), and upon the day of graduation from CR (post-CR). A subjective line was drawn at 85% representing a possible guideline for patients to meet prior to graduation.

Table 1. Self-efficacy scores (with standard deviation) of men and women in a Phase II CR program.

	Pre- CR		**Pre-RT**		**Post-CR**	
	M	**W**	**M**	**W**	**M**	**W**
Average	65±23.20	43±18.86	79±16.74	53±20.31	85±19.26	65±21.68
Walking Distance	63±20.92	42±20.61	76±17.70	58±21.13	79±17.81	68±19.64
Lifting Objects	78±24.58	54±24.79	88±13.65	60±16.34	92±16.72	71±22.10
Carrying Objects	66±32.11	39±22.81	85±19.40	57±25.78	88±23.17	70±26.77
Holding Objects	73±23.23	49±25.61	85±17.41	60±33.66	89±21.62	69±30.68
Tasks	44±29.94	31±24.97	63±27.85	32±27.72	78±28.94	54±31.67

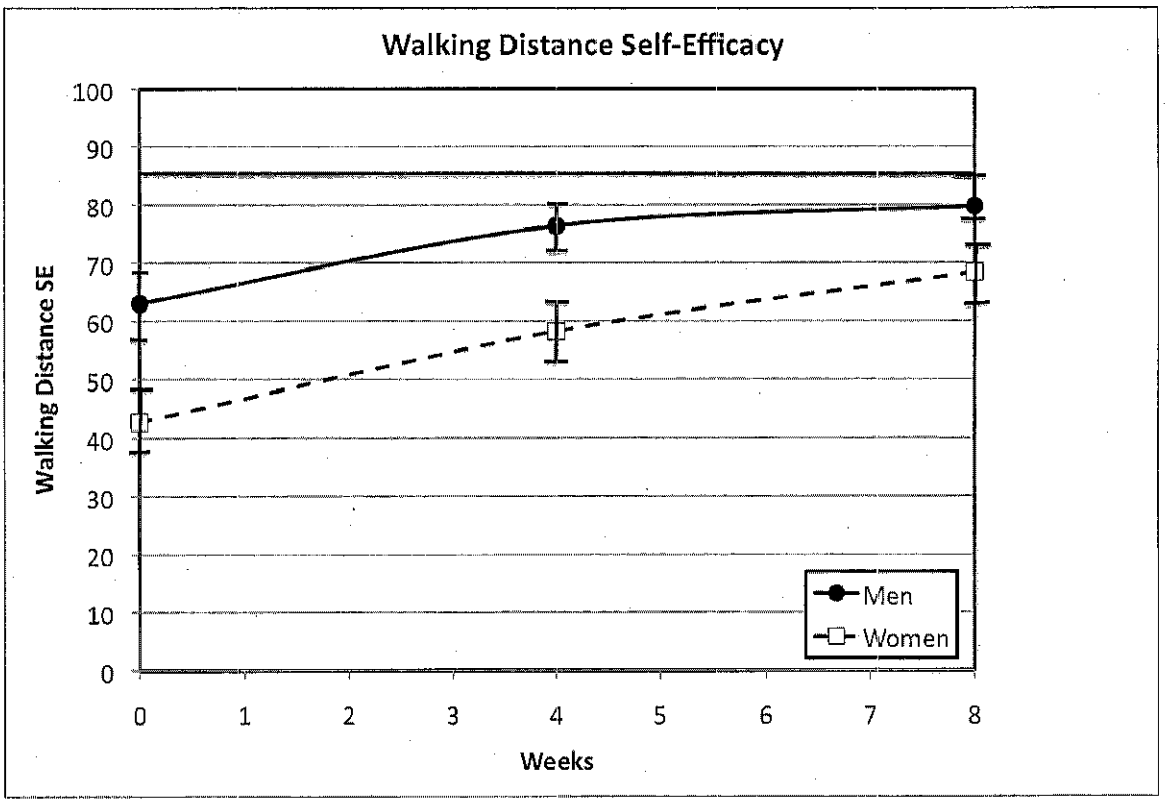

Figure 1. Walking distance self-efficacy scores at beginning of CR, prior to beginning RT, and final day of CR. Both sexes had an improvement in self-efficacy. Men started and finished CR with higher scores than women. Both genders increased at the same rate with no interaction. For the walking distance score, neither men nor women reached the subjective 85% target level.

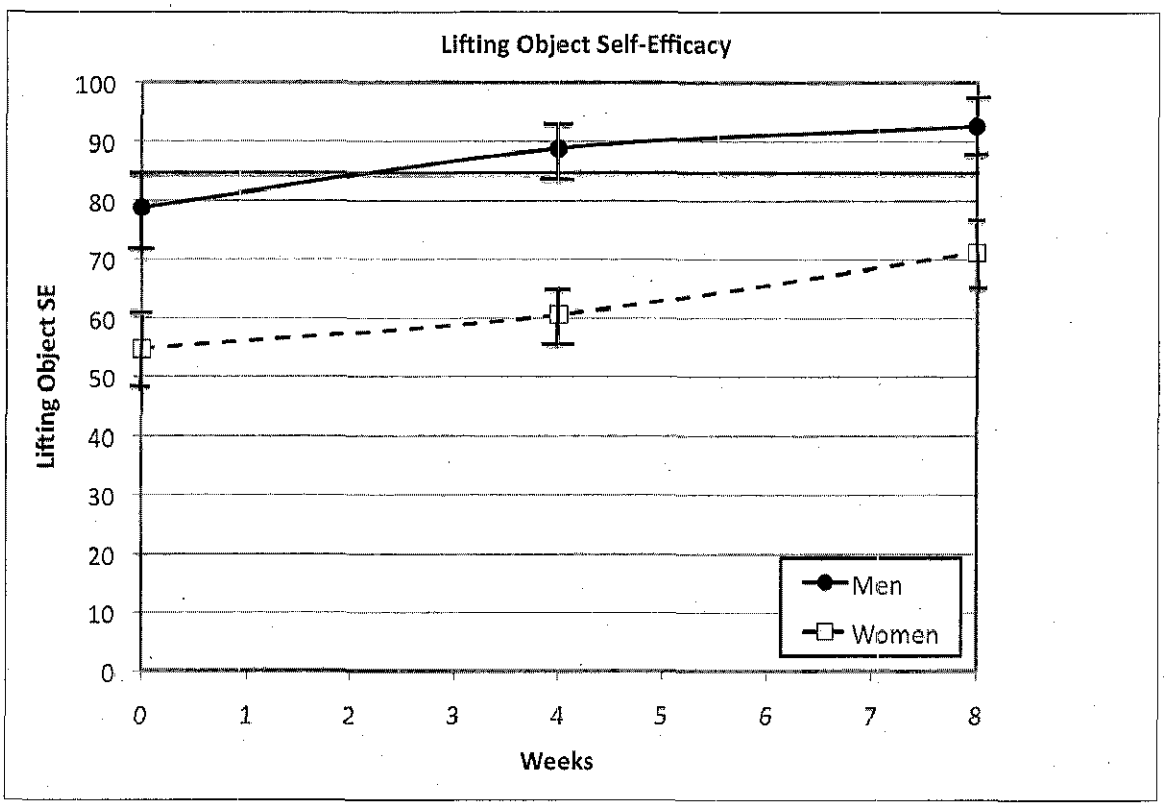

Figure 2. Average lifting self-efficacy scores at beginning, prior to beginning RT, and final day of CR. Both sexes had an improvement in self-efficacy. Men started and finished CR with higher scores than women. Both genders increased at the same rate with no interaction. For the lifting self-efficacy score, men reached the subjective 85% target while women did not.

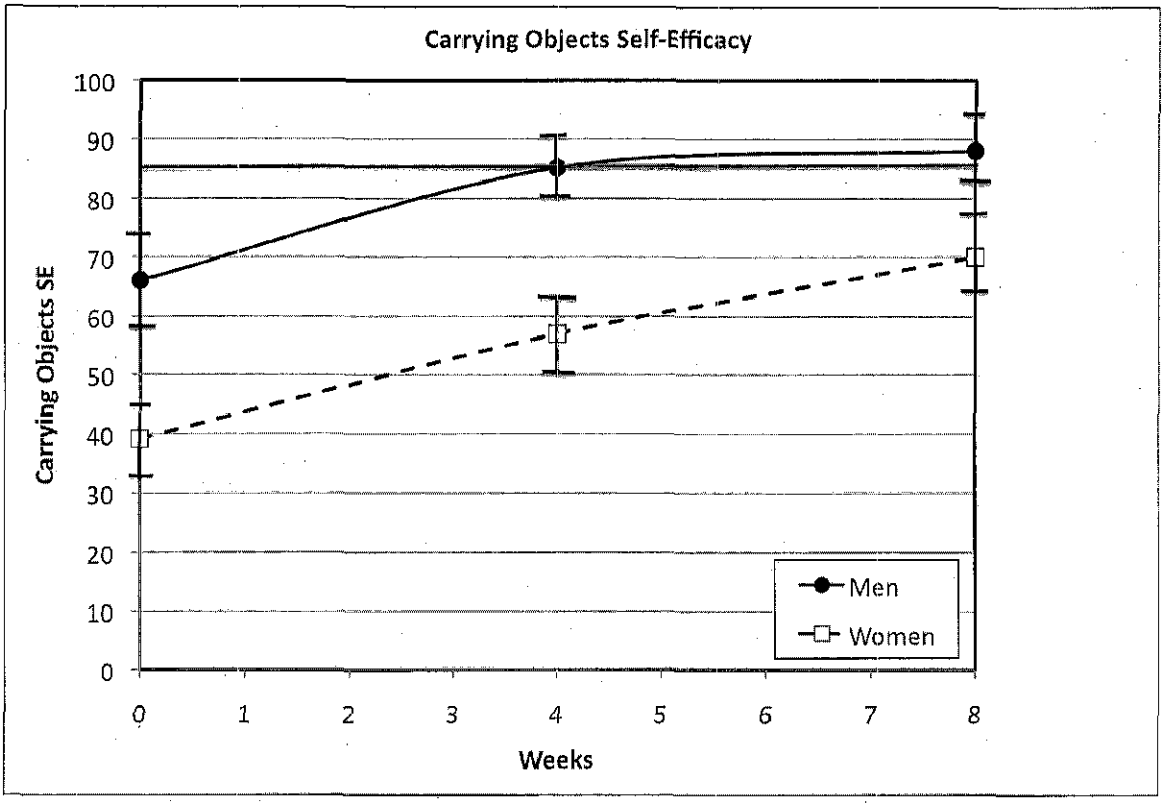

Figure 3. Average self-efficacy carrying scores at beginning, prior to beginning RT, and final day of CR. Both sexes had an improvement in self-efficacy. Men started and finished CR with higher scores than women. Both genders increased at the same rate with no interaction. For the carrying self-efficacy score, men reached the subjective 85% target while women did not.

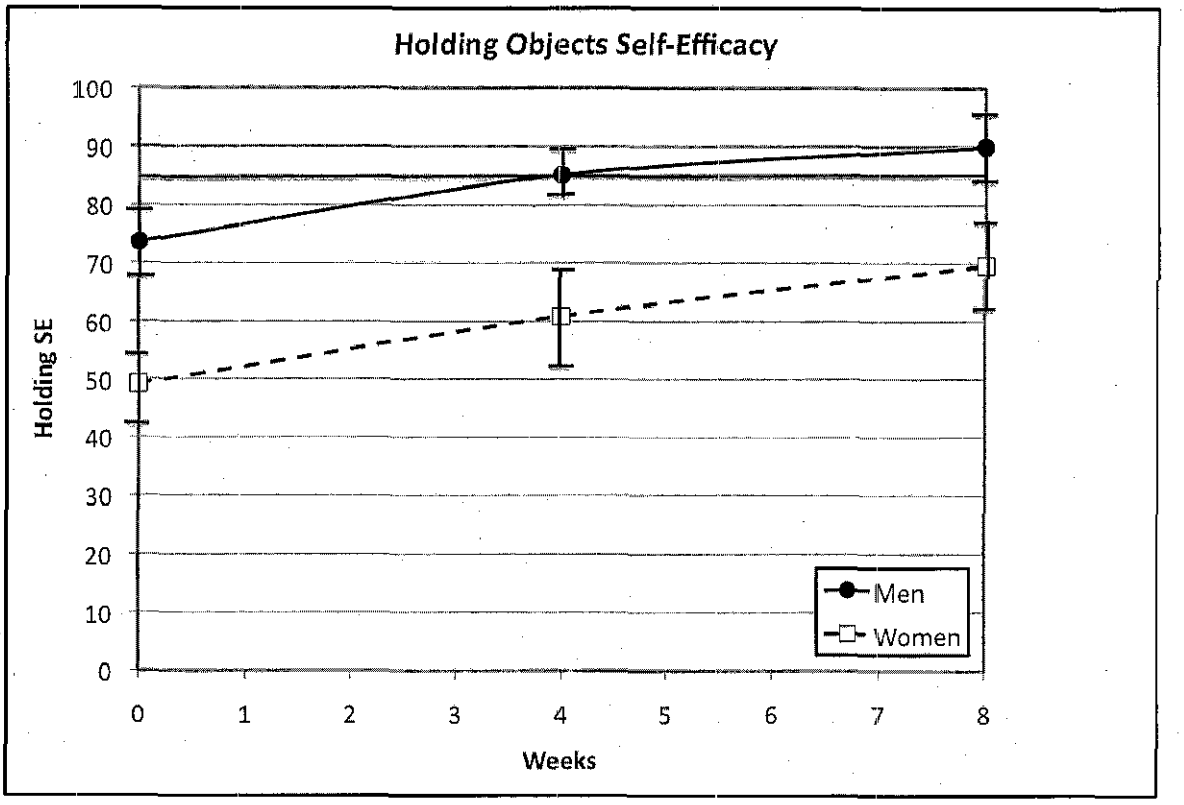

Figure 4. Average holding self-efficacy scores at beginning, prior to beginning RT, and final day of CR. Both sexes had an improvement in self-efficacy. Men started and finished CR with higher scores than women. Both genders increased at the same rate with no interaction. For the holding self-efficacy score, men reached the subjective 85% target while women did not.

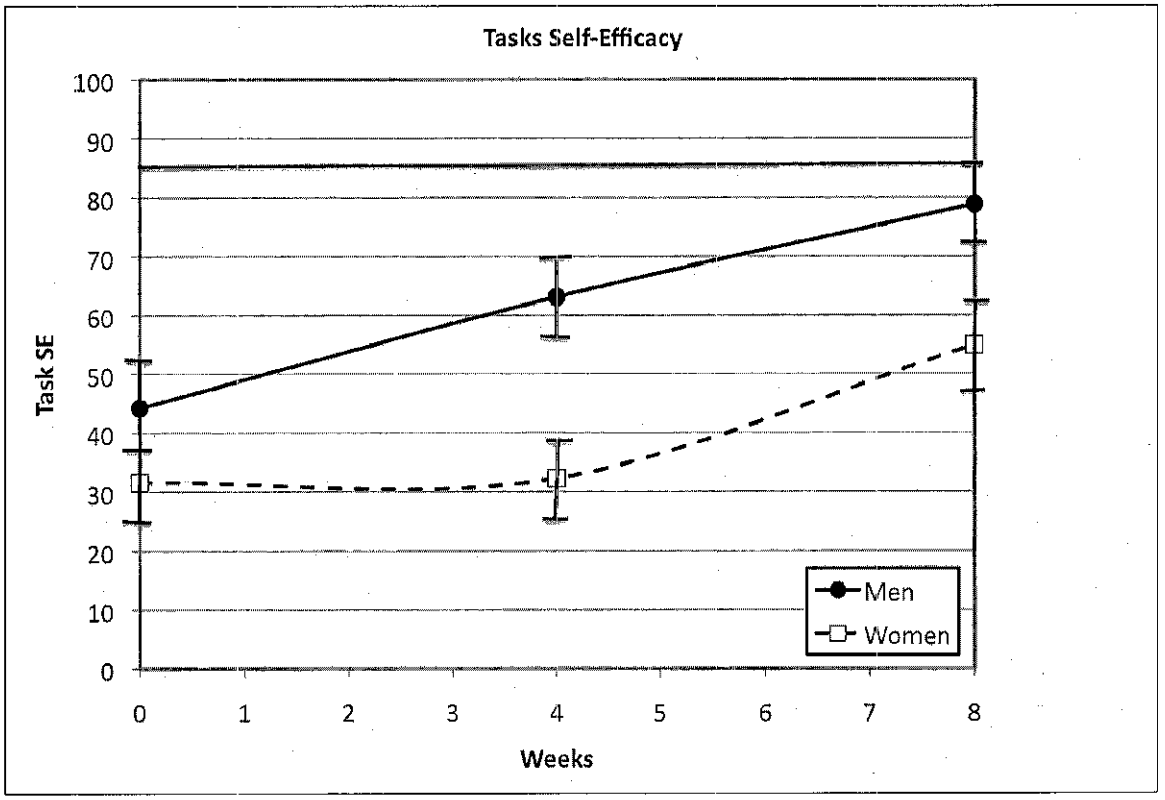

Figure 5. Average tasks self-efficacy scores at beginning, prior to beginning RT, and final day of CR. Both sexes had an improvement in self-efficacy. Men started and finished CR with higher scores than women. Both genders increased at the same rate with no interaction. For the tasks score, neither men nor women reached the subjective 85% target.

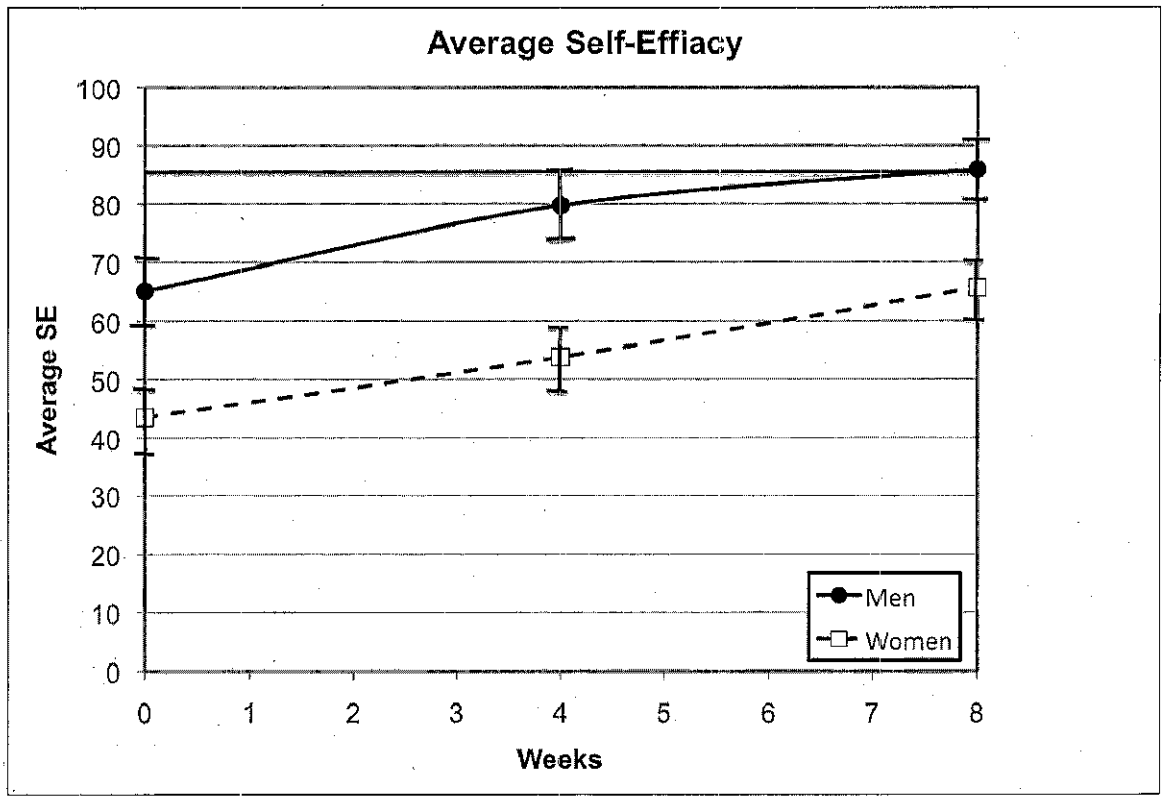

Figure 6. Average self-efficacy scores (combining the results of all self-efficacy scales) at beginning of CR, prior to beginning RT, and final day of CR. Both sexes had an improvement in self-efficacy. Men started and finished CR with higher scores than women. Both genders increased at the same rate with no interaction. For the average self-efficacy score, men reached the subjective 85% target while women did not.

DISCUSSION

The main finding of this study was that women have lower self-efficacy scores prior to and throughout CR compared to men. Both genders improved at the same rate with no interaction. Men finished above the arbitrary 85% value for expected self-efficacy for the overall self-efficacy, lifting, carrying, and holding scores while women were below the 85% value for all activities. The hypothesis that men will have greater improvement in self-efficacy was not supported. These results support the continuation

of the current RT exercise prescription with both genders receiving the same treatment. Both men and women receive the same benefit from a well-rounded RT routine like the one prescribed at GLMC. However, because most of the self-efficacy scores did fall below the subjective 85% line, GLMC may consider emphasizing an increase in the amount of RT participation from 1-2 days to 3 days a week.

The results of this study follow the same self-efficacy pattern found in previous studies. In 1991 Schuster and Waldron[13] published data stating that upon entering into CR, men had greater ability to tolerate exercise, were less anxious, and had better self-efficacy scores compared to female participants. Subjects included 80 men and 21 women. To test self-efficacy, a survey was used with 21 different questions related to expectations for performance of certain activities. Activities ranged from walking 1 mile to washing and waxing the car. The self-efficacy results were separated into quartiles. The outcome showed 74% of the women scored below the second quartile in comparison to only 35% of men who scored below the second quartile. The study concluded that professionals needed to work more closely with patients to help them select an appropriate self-efficacy level for activities.

One interesting finding was that many self-efficacy scores did not reach 85% self-efficacy. In 1995, Foster[10] followed the objective and subjective measures of recovery from an acute cardiovascular event in patients participating in CR. Objective measures were found via cycle ergometry and subjective scores were collected by self-efficacy and health-related quality of life questionnaires. Nineteen men and 7 women participated in the study. Results showed a significant increase in both objective and subjective measures. Participation in CR has been shown to increase self-efficacy for a number of

activities, mostly those involving ambulatory activity. Foster[10] argued that participants should have a subjective self-efficacy score of 85% to equal to the percent of their objective functional capacity being within normal range of variation. If patients are not confident they can reach 85% of their self-efficacy for common activities, thus not trying to reach it, it brings up the question as to whether they are confident enough to graduate from CR.

In this study women did not reach 85% self-efficacy for all areas of question including total score average, walking distance, lifting, carrying, holding and tasks. Men did not reach 85% of their self-efficacy for walking and tasks. These results bring up numerous questions: Are women graduating too early from CR? Was the questionnaire appropriate for both genders? Self-efficacy questionnaire results are highly dependent on the questions established, thus a limiting factor of this study. We believe this questionnaire was appropriate for the study based on previous studies.[7-9] The questionnaire used questions related to ambulatory and muscular responsibilities for which CR prepares its patients. Conceptually we believe this questionnaire was appropriate for the hypothesis being tested. However, the subjective value of 85% still requires more studying in future research. For example, does there need to be age specific norms like there are for objective capacity?

CONCLUSION

RT is an important part of a CR program with numerous benefits like an increase in muscular strength, increased cardiovascular endurance, and modified coronary risk factors. An important determinant of both participation and clinical outcome in CR is self-efficacy, which looks at how confident a person is in that they can perform a certain

task. This study looked at self-efficacy scores for men and women during phase II CR with a specific focus on changes made during RT. Results showed both men and women improved in self-efficacy at the same rate. The RT program was just as effective for women as men. The question still remains as to if they improved enough and if a more age specific questionnaire should be made for specific genders and age.

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APPENDIX A

INFORMED CONSENT

Protocol Title:

- Gender Differences in Self-Efficacy for Resistance Training in Cardiac Patients.
-

Principal Investigator:

- Rulla Sika
  776 N. 23rd St.
  La Crosse, WI 54601
  989-780-1608

Emergency Contact:

- Name: _____
  Relation: _____
  Phone number: _____

Purpose:

- The purpose of this study is to determine if men and women have different self-efficacy (or confidence levels) for strength requiring activities (e.g. lifting and carrying objects) at the beginning and end of a cardiac rehabilitation program.

Introduction:

- This study will be looking at the gender differences in self-efficacy for resistance training. Self-efficacy is how confident a person is that they can perform a certain task. Self-efficacy is an important tool for cardiac rehabilitation because it helps predict whether an activity will be attempted. For example, a patient may have the skills to exercise and is objectively able to exercise, but might not have the confidence to do the exercise.

Background:

- In 1991, Dr. Berry Franklin found that resistance training is an important part of a cardiac rehabilitation program. It has been shown to increase muscular strength, increase cardiovascular endurance, help maintain interest in exercise, and modify coronary risk factors like hypertension and hyperlipidemia.
- Men who participate during resistance training in cardiac rehabilitation improve their self-efficacy scores for activities related to an improvement in strength.
- Upon entering an outpatient cardiac rehabilitation program, women have lower quality self-efficacy scores.

Consent Form:

- I understand that participation in this study is voluntary.
- I am being asked to volunteer in this study to help better understand resistance training for cardiac rehabilitation patients.

- The purpose of this study is to determine if men and women have different self-efficacy (or confidence levels) for strength requiring activities (e.g. lifting and carrying objects) at the beginning and end of a cardiac rehabilitation program.
- Participation in this study will take about 1 hour of my time, which includes reading instructions and filling out the questionnaire at the beginning, middle, and end of my rehabilitation program.
- I understand I will be 1 of about 30 participants in this study.

Procedure:

- I will follow the resistance training program set up by Franciscan Skemp Healthcare. I will fill out the same questionnaire at the beginning, middle, and end of cardiac rehabilitation. The middle questionnaire will be answered prior to beginning my resistance training program. The questionnaire will include about 30 questions. Questions will relate to everyday tasks that involve muscular strength and will be accompanied by a colored picture of that task.
- I understand these questionnaires will be administered at Gundersen Lutheran Medical Center throughout my participation in cardiac rehabilitation. Participtiion will take about 1 hour total of my time, which includes all 3 questionnaires.

Risks:

- I have been informed of no potential risks for filling out a questionnaire. The total time required will be about one hour, and there are no particularly sensitive questions in the questionnaire.

Benefits:

- I may help determine new and better ways that cardiac rehabilitation centers can go about forming resistance training programs to better fit the needs of their patients.

Confidentiality:

- My identity and the information obtained during this study will be kept confidential to the extent of the law. However, my doctor and the Human Subjects Committee/ Institutional Review Board (IRB) may review my medical records to verify study-related information and the signed consent form. An IRB is a group of medical and non-medical individuals who have reviewed the study information with the subjects' protection in mind.
- The results of this study may be published in scientific journals or presented at medical meetings; however, I will not be identified by name.

Voluntary Participation and Withdrawal:

- My decision to take part in this study is voluntary. I may decide not to take part, or to stop taking part at any time, without penalty or loss of benefits to which you are otherwise entitled.

Authorization to View Patient Medical Records:

- The information needed from my hospital file is gender, date of birth, medication list, and cardiac history.
- This information may be disclosed to the principal investigator (Rulla Sika) and Dr. Carl Foster (Co-Investigator) from the University of Wisconsin- La Crosse.
- The purpose of this disclosure is to provide pertinent medical history to the investigator.
- The expiration date for this authorization is May 31, 2010.
- I understand I hold the right to refuse to sign this authorization.
- I understand I hold the right to revoke this authorization. If you wish to revoke this authorization, please contact Rulla Sika at 989-780-1608.

Contact Persons:

- Questions regarding the above mentioned information may be directed to Rulla Sika (989-780-1608), Dr. Carl Foster, a Professor in the Exercise and Sport Science Department at UWL (608-785-8687), or Amanda Hajoglou, exercise physiologist at Gundersen Lutheren Medical Center (607-775-4279).
- Questions regarding the protection of human subjects may be submitted to the Human Subjects Committee/ Institutional Review Board at Gundersen Lutheran Medical Center, (608-782-7300).

Statement of Consent to Participate:

- I have read and understand this consent form. All my questions have been answered. I volunteer to take part in this study. I will receive a signed copy of this consent form.

Signature of Participant Date

_____ _____

Signature of Researcher obtaining consent Date

_____ _____

_____ has read and signed this consent form and told us there are no questions that have not been answered by the researcher. The participant says the consent form is understood and the consent is willingly given. We are writing our names below as witnesses and we believe the patient understands what is being done and has willingly signed the consent form.

Signature of Witness Date

_____ _____

Signature of Witness Date

_____ _____

APPENDIX B

SELF-EFFICACY QUESTIONAIRRE

Name: _____

Gender: _____

Age: _____

Self-Efficacy Questionnaire

Self-efficacy is the belief that one is capable of performing, in a certain manner, to attain certain goals (Wikipedia.org)

-Made simple, self-efficacy is how confident you are in performing a certain task.

For the following 20 activities, please rate on a scale of 0- 100 how confident you are that you can perform that task.

90 - 100%	Extremely confident
80 - 90%	Extremely confident
70 - 80%	Extremely confident
60 - 70%	Extremely confident
50 - 60%	Moderately confident
40 - 50%	Moderately confident
30 - 40%	Moderately confident
20 - 30%	A little confident
10 - 20%	A little confident
0 - 10%	Not at all confident

For example: Sally knows she can walk 1 mile, she is 100% extremely confident.
Sally is fairly sure she can walk 2 miles; she is about 70% confident.

Activities

Walking Distance (at a comfortable pace)

Right now I feel confident I could…

Walk ½ block _____

Walk 1 block _____

Walk 2 blocks _____

Walk 6 blocks _____

(about 1/2 mile)

Walk 12 blocks _____

(about 1 mile)

Walk 2 miles _____

Walk 5 miles _____

Walk 10 miles _____

Lifting objects (one time)

Right now I feel confident I could…

Lift a 5 lb object, like a bag of flour _____

Lift a 10 lb object, like a bag of groceries _____

Lift a 15 lb object, like a bag of dog food _____

Lift a 20 lb object, like a bag of soil _____

Lift a 40 lb object, like a bag of water softener salt _____

Carrying objects

Right now I feel confident I could…

Carry a full garbage bag out to the curb _____

Carry a full laundry basket up **1** flight of stairs _____

Carry a full laundry basket up **2** flights of stairs _____

Carry a full bag of dog food from the car to house _____

Carry my golf bag from the car to the golf course _____

Carry a heavy suitcase from the car to the house _____

Holding objects

Right now I feel confident I could…

Hold and stand for 10 minutes my grandson at…

Time of birth (+/- 7 lbs) _____

2 months old (+/- 10 lbs) _____

5 months old (+/- 15 lbs) _____

10 months old (+/- 20 lbs) _____

20 months old (+/- 25 lbs) _____

Tasks

Right now I feel confident I could…

Put up my storm windows _____

Rake the leaves in my yard _____

Shovel my sidewalk and driveway

… in light snow _____

… in heavy snow _____

Shovel dirt out of a wheelbarrow

in my garden _____

Lift boxes over my head and put

them into the attic _____

Thank you for participating in this questionnaire, your time and effort is greatly appreciated. If you have any questions, please contact Rulla Sika at (989)780-1608 or Carl Foster at (608)785-8687.

APPENDIX C

SELF-EFFICACY PICTURE BOOKLET

Self-Efficacy Questionnaire
Picture Booklet

This booklet is to act as a guide for estimating self-efficacy for the activities listed in the questionnaire.

Self-efficacy is the belief that one is capable of performing, in a certain manner, to attain certain goals (Wikipedia.org)

-Made simple, self-efficacy is how confident you are in performing a certain task.

For the following 20 activities, please rate on a scale of 0- 100 how confident you are that you can perform that task.

90 - 100%	Extremely confident
80 - 90%	Extremely confident
70 - 80%	Extremely confident
60 - 70%	Extremely confident
50 - 60%	Moderately confident
40 - 50%	Moderately confident
30 - 40%	Moderately confident
20 - 30%	A little confident
10 - 20%	A little confident
0 - 10%	Not at all confident

Activities

Walking Distance (at a comfortable pace)

Right now I feel confident I could…

Walk ½ block _____

Walk 1 block _____

Walk 2 blocks _____

Walk 6 blocks _____

(about 1/2 mile)

Walk 12 blocks _____

(about 1 mile)

Walk 2 miles _____

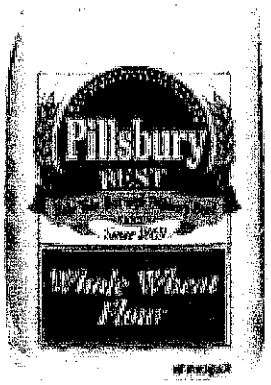
Walk 5 miles _____

Walk 10 miles _____

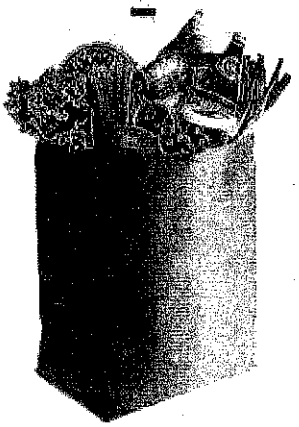
Lifting Objects (one time)

Right now I feel confident I could…

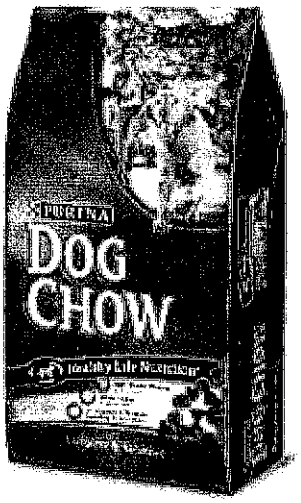
Lift a 5 lb object, like a bag of flour.



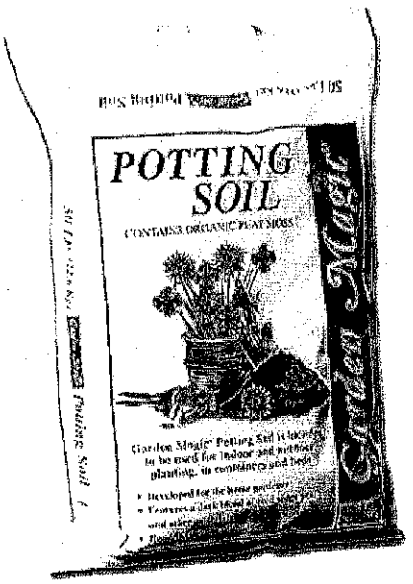
Lift a 10 lb object, like a bag of groceries.



Lift a 15 lb object, like a bag of dog food.



Lift a 20 lb object, like a bag of soil.



Lifting Objects (one time)

Right now I feel confident I could…

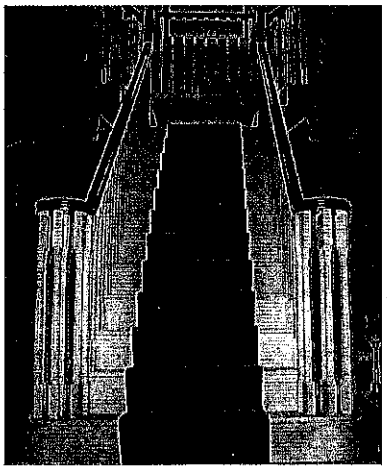
Lift a 40 lb object, like a bag of water softener salt.

Carrying objects

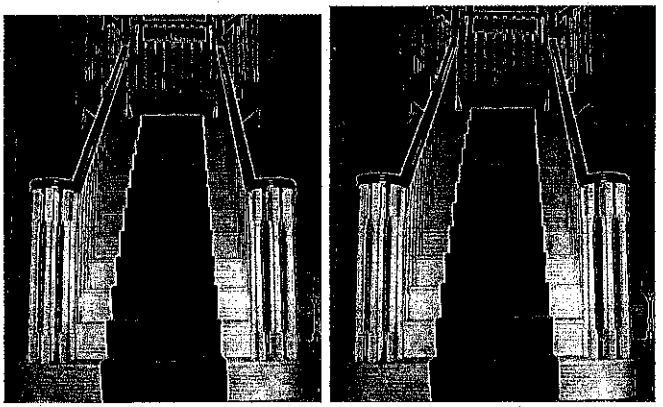
Right now I feel confident I could…

Carry a full garbage bag out to the curb.

Carry a full laundry basket up **1** flight of stairs



Carry a full laundry basket up **2** flights of stairs



Carrying objects

Right now I feel confident I could…

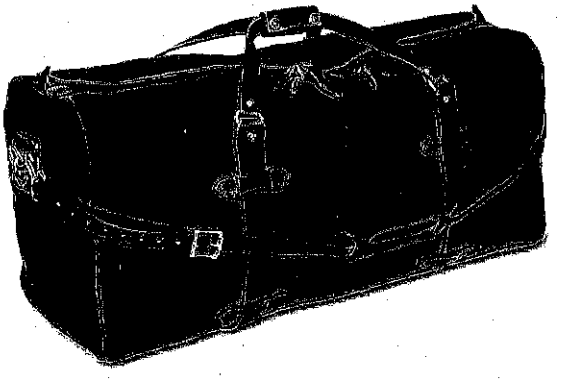
Carry a full bag of dog food from the car to house.

Carry my golf bag from the car to the golf course.

Carrying objects

Right now I feel confident I could…

Carry a heavy suitcase from the car to the house.



Hold and stand for 10 minutes my grandson at…

Time of birth (+/- 7 lbs) _____

2 months old (+/- 10 lbs) _____

5 months old (+/- 15 lbs) _____

10 months old (+/- 20 lbs) _____

20 months old (+/- 25 lbs) _____

Tasks

Right now I feel confident I could…

Put up my storm windows.

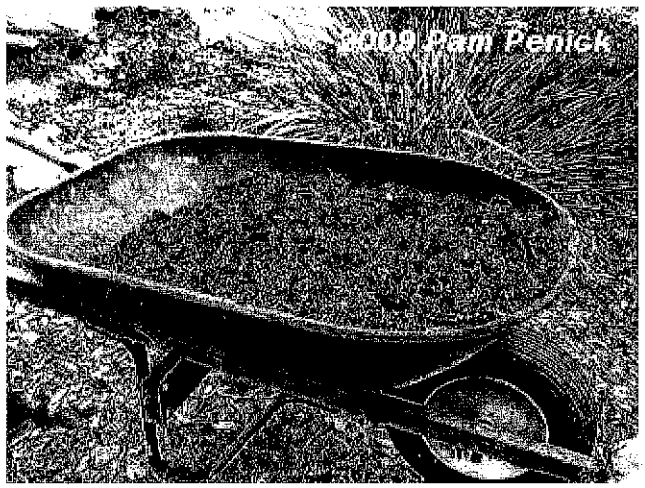
Rake the leaves in my yard.

Shovel my sidewalk and driveway

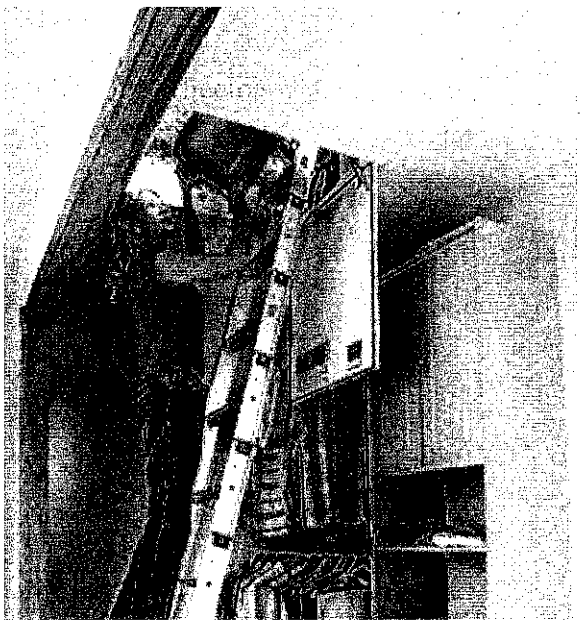
… in light snow

… in heavy snow

Shovel dirt out of a wheelbarrow in my garden.



Lift boxes over my head and put them into the attic



APPENDIX D

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Heart disease is the leading attributable cause of death in America. Those who are fortunate enough to survive coronary events and heart surgery are ideally sent to a cardiac rehabilitation (CR) program. At the facility they learn how to lead a healthier life through exercise and risk factor education. One component of exercise is resistance training (RT). The purpose of this study is to determine if there is a difference in self-efficacy for RT between men and women who are participating in a phase II cardiac rehabilitation program.

According to the ACSM's Guidelines for Exercise Testing and Prescription,[1] CR programs are composed of several important components that include baseline patient assessment, nutrition counseling, risk factor management, psychosocial management, activity counseling, and exercise therapy. There are generally 3 phases, inpatient care (I), outpatient care (II), and a maintenance program (III). This study will work with subjects in an outpatient phase II CR setting.

A phase II program usually lasts about 12 weeks, with 1-1.5 hour sessions, 3 days per week. During these sessions patients are monitored to detect change in clinical status. Work is done to help return the patient to premorbid vocational and/or recreational activities, assist the patient in developing a safe and effective exercise program, and providing the patient and family with education regarding cardiovascular risk factors and prevention.[1] Known benefits of CR include improving exercise capacity, reducing

coronary artery disease (CAD) risk factors, improving quality of life, reducing hospital costs, and reducing CAD events.[2]

CR has also been associated with a lower risk of mortality 4 years post treatment. Hammil[3] collected data from 30,161 cardiac patients who attended at least 1 session of CR between 2000 and 2005. The study found a strong association between the amount of CR sessions the patient attended and their long-term outcome. Patients who attended 36 sessions showed lower risks of death by myocardial infarction (MI) at 4 years compared to patients who attended fewer sessions.

CR has also been shown to improve depression and anxiety in patients post acute myocardial infarction (AMI). In 1991, Oldridge[3] studied 201 low-risk AMI subjects, 6 weeks post event and suffering from depression and/or anxiety. Subjects were randomized into 2 groups. The first group performed exercise and behavioral conditioning and the other received conventional care (e.g doctors office visits). After 8 weeks of therapy, significant improvement was seen in the exercise and behavioral conditioning group. However, 12 months post event, both groups displayed similar improvements. This lead Oldridge[3] to conclude that the brief CR intervention used in this study had little lasting effect on the quality of life in moderately depressed or anxious cardiac patients.

RT enhances muscular strength and endurance, functional capacity and independence, and quality of life while reducing disability in persons with and without cardiovascular disease.[5] It is important for CR participants because it can provide the strength for them to return to their activities of daily living (ADL's). RT was originally thought to be dangerous for cardiac patients because it elicits large blood pressure

responses. However, in today's rehabilitation setting, RT is a regular staple in the patient's exercise regimen. Mild to moderate RT can provide a safe and effective method for improving strength and cardiovascular endurance, modifying coronary risk factors, and enhancing psychosocial well being.[6]

In 1991, McCartney[7] found in patients with CAD, combined aerobic and weight lifting is a more effective method of increasing aerobic performance and strength than traditional aerobic training alone. They studied 18 males diagnosed with CAD. They were assigned to 2 groups, aerobic training alone (n=8) and aerobic combined with strength training (n=10). Subjects had similar strength test performance prior to training. After 10 weeks (20 sessions), the aerobic group could lift their previous 1-repitiion maximum on average of 4 times. The aerobic and strength group could lift their 1-repitition max on average of 14 times. Maximal loads were tested on single-arm curl, single-leg press, and single-knee extension exercises.

RT has also been linked to an increase in self-efficacy in men.[8,9] Ewart[8] studied 43 men with documented CAD. They completed pre-treatment strength and self-efficacy evaluations and were then assigned to one of two groups. Group 1 involved 20 minutes each of jogging and volleyball. Group 2 involved 20 minutes each of jogging and circuit weight training (CWT). Both groups exercised 3 times per week. After 10 weeks of training, subjects completed the strength evaluations and self-efficacy scales. They found subjects from the CWT group (who increased their strength and endurance) also had higher self-efficacy scores for activities resembling the training tasks in comparison to subjects who did not participate in CWT.

Two years later, Stewart[9] published an article that also showed an increase in self-efficacy for patients when performing activities similar to training tasks. The study was performed over 3 years and found that the subjects who only performed aerobic training did not improve in strength and actually decreased in self-efficacy scores. They concluded that programs with a wide variety of exercises, including CWT, have a greater influence on psychological and motivational components.

Heart disease was originally thought to be a "man's disease." For this reason early research subjects were usually only from this sex. Not until the late 1980's and early 1990's did the medical community start evaluating CAD in women. Studies found that men and women have different barriers in CR. Differences ranged from their psychosocial state (like self-efficacy) to awareness of to CR.[10] To this day, there is still a lack in treatment and knowledge of heart disease in women.

In 1992, Ades[11] reported upon gender differences in aerobic capacity for CR patients and referral to CR programs from their physicians. He worked with 226 subjects with CAD $\geq$ 62 years of age. They found that women were less likely to be referred to CR despite similar clinical profiles (women 15% vs. men 25%). Before entering the phase II CR program, women had lower exercise capacities in comparison to men (18% lower peak oxygen consumption). However, both sexes had similar improvements after 12 weeks of therapy (women 17%, men 19%).

Also in 1992, Cannistra[12] looked at the differences in men and women with regards to their clinical profile and CR outcome. Over 4 years, they collected data from 225 patients (51 women, 174 men). The 12 week long CR program was in an urban setting. The study concluded that women have a less favorable risk factor profile and

differed from men with regard to baseline demographics. More women were nonwhite, unemployed, unmarried, hypertensive, diabetic, or had high cholesterol. Initial exercise capacity was less for women, however both sexes had similar improvements in the amount of time exercising and their overall metabolic equivalent (MET) capacity. It was also observed that men and women had similar rates of compliance to the CR program.

In 1995, Lavie and Milani (2) reviewed records from 458 phase II CR patients (83 women, 375 men). At 6 weeks post-cardiac event or surgery and prior to beginning CR, in comparison to men, women had lower exercise capacities and ratios of LDL/HDL cholesterol. Women also had higher total cholesterol, HDL cholesterol, LDL cholesterol, and percent body fat. Women reported lower scores for energy, function, and total quality of life than men. After 12 weeks of CR (which included 36 exercise and educational sessions) women had improvements in exercise capacity, percent body fat, behavioral traits, and quality of life. Body mass index and lipids were not significantly improved. Improvements were similar in men and women.

Research has also been done in the area of gender preferences for CR. In 1996, Moore[14] asked 3 questions. How important are various CR program features to female and male participants? What are women and men's perceptions of experiences with specific CR program features? To what extent to women and men's experiences with program features match their rating of importance of these features? Using a self-administered survey, they looked at 65 subjects (33 men, 32 women). She found that in this group of subjects, convenience factors (like drive time and transportation) were well met for both sexes. Research also observed that both sexes preferences were not well met for the availability of professionals to discuss progress and to choose their own exercises.

The largest unmet preference for males was the ability to set their own goals. The largest unmet preference for females was physical pain and tiring while exercising.

Grace[10] looked at sex differences in CR barriers. Working with 97 different cardiologists, 1496 patients (28.7% female) were mailed a survey discussing CR participation. The survey listed 19 barriers to CR on a 5-point Likert scale. Results showed that 43% of respondents participated in CR, with more men participating than women. With regards to the total number of CR barriers, no differences were reported between genders. For subjects who participated in CR, women reported the following barriers as greater than men: transportation, family responsibilities, lack of CR awareness, experiencing exercise as painful or tiring, and comorbidities.

One of the leading researchers on self-efficacy is Albert Bandura.[15] In 1982, he proposed the amount of self-efficacy, or confidence, one has will foresee whether an activity will be attempted. He continued by stating self-efficacy influences thought patterns, actions, and emotional arousal. The higher ones self-efficacy, the higher the performance accomplishments and the lower the emotional arousal.

With this theory in mind, over the years self-efficacy has become an important tool for CR programs. Usually self-efficacy is measured through a type of questionnaire and thus is an inexpensive way to determine where a patient stands in ones confidence and readiness for therapy.

In 1983, Ewart[16] studied the effects of early postmyocardial infarction (PMI) exercise testing on self-perception and subsequent activity. Using 40 male participants (18-20 days post MI), the men were asked to keep a 3-day activity record. At day 21 the subjects, in sequential order: filled out a self-efficacy scale, performed a treadmill (TM)

test, filled out a 2nd self-efficacy scale, went through brief counseling, and lastly completed a 3rd self-efficacy scale. During days 25-28, another 3-day activity log was filled out. This study showed the largest increase in confidence (self-efficacy) for activities similar to TM exercise, like walking and stair climbing. Increases for dissimilar activities, like sexual intercourse and lifting objects between 10-75 pounds, were greatly increased after counseling with a professional.

In 1990, Gortner[17] measured self-efficacy expectations in 149 patients who were recovering from coronary artery bypass graft surgery (CABG) and/or heart valve replacement surgery. Prior to leaving the hospital, all subjects watched an in-patient educational program on recovering from surgery. The experimental group watched an additional educational program regarding family coping and conflict resolution, followed by a short counseling session with a nurse. The experimental group was contacted by telephone weekly for the first 4 weeks then biweekly up to 8 weeks post discharge. Both groups were interviewed for self-efficacy and activity levels prior to surgery then after surgery during hospital discharge. At weeks 4, 8, 12, and 24 they were contacted again to account for self-efficacy and activity reports. It was concluded that the treatment group had higher self-efficacy scores and greater amounts of activity when compared with the control group.

In 1991, Schuster[18] published data stating that upon entering into CR, men had greater ability to tolerate exercise, they reported being less anxious, and had better self-efficacy scores compared to female participants. Subjects included 80 men and 21 women. To test self-efficacy, a survey was used with 21 different questions related to expectations for performance of certain activities. Activities ranged from walking 1 mile

to washing and waxing the car. The self-efficacy results were separated into quartiles. The outcome showed 74% of the women scored below the second quartile in comparison to only 35% of men who scored below the second quartile. This study concluded that professionals needed to work more closely with patients to help them select and appropriate self-efficacy level for activities.

In 1995, Foster[19] followed the objective and subjective measures of recovery from an acute cardiovascular event in patients participating in CR. Objective measures were found via cycle ergometry and subjective scores were collected by self-efficacy and health-related quality of life questionnaires. Nineteen men and 7 women participated in the study. Results showed a significant increase in both objective and subjective measures. Participation in CR has been shown to increase self-efficacy for a number of activities, mostly those involving ambulatory activity.

A large problem with CR programs is adherence to exercise. In 2001, Carlson [20] researched self-efficacy, psychosocial factors, and exercise behavior in traditional versus modified CR programs. Using 38 subjects, one group emphasized a supervised exercise program with continuous electrocardiogram (EKG) monitoring for 3 months. The other group of 42 used a modified program that emphasized independent exercise and also included support groups and education. This group was gradually taken off EKG monitoring and the protocol cost less to run. Results showed that the modified group had higher levels of self-efficacy at the end of the program concluding that more CR programs should emphasize independent exercise.

CR is an important part of the recovery process for any person who has suffered some from heart disease. The therapy sessions must or should include exercise and

educational aspects. Self-efficacy is the confidence level one has to achieve a certain task. It is important to recognize barriers for patients in CR, like self-efficacy, so in turn health care providers can form more effective forms of therapy.

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