Taylor Guardalabene

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**Heart Failure Program Proposal**

**Background**

 Heart failure is a disabling condition that affects more than 5 million Americans nationwide. [1](http://f1000.com/work/citation?ids=5816692&pre=&suf=&sa=0) The American Heart Association describes heart failure as a “chronic, progressive condition in which the heart muscle is unable to pump enough blood to meet the body’s needs for blood and oxygen”. [2](http://f1000.com/work/citation?ids=6020192&pre=&suf=&sa=0) Patients with heart failure experience disabling symptoms, poor exercise tolerance, and impairments in functional status and quality of life. [3](http://f1000.com/work/citation?ids=5953431&pre=&suf=&sa=0) Heart failure is also one of the most expensive medical diagnoses for people over the age of 65, accounting for $27.9 billion in 2005.3 This has occurred due to current treatment focusing on disease management rather than lifelong health promotion.3 Even though there is sufficient evidence to support that exercise can help improve heart failure and reduce symptoms [4](http://f1000.com/work/citation?ids=5953433&pre=&suf=&sa=0), most patients do not participate in any physical activity, or do not have any opportunity to engage in physical activity. [5](http://f1000.com/work/citation?ids=5952498&pre=&suf=&sa=0) Only about 2.6% of patients with heart failure participate in programs such as cardiac rehab, and those who do participate do not continue exercise once the program is completed.5 Due to the increasing rate of heart failure, increased medical costs associated with heart failure, and lack of compliance to a heart healthy lifestyle, there is a strong need for an effective program to improve the lives of patients with heart failure.

 Healthy Hearts of America is a community based health program developed to improve the lives of patients with heart failure. The primary goal of this program is to allow patients to engage in healthy behaviors that will make an impact on the rest of their lives. Healthy Hearts provides free exercise classes, information about eating a healthy diet, and education about ways to improve heart health.

 Although most patients with heart failure have poor adherence to making behavior change, Healthy Hearts of America uses methods from the social cognitive theory to improve adherence and making lifelong behavior changes that will improve their heart failure symptoms. The social cognitive theory uses specific constructs such as self-efficacy, collective efficacy, outcome expectations, knowledge, observational learning, normative beliefs, and social support to promote behavior change. [6](http://f1000.com/work/citation?ids=6032886&pre=&suf=&sa=0) Using this theory can make improvements in both the individual and interpersonal levels within communities, and if successful the program could be implemented across entire populations all over the world. In the past heart failure patients have show great improvements with programs that utilize the social cognitive theory. The University of Nebraska developed a program for heart failure patients that utilized the social cognitive theory by using group based educational sessions and individual based strategies to deliver the interventions.5 The results showed that 42% of the patients were adherent to physical activity at least 30 minutes a day at 12 months compared to only 28% of patients who did not receive any intervention.5 Another article discussed how using components of cognitive behavior theory showed positive improvements in anxiety and depressive symptoms in patients with heart failure. [7](http://f1000.com/work/citation?ids=1739580&pre=&suf=&sa=0) If depression and anxiety symptoms are improved in this population then there is an increased likelihood that they will be more compliant with their exercise program and diet. It is unlikely for a heart failure patient to make behavior change without help, which is why Healthy Hearts of America uses components of the social cognitive theory to improve adherence and make lifelong health behavior change.

 Another important component of the Health Hearts of America program is incorporating exercise classes. The exercise interventions will focus on aerobic exercise and strength training. Using measures such as VO2 max, the 6 minute walk test, 1 repetition maximum for strength, and the Kansas City Cardiomyopathy Questionnaire (KCCQ) are all outcome measures that demonstrate improvements in exercise capacity, strength, and overall health. Interventions involving both aerobic exercise and resistance training have been shown to demonstrate improvements in all of these outcome measures. In one study, 60 patients with heart failure completed an exercise program consisting of aerobic exercise and resistance training. [8](http://f1000.com/work/citation?ids=5951420&pre=&suf=&sa=0) The results showed that after 6 months patients had improved VO2 max and improved exercise capacity.8 The results also showed that after 8 years there was a decreased mortality rate of these patients compared to heart failure patients who did not receive the intervention.8 In another study that examined the effects of resistance training on patients with heart failure patients, found that resistance training focused on 1 repetition maximum as the primary outcome measure allowed for improvements in strength, VO2 max, and aerobic exercise capacity. [9](http://f1000.com/work/citation?ids=5951499&pre=&suf=&sa=0) Resistance training and aerobic exercise can also improve distance walked on the 6 minute walk test and scores on the KCCQ quality of life assessment.[10,11](http://f1000.com/work/citation?ids=5951607,752443&pre=&pre=&suf=&suf=&sa=0,0) Along with aerobic and resistance exercise showing improvements in exercise capacity, strength, and quality of life, there is also evidence to show that exercise can actually reverse heart failure at the cellular level.4 Improvements in VO2 max is due to reverse cardiac remodeling and peripheral adaptations in both the skeletal and vascular systems.4 This occurs due to improve myocardial anabolic/catabolic balance, calcium handling, and neurohormonal adaptations which ultimately lead to decreased inflammation, and improved energy metabolism of the heart.4 Exercise and resistance training demonstrate improvements in these outcome measures, but these measures also have good clinical utility in the heart failure population. Uszko-Lencer et al. investigated the reliability and validity of the 6 minute walk test in heart failure patients. [12](http://f1000.com/work/citation?ids=6113579&pre=&suf=&sa=0) They determined that the 6 minute walk test was a reliable measure in the population when performed twice on subsequent days.12 They also determined strong significant correlations with peak VO2.12 In this population, patients with older age, lower lung diffusing capacity, and higher NYHA class showed a lower likelihood of having a meaningful increase in the second 6 minute walk test.12 The 6 minute walk test is also a useful tool because normative values for age and BMI have been determined, which can be beneficial to compare patients with heart failure to aged matched healthy population. [13](http://f1000.com/work/citation?ids=6113586&pre=&suf=&sa=0) The KCCQ has also been shown to be a clinically useful measure to use in patients with heart failure. [14](http://f1000.com/work/citation?ids=2372830&pre=&suf=&sa=0) This measure has demonstrated good reliability and validity for chronic heart failure patients, and has shown greater sensitivity than the Minnesota Living with Heart Failure and the Short Form-36 questionnaires.14 Since VO2 max is appropriate to measure exercise capacity, and the 6 minute walk test and KCCQ are valid and reliable measures to use in the chronic heart failure population, these 3 measures will be utilized in the Healthy Hearts of America program.

 Another important aspect of the Healthy Hearts of America program is education about eating a heart healthy diet and making other health behavior changes to improve heart health such as smoking cessation. The Dietary Approach to Stop Hypertension (DASH) is a low fat diet that focuses on eating a lot of fruits and vegetables, protein, fiber, whole grains, poultry, fish, nuts, and nutrient rich food with vitamins and minerals. [15](http://f1000.com/work/citation?ids=6033127&pre=&suf=&sa=0) This diet can help to decrease blood pressure, and has been shown to improve arterial elastance, ventricular diastolic function, and ventricular arterial elastance coupling, which can lead to improved quality of life, symptoms, and improved 6 minute walk test in patients with heart failure.15 Education about smoking cessation and decreasing alcohol consumption is also very important. Research suggests that working with a healthcare provider and making obtainable goals for smoking cessation and decreasing alcohol consumption can help patients actually make this behavior change, which will improve their heart failure symptoms.3 Education in the Healthy Hearts of America program can be group based or individualized to focus on the needs of each patient, and to allow for improvements in compliance and adherence to the program.

 Even though there are many different programs and healthcare providers focused on disease management for patients with heart failure, there is currently not an effective program that focuses on health promotion for this population. The Healthy Hearts of America program focuses uses evidenced based research to develop a program that will allow heart failure patients to make long lasting behavior change that will improve their symptoms. This program can improve adherence to physical activity, diet, and other lifestyle choices, and can help improve the lives of individuals, communities, and populations of people. Healthy Hearts of America will help decrease healthcare costs associated with the condition, and it will help the lives of millions of people nationwide.

**Program Goals**

Healthy Hearts of America has many goals that relate to both the individual and the heart failure population. We strive to provide the best care possible, and work hard to ensure our goals and the goals of the patient are met throughout the program. The primary goals of Healthy Hearts of America include:

1. By the end of the 12 month program, participants will demonstrate improved aerobic exercise capacity and muscular strength, which will be measured using VO2 max, 1 repetition maximum, and will demonstrate improvements on distance walked on the 6 minute walk test. This will allow participants to demonstrate decreased heart failure symptoms and improvements in daily functional activity.
2. By using components of the social cognitive theory, program participants will learn to how to make behavior changes in order to make healthy lifestyle choices for the long term that will allow for improvement in heart failure symptoms and overall quality of life. Improvement in quality of life will be measured using the Kansas City Cardiomyopathy Questionnaire throughout the duration of the program, and patients will demonstrate clinically significant quality of life changes within 12 months after initiating the program.
3. By the end of the 12 month program, participants will be educated on healthy lifestyle choices such as diet, exercise, smoking cessation, weight loss, and decreasing alcohol consumption. Participants will understand what the implications of continued poor health choices are, and will be able to independently make lifelong healthy choices.
4. Throughout the program, participants will develop lifelong relationships and friendships. This program will also provide participants with a strong community support system, which will build trust between program instructors and participants, and will allow for successful program outcomes.

**Methods**

*Instructor Training*

 Prior to the implementation of Healthy Hearts of America in the community, instructors need to be recruited and trained to provide the correct interventions and understand the program policies. All instructors must be a licensed healthcare professional, which could include physicians, doctor of osteopathy, physician assistants, physical therapists, occupational therapists, etc. Instructors will be required to attend in person training, which will consist of 4 Saturday classes, which will last approximately 5 hours each day. During the training, instructors will be given a manual which contains all of the program policies and interventions of the program. The manual will be specific and provide important information about exercise interventions, nutritional advice, smoking cessation, alcohol cessation, and utilizing the social cognitive theory during educational session. The training sessions will also provide instructors with important health information pertinent to patients with heart failure to ensure safety throughout the program. Trainings will consist of going through the manual to discuss how to instruct the program through a 12 month period, conduct outcome measures, conduct educational and coaching sessions, and work with a healthcare team to ensure goals are being met. Training sessions will also consist of hands on activities such as creating an hour long session plan, practicing an educational session, setting up and using specialized equipment, and asking any questions that they have. At the end of the training, instructors will be required to take a multiple choice exam to ensure understanding of the components of the program. A score of at least 80% must be achieved on the exam. If instructors complete all training sessions and pass the final exam, they will be given a certificate of completion to demonstrate that they are qualified to be instructors of the Healthy Hearts of America program. Along with the certificate, instructors must currently be CPR and Basic Life Support certified and maintain their certification as long as they are currently instructing. Instructors must also provide proof of licensure and maintain all licensure standards as long as they are currently working with the program.

*Program Funding*

Although Healthy Hearts of America is a free community based program for heart failure patients. The program will require funds for equipment, use of a meeting space, marketing, and employee reimbursement. The founders of Healthy Hearts of America have worked hard to save money for start-up costs of the program in major cities across the United States. Luckily founders have agreed to a partnership with American Heart Association, which will provide continued funding to increase the number of programs nationwide. Funding from AHA will also allow for marketing to recruit participants and instructors, and ensure the program is successful. Healthy Hearts of America has also created a partnership with the YMCA across the nation to allow use of the YMCA as a weekly meeting space for the program. This partnership will also allow participants to become a member of the YMCA at a discounted rate with successful completion of the 12 month Healthy Hearts of America program. Along with these partnerships, Healthy Hearts of America will always accept donations from any organization or individual who want this program to be successful. All donations will be used toward making program improvements and ensuring successful implementation across the nation. Unfortunately instructors will be considered volunteers, and will not be paid a salary. However, as an instructor, healthcare providers will receive benefits such as continuing education credits, building relationships with community members, and working collaboratively with other healthcare professionals.

*Participant Recruitment*

All participants will be recruited from local hospitals and clinics who work with heart failure patients. Program founders and instructors will market the program to healthcare providers in these settings and provide pamphlets and brochures to their patients. Participation in this program is completely voluntary, however participants are more likely to participant if their healthcare provider is recommending the program. If patients decide they would like to participate in the program, they can fill out a new participant form on the Healthy Hearts of America website, which can be found on the pamphlet or brochure. After signing up, participants will be emailed detailed information about the program including, program goals, start date, location, time/schedule, expectations, and any other pertinent information. Participants are welcome to email or call their instructors with any questions prior to the start of the program.

*The Program*

Healthy Hearts of America is a 12 month long program dedicated to changing the lives of heart failure patients. A new cohort will begin every three months, which can give members of the community the opportunity to join 4 times throughout the year, and prevent overly populated classes. The first program will begin in January, then another will begin in April, then July, and then October. There is no set limit to the number of participants in each cohort. The number of instructors will depend on the number of participants. Each program will consist of at least one instructor for ever 5 participants, but more instructors are welcome to participate and collaborate together. All sessions will take place a local YMCA. If there is not a YMCA in the surrounding community, a different meeting facility will be established by the instructor.

For successful completion of the program, participants are required to attend at least 2 sessions each week, and they are more than welcome to attend more if they want. There will be 3-4 sessions held weekly, including two evening session during the week and two weekend sessions. Instructors will decide what time the sessions start based on participant preference and scheduling conflicts. Each general session will last 1 hour, and no session will be the same as any other. The exception to this is during the first week and during re-evaluation periods, sessions will last 2 hours in order to complete evaluation and assessments. During the first week participants are required to attend the two evaluation sessions in order to get baseline measurements. Re-evaluation will take place every four weeks (once per month) to assess progress.

During the first session, participants will be registered and given orientation to the facility, given an overview of the program, and educated on safety with using the exercise equipment during the first 45 minutes. The remaining time will be used to complete a clinical examination for each patient, which will include past medical history, vitals assessment, assessment of range of motion and strength, and gait assessment. Participants will also fill out the Kansas City Cardiomyopathy Questionnaire (KCCQ) on the computer and complete the 6 minute walk test (6MWT) during the first session. The 6 minute walk test is completed by having participants walk around a measured track or course for 6 minutes. Prior to the start of the test, resting heart rate, blood pressure, and oxygen saturation will be taken. During the test, participants are allowed to use equipment such as canes or walkers if that is what they use for community ambulation. They are also allowed to take standing rest breaks during the test, which will be recorded. At the completion of 6 minutes, participants must stop where they are and the distance will be measured, and heart rate, blood pressure, and oxygen saturation will be taken again. Distanced walked will be entered into the computer where it will be compared to age and BMI matched normative data. During the second session, participants will complete assessments including VO2 max and 1 repetition strength maximum. VO2 max and exercise capacity will be measured via the cardiopulmonary exercise test. To complete this measure, participants will be wear a face mask that measures oxygen and breathing patterns, and an EKG monitor to assess heart rate and rhythm. Normal breathing patterns and heart rate/rhythm will be measured prior to starting the test. Participants will then get on a stationary bike and pedal lightly for a few minutes to warm up. The bike will then progressively increase in resistance until the participant is giving their maximal effort and can no longer continue. The facemask and EKG will gather data during the exercise test and will calculate VO2 max. After completion of the cardiopulmonary exercise test, participants will have a 30 minute break to rest where they can drink water, eat a snack, and rest. The next test they will complete is the 1 repetition maximum for strength. Prior to this test participants will be taught proper squat form. To complete this test, participants will chose a weight (using dumbbells) in which they feel comfortable completing 10 squats, which counts as their warm up. Participants are allowed to use body weight for their warm-ups. After that they will then chose a weight that will allow them to complete 5 repetitions of a squat, but they should be fatigued enough where they cannot do more than 5 repetitions. Once they determine their weight and complete the test the information will be inputted into the computer and a 1 repetition maximum calculator will be used to calculate their 1RM. All assessment and evaluation session will occur in the same order that they occurred on during the first week so that patient results are consistent each time. After each evaluation and assessment session patients will meet individually with the instructor to discuss their progress and create new goals for the upcoming month.

After the assessment and evaluation sessions are completed, the general sessions will begin. Each general session will last 1 hour. Participants will begin with a light warm up for about 5 minutes and then complete aerobic exercise for 20-30 minutes. Following that, participants will then complete resistance exercise for 15-20 minutes. Instructors have the freedom to create their exercise intervention, and will make interventions fun and interesting to keep participants engaged. The remaining 10-15 minutes will focus on educational sessions and coaching, which will incorporate components of the social cognitive theory. Some sessions may have a shorter exercise component to allow for longer group education sessions, and to allow time for individualized session where participants can discuss their goals, progress, and concerns with the instructors. Some session may also involve guest speakers such as previous program participants, nutritionists, physicians, etc. to provide education and motivation. Although the program is voluntary, in order to successfully complete the program participants should attend at least 2 sessions every week. Instructors will use motivational tactics to keep participants engaged and work with them individually during difficult times so that participants can achieve success. While participants should attend 2 sessions of the Healthy Heart Program each will, they will also be encouraged to participate in 20-30 minutes of exercise at home during the other days of the week.

Every session, instructors will develop an exercise program. Frequency and duration for each exercise will be similar for each participant such as the type of exercise, number of repetitions and length of the exercise, but intensity will be individualized based on the patients scores on the cardiopulmonary exercise test, 6 minute walk test, and 1 repetition maximum. Every two weeks, intensity will increase to ensure the patient is continuing to improve in exercise capacity and strength. This process will continue for 8 months. After that time, patients will begin to transition to creating their own exercise programs and creating weekly meal plans under the supervision of the instructors. This will allow participants to begin to make independent choices about their lifestyle and teach them how to transition to independence once the program is complete. By the end of the 12 month period, patients will not only have improved strength, exercise capacity, and quality of life, but they will also have the skills to continue to lead a healthy life and keep their health condition under control.
*Patient confidentiality*

 All patient information and medical history will be stored on an electronic medical records system that is password protected. Paper records will also be stored in a locked filing cabinet as a backup in case of loss of power or other emergency. Participants will have access to their information anytime they request it. Only instructors will have access to the medical records, and medical records will be kept on file for 10 years. All instructors will be required to maintain HIPAA standards.

**Program Evaluation:**

 Program evaluation is an important process to ensure successful outcomes in Healthy Hearts of America. Wagner et al. states that “effective chronic illness management requires more than adding new features to an unchanged system focused on acute care”. [16](http://f1000.com/work/citation?ids=540487&pre=&suf=&sa=0) Program evaluation allows shareholders and instructors to make changes to Healthy Hearts of America to ensure that it is as effective as possible. The CDC has provided many different strategies for successful program evaluation, which Healthy Hearts of America will incorporate into their plan. [17](http://f1000.com/work/citation?ids=6115030&pre=&suf=&sa=0) The first part of program evaluation that is important, is feedback from instructors and participants about how well the program is run. Participants will provide feedback at 6 months and at the conclusion of the program to determine their satisfaction with the program and suggest any changes that should be made. Instructors will also provide feedback twice a year, where they can discuss whether they think the program is successful, and any changes that should be made. Program effectiveness will also be monitored by having biannual check-ups to ensure instructors are following the manual and correct protocol. Inspectors will pay a visit to each session 2 weeks out of the year. While there, the inspectors will ensure that instructors are following all program policies and procedures, there are no safety hazards or concerns, and to ensure all governmental policies such as HIPAA and OSHA are being followed. If there are no problems discovered during that time, instructors can continue with the program, and another inspection will occur in 6 months. If the inspector does find some issues, the instructor has 2 weeks to make any changes or corrections. After that 2 week period, the inspector will return to investigate and ensure the changes were made. If not, the instructor will be asked to resign from their position, and a new instructor will be put in place to continue to program. The last aspect of program evaluation that will occur is a yearly meeting with all instructors and founders. This meeting would be completely voluntary, but founders highly encourage instructors to attend to provide their input. At this meeting, they will discuss overall outcomes and success rates of the year, discuss feedback provided from the participants and instructors about changes that should be made, and they will provide any changes that will be implemented within the coming year. All of these evaluation methods will be very important to ensure long term success of the Healthy Hearts of America program, and will allow this program to grow into a nationwide community program.

**Conclusion**

Healthy Hearts of America is not your average cardiac rehab program. This program was developed to make an effort to allow patients with heart failure to make healthy behavior change that will lead lifelong disease management. Healthy Hearts of America is unique because it uses aspects from the social cognitive theory to teach participants how to make health behavior changes that can last a lifetime. Participants will go through weekly exercise programs that include aerobic exercise and resistance training to improve their overall health. They will also get group and individualized education session to allow them to successfully make health behavior change. The program also teaches participants how to transition from instructed exercises session to independently creating their own exercise program and weekly meal plan. This program recruits instructors with a strong medical background to ensure safety of all patients, and all instructors are trained to provide the best care for heart failure patients. Healthy Hearts of America is a unique program that is different from others because it focuses on lifelong health promotion rather than disease management. If successful, this program will be able to change the lives of millions of heart failure patients across the country, decrease mortality rates associated with heart failure, and help decrease healthcare costs associated with heart failure. Overall, this is a special program that can be beneficial to all patients with heart failure.

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