***Part 1: Statement of Need***

Hypertension is the number one attributable risk factor for mortality worldwide.1 Globally, the statistics show that hypertension effects more than a quarter of the world’s population, which is roughly 1 billion people, and is estimated to be responsible for 6% of all deaths.2,3 According to data from 2009-2012, nearly **one third** **of adults over the age of 19 in the U.S. are hypertensive**.3 Inactivity has surpassed smoking as the greatest risk factor leading to hypertension.4 Despite these statistics, little effort has been focused on interventions to increase activity by governments when compared to anti-smoking campaigns.4 It is well documented that aerobic and resistance training can lead to reductions in blood pressure.1 However, the U.S. health care reimbursement system currently does not reimburse for preventative programs, which have been proven to reduce costs.5,6 The implementation of a health promotion program to increase activity in middle aged adults is crucial if the current trend of increased prevalence of hypertension is going to be halted and reversed. Just as it has been proven through evidenced based research that exercise can reverse coronary artery disease, so too can exercise be used to reverse hypertension and reduce premature death in the U.S. and around the world.1,7,8

Hypertension is a chronic condition in which the pressure in the blood vessels remains elevated for long periods of time.2,9 Sustained time periods of elevated blood pressure leads to an increased risk for cardiovascular diseases such as coronary artery disease, atherosclerosis, cardiovascular disease, and peripheral vascular disease, as well as myocardial infarction (heart attack), heart failure, kidney disease, and stroke.9,10 Hypertension is often referred to as the “silent killer” because there are usually no signs or symptoms present while these underlying damaging changes are occurring.2

Economically, hypertension is one of the largest burdens to health care, worldwide and in the U.S.1 According to 2011 statistics presented in the 2015 Heart Disease and Stroke Statistics from the American Heart Association, heart disease represents the largest cost to the U.S. healthcare system and hypertension is number eight in terms of cost expenditure categorized by disease (See Appendix part A for details).3 If you combine the 2011 direct expenditures on these two chronic conditions, the cost was roughly $160 billion in 2011.3 North Carolina is among the states with the highest percentage of people with 2 or more risk factors, such as physical inactivity, which contribute to cardiovascular disease.3

***Part 2: Background***

The information presented above has been provided to stress just how dire the current situation is and to present an alternative through the Health Promotion Program. We are promoting a shift from the current health care model and moving toward disease *prevention*. For example, individuals with hypertension may be able to take medications to lower their blood pressure, however, this is not preventative and will not target the original reason hypertension may have occurred. Activity level is a modifiable risk factor that has been found to have a significant impact on preventing, and even reversing cardiovascular disease.8 The Health Promotion Program will target 45-60 year olds that currently have hypertension or are at high risk for developing hypertension and are not meeting the current CDC exercise recommendations in order to increase quality of life, vitality, and longevity (see Appendix part C).

The implementation of this Health Promotion Program will be rolled out in Winston-Salem, NC and will reduce health care costs, help people discover the tools to lead healthier lives, and reduce premature deaths. Winston-Salem was chosen because it is representative of the larger demographic of the Southeast, which has a higher rate of hypertension compared to other regions in the United States.11 Winston-Salem’s population consists of approximately 35% Black or African Americans and 15% Hispanics (representing approximately 50% of the overall population), both have higher rates of hypertension and physical activity compared with Caucasian.3,12 If successful, this model can serve as a basis for other Southeast communities with similar demographics. The program will begin by primarily targeting churches in Winston-Salem, NC, starting with Green Street Methodist, due to its proximity to diverse neighborhoods and because it is actively engaged in the community through a free medical clinic and food pantry.

Physical therapists are well situated to help with the implementation of this Health Promotion Program. The American Physical Therapy Association’s vision statement is “transforming society by optimizing movement to improve the human experience.”13 As health professionals, physical therapists are trusted, respected, and regarded as credible sources for health behavior change.14 Physical therapists are already skilled at the treatment level with helping patients modify behavior through modification of activity, strength training, and developing movement strategies.14 Physical therapists are well situated to provide these health preventative services and help reduce the prevalence and incidence of hypertension through the implementation of this Health Promotion Program through education and leading group exercises.

There is evidence supporting the positive effects of prevention through exercise on reducing cardiovascular disease as well as improving quality of life.6–8 The “Lifestyle Heart Trial” and the “Multicenter Lifestyle Demonstration Project” demonstrated successful outcomes through lifestyle changes, such as eating healthy, stress management, group support, and smoking cessation.7,8 The “Lifestyle” intervention also included moderate aerobic exercise as part of their routines with no use of lipid lowering drugs which ultimately led, not only to a decrease, but a *reversal of* cardiovascular disease and events.8 Moderate exercise was mostly walking with a target of 50-80% of their maximum heart rate (adjusted based on conditioning level) for at least 30 consecutive minutes for a minimum of 3 hours per week.15 Not surprisingly, the participants in the study that were most adherent to the lifestyle changes showed the greatest benefits.8

These two evidence based lifestyle interventions have proven results among participants with severe chronic heart conditions (coronary artery disease) at improving heart health. Another major accomplishment of these two studies is that they were implemented and conducted at a significantly reduced cost (and future cost) to the healthcare system.7,8 As mentioned before, our current U.S. ‘health care’ has been described as a being ‘sick-care’ model, which results in expensive surgeries rather than addressing the root cause at a fraction of the cost.6

Another program to serve as a model for this Health Promotion Program is the Eat Smart Move More Weigh Less program (ESMMWL), an evidenced based program helping people to lose weight.16 ESMMWL is a 15-week program consisting of group meetings (some online), tracking of weight, food intake, and exercise, and an education component.17 Through these components, along with personal goal assessment and motivation, the ESMMWL helps to increase mindfulness about daily choices, which has been shown to lead to a decrease and maintenance of weight loss and a decrease in hypertension.16,17

The Health Promotion Program utilizes the constructs of the socio-ecological model (SEM). The SEM for health care has been used successfully in other health promotion campaigns. For example, it has been the basis for drug prevention programs, smoking cessation, improving the intake of fruits and vegetables in African Americans, and increasing participation in sports among rural adolescent girls.18–21 These programs were successful because they identified and recognized the many factors that influence a person’s behavior when planning their health programs. The SEM targets individual *and* environmental social factors rather than purely at an individual level.19 The four levels of the SEM are: 1) individual or intrapersonal - individual characteristics such as, belief, attitudes, and knowledge, 2) interpersonal - formal and informal social support systems such as, family, friends, work and or school, 3) community – institutions and organizations system beliefs, and 4) public policy - local, national, and global policies.19

Key components when applying the SEM are to be able to identify these various determinants, address specific behaviors to change, and target multiple levels to maximize behavior change.18 For example, the Health Promotion Program has identified inactivity as the behavior to change and targets factors of the SEM from multiple levels.18 Strong motivation and education (intrapersonal), strong social support through the group setting (interpersonal), and the education and influence of church and community leaders (community and public policy) are believed to maximize behavior change, which is what the Health Promotion Program seeks to accomplish.18

The Health Promotion Program will target the intrapersonal level through the education of participants about the effects of hypertension to help influence beliefs and attitudes.19 Education about the benefits and risks of inactivity is extremely important. Based on the National Health and Nutrition Examination Survey, roughly 17% of people are undiagnosed and may be unaware that they have hypertension.3 This program could potentially help to diagnose and educate a portion of this unaware population. Also, the education on the risks of inactivity can potentially help participants understand their own susceptibility, seriousness, benefits, barriers, and self efficacy, which are the constructs of the Health Belief Model.22 Individual education is important, of course, and educating community leaders on the health benefits has also been found to be helpful – especially among socio-economic disadvantaged communities.23 Community leader education will also influence perceptions and social support at the community leadership level.23 However, education alone has been shown to have short-term effects, which is why the Health Promotion Program targets additional levels of the SEM for maximal effectiveness.18

In addition to targeting the intrapersonal level through education, the Health Promotion Program will also focus on the interpersonal level through the organization of groups, which will meet every week to participate in group exercise, education, and support. Group meetings will facilitate ongoing support which will help to motivate participants through unique interactions to foster encouragement.18 A survey from participants in The Healthy Living Program, which also uses “group support, health education, and organized group exercise,” revealed that support was key for motivation and adherence, and their ultimate success with the program.24

In terms of community and public policy, one of the targets of the Health Promotion Program will be to increase active transportation among the targeted population. Incentives, in the form of fitness trackers, will be given to participants who utilize active transport such as biking or walking to work, church, or the store. Also, screening and recruitment events will occur throughout the year through the collaboration of churches, health fairs, physicians, and local governments in order to promote the program and educate the community. The church, especially among the African American community, has been shown to have a central role over the influence of lifestyles and behaviors.20 African Americans have the highest prevalence of hypertension globally and almost half (≈45%) of all adult African Americans have hypertension in the United States.3 The Faith, Activity, and Nutrition Program, implemented in 36 churches throughout South Carolina found a significant reduction in the amount of leisure time spent.25

The Health Promotion Program plans to educate government leaders, which can impact public policy. Educating the mayor, such as Mike Cornett of Oklahoma City, that have become aware of the pressing issues of inactivity, have made positive impacts in their community by increasing walkability and making the city more bike friendly, which is especially important in areas without access to sidewalks or safe walking spaces, such as Winston-Salem.26 Also, from a national public policy perspective, this health promotion program will promote the 2008 Physical Activity Guidelines for Americans to help influence behavioral change.27 It will accomplish this by educating the participants and community about these guidelines and will include this as a program and participant goal.

This program targets health behavior change through the constructs of the SEM. The Health Promotion Program’s hope is that as changes occur at each of the four individual levels, reciprocal causation will occur. Reciprocal causation between the environment and the individual will transpire which will begin to naturally influence various SEM levels, manifesting the essence of the Health Promotion Program.

***Part 3:* *Program Description & Objectives:***

The Health Promotion Program is an exercise promotion program developed by physical therapists using the constructs of the SEM. This program is aimed at reducing hypertension through increased activity in accordance with the Centers for Disease and Control Prevention (CDC) exercise recommendations and targets adults ages 45-60 in the Winston-Salem area of North Carolina. The SEM recognizes that there are multiple levels of influence, such as individual motivation *and* the environment, which has served as a guide during the planning and integration of interventions of this Health Promotion Program.23 The Health Promotion Program is designed to influence the intrapersonal, interpersonal, community and public policy constructs of the SEM. The Health Promotion Program consists of weekly classes, which include weekly lessons or group discussion, group exercise classes, and mindfulness training.

Health Promotion Program goals:

1. Successfully hold 30 recruitment and education events during the first year at the following: churches, physician offices, health fairs, local events, and local governments in order to increase awareness and support. The information about the program will be disseminated through handouts, PowerPoint presentations, and blood pressure screenings.

2. Reduce each participant’s blood pressure by 5% during each of the 8-week sessions through exercise as measured by weekly blood pressure reading “check-ins.” A digital blood pressure machine and a manual blood pressure machine will be available at each event and a booklet will be given to each participant to track blood pressure. Measurements will be taken during each session to increase awareness and to track progress.

3. Increase the activity of each participant by program’s end to meet, at a minimum, the exercise component of the current CDC guidelines as evidenced by the completion of the participants’ exercise logs to meet these guidelines consecutively for the last 4 weeks of program. Current CDC guidelines for adults 18-65 years old recommend 150 minutes of moderate intensity aerobic activity per week and 2 days of strength training.27

4. Increase knowledge of the participants understanding of the risks of hypertension and the benefits of exercise - including susceptibility, seriousness, and benefits, which are constructs of the Health Belief Model - as measured by an increased score (minimum increase of 5 points, each question worth 1 point) on the 32 question Health Promotion Program assessment given at the 1st and last session.22

5. Receive positive confirmation from 80% of the participants that they are engaging in a minimum of 150 minutes of moderate intensity aerobic activity per week at 6 month follow-up.27 Long-term success of the program will be demonstrated by sustaining the increased physical activity behavioral change as demonstrated through the maintenance of the CDC guidelines.

6. Successful completion of at least one full program with a minimum of 10 participants during the first year.

7. Establish an additional event center in another part of Winston-Salem within the first year.

***Methods-* Who? -** Program/Marketing Director – (full-time) oversees daily operations, in charge of recruitment/education about the program, works directly with PT’s and various organizations, community leaders, and organizers in the community. They will also be responsible for the development and dissemination of printed and online material.

3-5 Physical Therapists – (part-time or paid per event) will be responsible for the following: obtaining blood pressure from participants during screenings/recruitment events and lead weekly exercise/education classes.

***Methods- What?*** – Total program length 20 weeks = 2, 8-week sessions, which will meet weekly for 75 minutes with an allotted time of 90 minutes for setup, questions and discussion. A 4-week ‘break’ between sessions will be provided to allow for the participants to adapt the changes into their lives and to have time to identify potential barriers, which will be discussed when the second 8-week session begins. Blood pressure will be taken at the beginning of each session and recorded in the participant’s chart as well as the PT’s chart so that both may have access to this information. Each session will consist of a short, 20-minute discussion with a lesson (every other week) or a group facilitated discussion to provide support and encourage participants. Each week, participants will set individual goals for activity during the week and will be encouraged to be active for a minimum of 2 more days when not in session, recording it in the activity log. Also, participants will be encouraged to exercise with a buddy from the program for increased adherence and motivation.

|  |
| --- |
| Basic Anatomy of Class (1-1.5 hours) |
| Time (minutes) | Each session will obtain at least one component |
| 0-15  | Obtain blood pressures |  |  |  |
| 15-35/45 | Education session | Group discussion | Group support | Motivational speaker |
| 35-70 | Group exercise | Brisk walking | Aerobics class | Dance |
| 70-80 | Mindfulness training | Body Awareness training | Mental relaxation |  |

Titles of the 8 education sessions will be **held every other week** during the program incorporating the constructs of the SEM:

* Risks of Hypertension & Learning the Borg (RPE)
* Beliefs and Attitudes
* Exercise Effects
* Family Matters
* Identifying Barriers
* Breaking Down Barriers
* Keep Keepin On – How to stay motivated
* Lifestyle Changes

***Methods- When? -*** Recruitment/education sessions will occur when scheduled according to the availability of the organization. Program intervention will include 3, 20-week sessions held seasonally throughout the year; Spring session: January-June, Fall session: August- January, Summer session: March-August. The sessions will be held on a weekday evening, with the possibility of multiple programs running simultaneously each seasonal session depending on the number on participants based on a max class size of 18.

***Methods- Where? -*** The first location, which has been established, is the Green Street Methodist Church. Green Street is located in South East Winston-Salem and is at the center of a diverse community. The Health Promotion Program hopes to collaborate with 2-3 other churches/YMCAs in other parts of Winston-Salem within the first 3 years of the program to effect change in more neighborhoods across the city. Churches and YMCA’s are the target because these are considered community centers and can usually be obtained at low or no cost and typically have large spaces with which to conduct the group exercise classes. Recruitment of participants will be held in Winston-Salem at the following locations: churches, physician offices, health fairs, local events, and local governments.

***Methods- How? -*** This Health Promotion Program will decrease hypertension through successfully helping people increase their exercise activity level through program design, which utilizes the constructs of the SEM. Important aspects of this program include (construct of the SEM noted in parentheses): 1) education and goal-setting (intrapersonal) for the purpose of increasing awareness and empowering individuals, 2) group sessions and discussion (interpersonal), which help to foster accountability through peer influence and social support, 3) educating community leaders (community)– to serve as role models to promote change, 4) (public policy) – the promotion of the CDC recommendation.24,28 Other components of the intervention include motivation through the use of incentives such as rewards (exercise tracker) for obtaining goals, free personal PT sessions for the participant with the greatest overall blood pressure drop, and other smaller incentives throughout the program. Mindfulness will be promoted through stress reduction techniques, body awareness, and mindfulness training in an effort to empower participants to make healthy choices.16 Another part of the program will be to connect participants to resources if barriers are found. For example, if the participant smokes and is having trouble quitting, the program will refer this participant to a smoking cessation program. If the participant is unable to purchase proper footwear, the program will connect the participant with Fleet Feet on Harvey Street, which has donation programs.29 Funding for equipment, incentives, employees, and leasing of space will be provided for through a grant, which has been obtained for 3 years with a clause to extend for an additional 5 years if program goals are met.

***Part 4: Program Evaluation***

The Health Promotion Program attempts to counter the trend of increasing inactivity and hypertension, expecting to reverse/reduce hypertension among participants. However, an evaluation naturally needs to be conducted to gain insight into the feasibility of this program and the quality and effectiveness need to be determined and possibly redirected as this program is in its infancy and is getting ready to launch.30

Stakeholders to benefit from this evaluation are those involved with program operations (program director, PTs, funding agencies, collaborating agencies), insurance companies, evaluators, and individual program participants.31 Nearly everyone is affected, either directly or indirectly, by hypertension as nearly one third of all adults in the U.S. are hypertensive.3 There are many costs to hypertension including: 1) significant financial costs that drain precious health care dollars and resources, 2) reduced health, vibrancy, and lifespan of individuals affected, and 3) loss of quality time spent with loved ones.3

The Health Promotion Program is an evidence-based program that uses the constructs of the SEM and Health Belief Model (HBM) to address the public health issue of hypertension.22 The SEM has been used to increase physical activity in populations with positive outcomes.21 The HBM has been successful at increasing perceived benefits of balance to reduce falls in older adults and jogging to reduce blood sugar of people with type II diabetes.32,33 Another strength is the cost, which is free to participants. A study by Yancey et al. found that a free gym membership was the motivating factor compared to education and social support for participation in an 8-week program targeted toward increasing activity.34 In this same vein, the Health Promotion Program uses incentives, such as activity trackers and individualized PT sessions to motivate participants. Furthermore, the program addresses smoking cessation through referral and stress reduction through mindfulness training.

The goals of the Health Promotion Program are measureable. Many short-term program goals (1 year or less) have been accurately described and if met, there is agreement that these would be appropriate program success measures to use. However, the overall goal of the program is *prevention*, which needs to be addressed in order to accurately measure success. However, it is understood that measuring over the long term is not without its difficulties. It is recommended that a long-term outcome measure be used at 1 year, 5 year, 10 year, and 15 year follow up, measuring if a participant is able to sustain behavioral changes promoted through this program as measured through a verbal or written response and continued ‘normal’ blood pressure readings (Appendix B) at these time periods.

The Health Promotion Program has targeted North Carolina’s 4th largest city and recently partnered with Green Street Church in Winston-Salem where sessions will be held one time per week.35 However, it is unknown whether community members in this area will be receptive to this program. As such, an additional evaluation will further assess the needs and desires (feasibility) of the community members through a survey, which is currently being conducted by the evaluators in the 3 areas of Winston-Salem identified for implementation of this program.30 The number of surveys sent to each of the 3 areas was 1000 (a total of 3000), with a ≥25% interest out of the overall responses received will be considered significant and therefore worthy of implementation. If there is less than a 25% interest based on survey responses, then the revised evaluation report will possibly recommend changes in the areas targeted for implementation or possibly changes to the program according to responses obtained, such as expanding the age limits as indicated below or offering virtual lessons.

This programs targets 45-60 year olds, which according to the graph in the appendix C is appropriate, however, it is uncertain whether this targeted lifespan is ideal for a preventative program as it may be harder for these individuals to sustain behavioral changes and it may miss opportunities with younger and older hypertensive individuals that could potentially benefit. The statistics state that almost one out of three individuals over the age of 19 is hypertensive, so, if the basis of this program is prevention, it may benefit recruitment efforts and result in a greater reduction in hypertension if the targeted age is expanded to include individuals with hypertension at any age over 19.3

***Limitations***

While the Health Promotion Program utilizes the constructs of the SEM model and the HBM in order to elicit sustained behavioral changes among participants, one of the major limitations is that it attempts to do this mainly through only one intervention -increasing activity. However, while increasing activity has been shown to be beneficial, if a participant is not getting the proper nutrition, the effects of the increased activity may be negated. Other successful programs have incorporated multiple factors to reduce hypertension. For example, Dr. Ornish’s program and the Eat Smart Move More Weigh Less, which the Health Promotion Program purports to be based on, use exercise as well as eating healthy, smoking cessation, and stress reduction.8,16 While stress reduction and smoking cessation are addressed; the extent and details of stress reduction may need to be clarified. Additionally, one of the goals of the program is to meet the CDC’s activity recommendations in regards to aerobic activity, however, the strength component of the recommendations are not addressed and may be important to incorporate.

Another limitation is that potential participants may feel the length of time (20 weeks) is too long, which may deter recruitment and increase dropout rate. The program is free, which is a positive, but may also be a limitation. For example, if participants have not put forth any monetary value toward the program it may be easier to drop out, as they may not feel invested in the program. Also, it is unknown whether the current funding through the 3-year grant of the Health Promotion Program is sustainable, which may negatively impact the program’s future.

***Conclusion***

The Health Promotion Program helps participants learn more about the risks of hypertension and benefits of exercise through education and promotes increasing activity in order to lower blood pressure in a targeted population of 45-60 year olds in Winston-Salem, NC and was developed by physical therapists to ultimately prevent secondary conditions, including, surgical procedures, stroke, and heart failure, which are caused by hypertension.9,10 The Health Promotion Program makes a strong case for the need of this program. There are many strengths of this program, like using proven behavioral models to target and influence multiple constructs of individual participants for maximal influence, using rewards, making it free to participants for increased appeal, using groups to influence motivation, and using goals and activity tracking. Also, it should be pointed out the ‘break’ is unique to this program and is considered a strength because it should allow the participants to experience some of the struggles and possible barriers, which can be addressed during the second session. Recommendations for program adaptation and advancement include: using text messages and email blasts to participants for increased motivation and support, both of which have been shown to be effective enablers for increasing activity.28 Also, it is recommended that the program add a strength component and possibly add or address the nutrition component. The results of the current survey will be analyzed once all are received and added to our current recommendation. Overall, we have deemed the quality of this program to be moderate-high (6/10 rating), it appears to be feasible, and the obvious need for the implementation of this program is undoubtedly worth the investment.

**APPENDIX**

**A.** Chart showing the heavy economic cost of hypertension in the U.S. in billions, stressing the need for this preventative health program.3



**B. Blood Pressure**

* Normal: 120mmHg/80mmHg
* Prehypertensive: >120mmHg/80mmHg-139.9mmHg/89.9mmHg

Hypertension defined:36dic

* Stage 1: > 140 mmHg/90 mmHg
* Stage 2: >160 mmHg/100 mmHg

**C.** Main goal is *Prevention*, targeting Middle-Aged Adult (45-60 years) prior to the accumulation of chronic health conditions which will increase health costs (see “Health Policy in Perspective” below).37



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