

Chronic Obstructive Pulmonary Disease (COPD) encompasses a series of chronic conditions that affect the respiratory system. These conditions, including chronic bronchitis, emphysema, and some forms of asthma, result in impairment of structure and function of the pulmonary system.<sup>1</sup> COPD, which is commonly associated with smoking, can impact individuals' independence in activities of daily living, performance of functional tasks, and overall quality of life (QOL).<sup>2</sup> A community health program is one resource that could help individuals with COPD management.

### Statement of Need

This program proposal describes Water Walking for Wellness (WWFW), a health program aimed to increase endurance, improve QOL, and encourage participation for individuals with COPD. One community health pilot initiative, The COPD Wellness Program, utilized education to encourage individuals with COPD to take an active role in disease management.<sup>3</sup> The American Lung Association's Better Breathers Club (BBC) is another education-based wellness initiative for individuals with COPD.<sup>4</sup> Although BBCs add an element of group programming and social support, it lacks the integration of an exercise component. According to the literature, educational interventions alone are ineffective for long-term disease management.<sup>5</sup> WWFW differs from these programs because it integrates education with a physical activity in order to effect change.

Nationally, there is a substantial need for an evidence-based wellness program for COPD due to the high prevalence of the disease and the costs associated with treatment. According to the Centers for Disease Control and Prevention (CDC), approximately 6.5% of the population in the United States is diagnosed with COPD.<sup>6</sup> This chronic condition also incurred approximately \$32 billion of healthcare costs in

2010 and is ranked 3<sup>rd</sup> in leading cause of death.<sup>6,7</sup> Online resources such as the COPD Foundation are available to help educate individuals and families about the disease.<sup>8</sup> However, there is a lack of information available regarding direct, COPD-specific wellness programs that combine education with other evidence-based interventions.

The state of North Carolina (NC) also demonstrates a significant need for a wellness initiative aimed at long-term COPD management. According to the 2011 Behavioral Risk Factor Surveillance System, over 12% of adults over the age of 65 in NC have COPD.<sup>9</sup> In addition, nearly half of the NC adult population has a history of smoking.<sup>10</sup> Due to the long history of tobacco production in the state, cigarette smoking is entrenched in the culture in parts of the state. NC, therefore, requires greater emphasis on disease prevention and management. Currently in NC, there are hospital based rehabilitation programs, one BBC, and support groups.<sup>11</sup> WWFW would offer a multi-faceted approach to COPD management that is currently unavailable in the state.

Individuals living with COPD face significant physical and emotional challenges. COPD impairs individuals' ability to perform routine tasks and is likely to reduce participation in activities at home and in the community.<sup>6</sup> Given the reduction in participation and functional ability, there is a major effect on QOL for individuals with COPD.<sup>2</sup> Although a wellness initiative cannot reverse COPD, WWFW could provide an outlet through which this patient population could increase community participation.

WWFW is a unique initiative for COPD because it utilizes evidence-based physical interventions in a group-based atmosphere. WWFW a 3-pronged approach to manage COPD: (1) water walking at waist level to increase endurance and physical activity tolerance; (2) communal space to offer social support; and (3) assessment of

smoking cessation readiness and education for smoking cessation. In contrast to pure educational wellness programs, the physical, social, and goal-oriented elements of the program interact to help improve confidence in chronic disease management.<sup>5</sup>

### Background

WWFW is based on current evidence that demonstrates the myriad benefits of aquatic exercise for individuals with COPD. This evidence, in conjunction with theories of health behavior change, proves that WWFW can initiate change and teach patterns for long-term COPD management. In the past, the aquatic environment was not used with COPD patients; it was believed that the pressure from the water would increase respiratory difficulties and reduce activity tolerance for these patients.<sup>12</sup> However, one recent systematic review indicated that aquatic exercise is a safe intervention for COPD patients, one in which they can participate for longer duration and higher intensity compared to land-based interventions.<sup>12</sup> In addition, all of the studies in the systematic review showed higher in QOL for individuals with COPD following participation in an aquatic program.<sup>12</sup> These studies also indicated that aquatic exercise results in a significantly greater improvement in endurance for the COPD population compared to traditional land-based interventions.<sup>12</sup> This systematic review, therefore, justifies the WWFW goals of QOL and endurance improvements for participants.

Another study, a randomized control trial, evaluated the effects of low-intensity aquatic interventions for individuals with moderate to severe COPD.<sup>13</sup> This study also demonstrated that aquatic therapy is safe for this patient population, even for those with a more advanced disease state.<sup>13</sup> Furthermore, this trial indicated that there are many benefits of water-based activity, including increased strength of respiratory musculature,

improved activity tolerance, and improved pulmonary function.<sup>13</sup> In this study, individuals in the aquatic training group were able to achieve the minimum clinically important difference (MCID) in the 6-minute walk test (6MWT), while the land-based intervention group did not achieve the MCID.<sup>13,14</sup> Given that the 6MWT is one measure of endurance for COPD patients, improvement in the 6MWT for the aquatic group also helps to justify the WWFW program goal of improved endurance for participants.

Finally, one retrospective study compared land and aquatic pulmonary rehabilitation programs for COPD patients. According to the authors, aquatic therapy demonstrated similar improvements in QOL and physical performance to traditional land-based programs.<sup>15</sup> This evidence is useful for WWFW justification because it demonstrates that aquatic exercise is “equally beneficial” for this patient population with regard to strength, endurance, and QOL.<sup>15</sup> According to the Health Belief Model (HBM), if a individual perceives that an activity is too effortful for them to complete, they will not engage in that behavior change.<sup>16</sup> For some individuals, land-based exercise can be intimidating. In contrast, the aquatic environment, which reduces the effects of body weight, could appear easier than land exercise. This results in an enhancement of self-efficacy for participants of WWFW.<sup>16</sup> Individuals who are unwilling to participate in land-based activity may select WWFW as an alternative form of exercise, which may improve self-efficacy and promote long-term COPD management.

WWFW incorporates several elements of the HBM in order to initiate individuals' willingness to participate in chronic disease management. In addition to the perceived achievability of water exercise, the ability to achieve goals within the program is also likely to bolster self-efficacy for participants of WWFW.<sup>16</sup> As participants achieve

program goals, they will perceive that they are in control of COPD. The integration of participant goals in WWFW appeals to the HBM facet of increased self-efficacy, proving to individuals that they have the capacity to be in charge of the condition.<sup>16</sup> Another element of the HBM that is used in WWFW is proving perceived benefits of aquatic exercise. According to the HBM, if an individual perceives that the benefits of a behavior change outweigh the costs, then that person will be more likely to embrace the behavior change.<sup>16</sup> As described above, there is ample evidence demonstrating the benefits of aquatic therapy.<sup>12,13,15</sup> Participants of WWFW will be able to identify the positive effects of community-based aquatic activity via outcome measures and, therefore, will be more likely to participate in similar activities following the conclusion of the program.

In addition to the HBM, WWFW integrates other theories of health behavior change, including the Social Cognitive Theory (SCT) and the Transtheoretical Model (TTM), in order to encourage participants to continue chronic disease management activity. First, the group-based environment of the WWFW employs the SCT of behavior change, which indicates that individuals with robust social support will be more motivated to sustain positive healthy behavior changes.<sup>17</sup> In the WWFW group, people with COPD will be afforded the opportunity to meet and interact with peers facing similar challenges. Through the SCT idea of observational learning, observing other individuals with COPD succeeding in disease management should motivate participants to make their own positive changes.<sup>17</sup> The group component of WWFW provides a foundation for a social support network, which can continue to develop and foster healthy behavior changes following the completion of the program. Finally, the TTM idea of behavior change stages is a critical component of WWFW.<sup>18</sup> The TTM stipulates that individuals

can be categorized into one of many stages of behavior change readiness.<sup>18</sup> For patients with COPD, smoking cessation is one aspect of chronic disease management that is critical for long-term success. Identifying participants' stage of change with regard to smoking cessation can inform the educational and support needs for each individual.

The combination of current evidence supporting aquatic exercise and various theories of behavior change makes WWFW a compelling wellness initiative for COPD management. Program facilitators must be cognizant of this foundation in order to best adjust interactions with participants and reaffirm permanent behavior change.

### Program Goals

In order to improve self-efficacy and enhance perceive benefit of aquatic exercise, WWFW has several goals for participants to achieve by the end of the program. The first goal of the program involves the improvement in QOL. The St. George's Respiratory Questionnaire (SGRQ) is used for this goal because it has been validated for use with the COPD population and has a set MCID of 4 points.<sup>19</sup> The specific goal for WWFW participants is that, in 12 weeks, participants in the program will improve score on the SGRQ by at least 4 points.<sup>19,20</sup> Improvement on this outcome measure reflects the overall goal of QOL improvement.

The next two goals for the program reflect the endurance component of WWFW. The 6MWT was selected because it has been validated for use with COPD patients and has a set MCID.<sup>14</sup> Moreover, the literature that has evaluated aquatic exercise for COPD patients uses this outcome measure as the tool of choice.<sup>13,15</sup> The endurance goals is, in 12 weeks, participants will improve distance on the 6MWT by 55 meters, or will achieve a distance of at least of at least 200 meters.<sup>14</sup> These distances were

selected based on the MCID of 54 meters and the cutoff of 200 meters for predicting a hospitalization.<sup>14</sup> In addition to the distance, there is also a perceived exertion goal for the 6MWT. In 12 weeks, at the completion of the 6MWT, participants will report a value no greater than 5/10 on the Modified Borg Scale for Perceived Dyspnea.<sup>21</sup> In performing the 6MWT, participants can see improvement in distance and perceived difficulty of the task as indications of achievement, thereby impacting self-efficacy.

Commitment to smoking cessation is another goal for WWFW participants. Although COPD patients receive significant smoking cessation education, there will still likely be participants who have not initiated smoking cessation. Using the TTM, the program facilitator can identify the individuals' current stage of smoking cessation and provide the tools that will be most beneficial in promoting smoking cessation, such as a counseling referral or smartphone accountability apps.<sup>18</sup> The goal is that for individuals who reported that they were current smokers at start of program, participants will express interest in initiation of smoking cessation at program conclusion.

The final goal is that at completion of the program, all participants will verbalize commitment to a lifelong exercise program, to be performed at least 3 days per week. This goal is important because it represents the culmination of other goals. It demonstrates that the individuals involved in WWFW have come to perceive the significant benefits of physical activity and that they are motivated to become independent in COPD management following the completion of the program.

### Program Description

WWFW is a 12-week aquatic exercise program, with bi-weekly water walking sessions. The maximum capacity is set at 15 participants, or equal to the capacity set

by the facility. The inclusion criteria are as follows: over the age of 65, diagnosis of COPD, independent with transfers into and out of the pool, living in the community, and signed consent from a physician. These criteria are broad in order to capture a wide range of the COPD population. To accommodate varying levels of disease severity, each 45-minute session will be an independent “free walk.” As indicated in the literature, low-intensity activity and more demanding exercises in the water environment both provide physical and psychological benefits for individuals with COPD.<sup>12,13</sup> Therefore, the free walk is suitable for all levels, providing the option for individuals to utilize pool toys to increase or decrease the difficulty of the task. Participants can also modulate the difficulty of water walking by moving to a different depth of the pool.<sup>12</sup> To ensure safety, a program facilitator will be present in the pool and available to assist participants as needed. The independent nature of the water walking intervention provides freedom in the environment, which will allow natural interactions between participants. By offering and opportunity for organic relationships to form, the format of the WWFW helps foster a social support network between participants, thereby promoting elements of the SCT to facilitate long-term healthy behavior change.<sup>17</sup>

A comprehensive evaluation will be performed at the initiation of the program and at the completion of the program to assess for physical and emotional improvements. The evaluation methods used with WWFW participants are: SGRQ, 6MWT, patient report of Modified Borg Scale following 6MWT, evaluation of current exercise routine, and a smoking cessation interview. The inclusion of outcome measures is critical to the HBM because firm, qualitative evidence will enhance the perceived benefits of participation in an exercise program.<sup>16</sup> By using outcome measures that have been

verified for used with COPD patients, participants in the program can also determine new independent goals to achieve after the conclusion of WWFW.

Since WWFW requires an aquatic environment, this program will take place at a local fitness center or YMCA with a pool. According to the HBM, if the perceived costs of a behavior change are greater than the benefits, than individuals will not continue participation.<sup>16</sup> The “cost” of the change is not always equated with a fiscal cost.<sup>16</sup> For this program, however, one cost is the participation fee. There are two payment formats for the program that influence the perceived costs of the program. The cost of WWFW program will be \$15 per week. If paid upfront, rate is reduced to \$145 for the entire program. For individuals who have not yet perceived the various benefits of participation, the weekly payment helps to reduce the barrier of payment.<sup>16</sup> In contrast, other people with COPD may perceive the overall, lump-sum payment reduction as an incentive to pay upfront. Flexibility in the payment structure is essential in reducing payment barriers and appealing to different financial perspectives.

### Program Evaluation

The program evaluation requires assessments by a variety of parties in order to secure a comprehensive, unbiased perspective on the success of WWFW, which will inform necessary changes. The first category of stakeholders involved in the program is the patients.<sup>22</sup> A patient satisfaction survey will be completed immediately at end of the program to identify areas of improvement from the perspective of participant.<sup>22</sup> Follow-up surveys will also be sent 12 weeks and 24 weeks following the completion of the program. These assessments will identify the success or failure of long-term goals, such

as physical activity and smoking cessation.<sup>22</sup> Tapping into the patient perspective will help identify weaknesses that were undetected by the program coordinators.

Family members or caregivers of participants should also participate in the WWFW evaluation. These individuals are stakeholders because they are directly affected by the potential success of the program.<sup>22</sup> In addition, caregivers might be able to detect change of behavior or attitude that is not perceived by the participant. The evaluation of the program from the perspective of the caregiver may determine secondary program needs, such as transportation recommendations. Overall, caregivers might provide insight that participants are unwilling or unable to report.

The next group of stakeholders to include is external support, such as funding sources and the physical landlord of the program. The WWFW will require external funding upon initiation of the program. The individuals or organizations that provide funding in the form of grants or loans will be interested in the program's financial success.<sup>22</sup> Evaluating the program based on percent capacity, gross profit, net profit, and growth will help determine potential financial changes of the program. The location where the program takes place is also a stakeholder because the program operations likely have an impact on the facility.<sup>22</sup> Using the facility, such a health club, for program evaluation will help to ensure a strong partnership with the landlord facility.

The program coordinators also need to perform a thorough self-evaluation at the end of the first year of WWFW programming. A long-term self-evaluation will assess class enrollment rates, attrition, and referral sources that have contributed to the success or failure of the program. This evaluation will help to re-strategize marketing techniques in order to grow pilot program and reach other cities in NC.

## Resources

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