Health and Wellness Proposal

Purpose and Scope

This proposal will first review the need for implementing a Type 2 Diabetes Mellitus (DMII) prevention intervention in the population of African American veterans, 45 years of age and older, served by the Durham, North Carolina (NC) Veteran's Affairs Medical Center (VAMC). A Chronic Care Model (CCM) approach (RWJF, 2012) will then be used to provide a background of factors that contribute to the development of DMII in the target population and of DMII prevention approaches that have been studied in the past in similar populations. Next, the CCM approach will continue with the proposal of an evidence-based intervention that is meant to prevent development of DMII in the target population. Finally, limitations in the proposed interventions ability to affect change in the target population, limitations regarding interpretation of results caused by the proposed intervention and implications for use of the proposed intervention in other populations will be evaluated.

In 2010, it was estimated that the prevalence of DMII in the U.S. population is 8.3%, which increases every year, as evidenced by the 1.9 million new diagnoses made in 2010. (CDC, 2011, May 23) African Americans are twice as likely to be diagnosed with DMII as non-Hispanic whites, and are more likely to suffer DMII-related complications (e.g., 1.7 times as likely to be hospitalized, 2.7 times as likely to develop end-stage renal disease, and 2 times as likely to undergo a lower extremity [LE] amputation). (HHS, 2012, May 25) Also, Vietnam veterans exposed to the herbicide Agent Orange may be at increased risk for developing DMII, which affects part of the above mentioned target population, and which is recognizes as a Vietnam service-related disease that is eligible for receiving VA disability compensation. (VA, 2012, February 14) Additionally, the prevalence of DMII is greatest among older Americans aged 65 years or older, which in 2010 was 26.9%. However, middle-aged Americans aged 45-65 years are close behind, with a rate of 13.7% in 2010. Further, of the 1.9 million new diagnoses in 2010, about 1.05 million were aged 45-64 years; while about 0.39 million were aged 65 years or older. (CDC, 2011, May 23) Prevalence of DMII trends higher in NC in general at 9.7%, and in Durham county the prevalence is 9.4%, which is 1.4% and 1.1% higher than the national prevalence, respectively. (CDC, 2012) This increased prevalence is likely influenced by the estimated 43.8 percent of the Durham population being African American, which is 31.5% higher than the percentage of African Americans in the entire U.S. population, and by the estimated 9.5% of the populations in Durham that are civilian veterans. (AmericanTowns, 2012, November, 6)

Modifiable risk factors for DMII include obesity, unhealthy eating habits and a sedentary lifestyle. When it comes to obesity NC has the 16th highest prevalence in the nation at 29.1%. (CDC, 2012, August 13) Also, Durham residents have unhealthy eating habits, as evidenced by about 75.1% of the population consuming less than 5 servings of fruits and vegetables per day. (CDC, 2008) Additionally, residents of the South, and especially African Americans in the South, have demonstrated being less likely than the rest of the U.S. population to engage in physical activity (CDC, 2012, August 13) (less than half of the U.S. population meets the surgeon general's physical activity guidelines [CDC, 2012, August 07]).

Given: the increased number of DMII-related risk factors and the subsequent increased prevalence of DMII in the population of African American veterans, 45 years of age and older, served by the Durham VAMC; the fact that participation in lifestyle interventions has demonstrated effectiveness in reducing DMII incidence in similar populations (discussed in the background section below); and the fact that effectively reaching similar populations has been a struggle in the past. (Colagiuri et al, 2010; Laws et al, 2012); a DMII prevention intervention focused on improving nutrition and physical activity habits in this population would be beneficial, both in improving the average quality of life (QOL) of this population, and in reducing healthcare costs on the local and national public.

Background

Savoca et al found that low-income African Americans with DMII: have a history of eating large portions of food, particularly high fat foods, desserts, or candy; have a history of being overweight; have attitudes of hopelessness, denial, fear, stress, and depression; and are likely to think that their condition is caused by family history. (Savoca, 2004) In addition, Cox et al found that this population does not get adequate exercise. (Cox, 2004)

Gumbs et al demonstrated that low-income African American women who receive diabetes self-management education tend to more regularly check their blood sugar, check their feet, participate in moderate physical activity, and receive diabetes-related services from their healthcare providers regularly (e.g., foot examinations, glycosolated hemoglobin measurements and dilated eye examinations). (Gumbs, 2012)

Bains et al, Gumbs et al and Onwudiwe et al state that health and wellness (H&W) promotion efforts should be designed around cultural characteristics in order to be successful. They suggest that the designers and the individuals executing the design be culturally competent (i.e., knowledgeable about the culture, and perceived barriers to changing H&W behaviors, and able to efficiently assist the members of the culture using common language, customs, and behaviors). (Bains, 2010; Gumbs, 2012; Onwudiwe, 2011)

There are a number of common, cultural characteristics that effect impetus for change in the community of African Americans who have DMII and low-incomes. Walker et al suggests that one of these characteristics is a minimal level of education, which makes them oblivious to the harmfulness of the behaviors they have become accustomed to, including poor eating habits and low levels of activity. Therefore, they state that the act of providing education alone should go a long way in promoting H&W efforts. (Walker, 2010) However, Savoca et al, Cox et al and de Groot et al suggest that this population is commonly depressed, making them apprehensive and easily stressed when faced with change, which contributes to noncompliant behaviors that require a certain degree of follow-up to influence change. In addition, they point out that many of those in this population are disabled, which requires provision of accommodations in some cases to enable them to participate in the interventions being promoted. (Savoca, 2004; Cox, 2004; de Groot, 2003) Another factor that Samuel-Hodge et al and Hill et al suggest could be taken advantage of to help with compliance in this population is there tendency to be very religious and involved in church groups. Stating that if efforts can be designed in cooperation with community church groups this may increase the chances of compliance, and could promote formation of focus groups that could utilize organized problem-solving training formats. (Samuel-Hodge, 2006; Hill, 2011)

There have been attempts to implement H&W promotion initiatives in the African American population with low-incomes and DMII with mixed results. A study by walker et al examined an approach that did not address any special aspects of cultural characteristics, to see if it was effective. The initiative provided 3 educational sessions to include, "information about diabetes and its complications, risk factors, proper diet, recommendations for exercise, medications, and monitoring blood glucose…, through discussion, games and demonstrations." The examiners found that, although participants demonstrated an improved knowledge about the content covered, the educational sessions did not have any impact on decreasing diabetes risk factors or HBA1c values. (Walker, 2010)

Hill-Briggs et al conducted a preliminary study that implemented a diabetes self-management support intervention with 56 low-income African Americans with DMII. The initiative utilized intensive problem-based training in focus groups with others in similar situations once a week for 3 weeks. Three months after intervention participants demonstrated significant improvements in diabetes knowledge, diabetes-related problem-solving abilities and diabetes self-management behaviors, and clinically significant improvements in

SBP, DBP, and LDL cholesterol. In addition, participant's satisfaction and usability ratings were high. These results demonstrate that the addition of support groups to diabetes education efforts has the potential of impacting positive change in this population. (Hill-Briggs, 2011)

Samuel-Hodge et al outlined a potential church-based group diabetes self-management education intervention for African Americans, where church groups would recruit congregants with DMII to attend group sessions each week for 12 weeks and designated a diabetes advisor or peer counselor who they would engage with in 12 monthly telephone calls, and would receive 3 postcard messages from diabetes care providers with helpful information. (Samuel-Hodge, 2006) This seems as though it has high potential for this population in lieu of the results demonstrated by Hill-Briggs et al.

Nonetheless, Gumbs et al suggests that there is still a need for designing H&W initiatives and policies that have more potential for improving participation among low-income, African Americans with DMII, in order to decrease complications related to DMII and improve the quality of life for this group. (Gumbs, 2012)

Even though the above studies are focused on an African American population, they still demonstrate that patient groups that share cultural characteristics require a tailored approach to interventions for optimal results to be obtained. In addition many of the patients served by the Durham VAMC do fit the description of the patients in the above studies. However, a few modifications to intervention will be needed to fit a broader population of veterans, which will be discussed below.

Diabetes Prevention Approach

Recruitment:
The approach for recruitment of patients is similar to the approach used by Hill-Briggs et al. (Hill-Briggs et al, 2011) Patients at the Durham VAMC who are at risk of developing DMII will be identified by their primary care physicians (PCPs). The PCPs will mail invitations to these patients, who are at risk, requesting participation in a DMII prevention program. The invitation will include a detailed explanation of the planned intervention, and will notify potential participants that a counselor will call and/or email them to answer questions and to register anyone who is interested. Reasons for potential participants declining the program will be recorded by the contacting counselors.

Intervention:
Patients who decide to participate in the program will attend a baseline session where: their health problem-solving behaviors, knowledge of diabetes and dietary habits will be assessed using selected measures; they will attend a 2 hour diabetes education session; they will be lent an ActiGraph wireless activity monitor for the duration of the intervention for tracking of their physical activity; and they will be assigned to a group of 8-10 participants, based on what works for their schedule. The remainder of the program will continue on the following timeline:

- Month 1: Twice weekly, 1 hr problem-solving training/education sessions in assigned groups at the Durham VAMC
- End of month 1: Assessment of changes in health problem-solving behaviors, knowledge of diabetes and dietary habits with provision of information on progress and areas of opportunity
- Months 2-4: Weekly communications with a group "buddy" to discuss progress and provide encouragement, and bi-monthly communications with a program counselor to also discuss progress and offer guidance
- End of month 4: Assessment of changes in health problem-solving behaviors, knowledge of

diabetes and dietary habits with provision of information on progress and areas of opportunity
- Months 5-16:   Mailed monthly newsletters with helpful information for preventing DMII
- End of month 16:   Assessment of changes in health problem-solving behaviors, knowledge of diabetes and dietary habits with provision of information about progress and areas of continued opportunity for the future

The initial education session will include the cause of and complications that result from DMII, appropriate dietary and physical activity practices for preventing DMII, and common misunderstandings about behaviors that place individuals at risk of developing DMII. Each problem-solving training session after the initial education session will begin with the reading of a common, hypothetical scenario that revolves around dilemmas regarding dietary and exercise habits (e.g., deciding what to do during break-times at work, how to eat at family or social gatherings where there is a lot of food around, etc.). Following the reading the group counselor will mediate a discussion about strategies that could be utilized in the various scenarios. At the end of each session the group counselor will bring attention back to some of the ideas discussed during the session, and then will redirect participant's attention to the cause of DMII and evidence-based approaches in preventing development of DMII related to the scenario in question.

Measures:
The Health Problem-Solving Scale (HPSS) will be used to assess health-related problem solving ability. Health-related domains included in the HPSS include problem orientation/motivation, problem-solving skill, and transfer of past experience/learning. The HPSS includes a total of 50-items designed to assess positive/effective and negative/ineffective aspects of health-related problem solving across the domains. Participants respond on a 5-point Likert scale ranging from 0 (not at all true of me) to 4 (Extremely true of me). Total scores are derived from summing positive/effective and reverse-scored, negative/ineffective items in each domain. Higher scores indicate more effective problem solving. Hill-Briggs et al found that the HPSS takes only 5-10 minutes to complete and demonstrates internal consistency reliability for use with persons with DMII. They also found that low scores are consistently associated with increased hospitalizations and ED visits. (Hill-Briggs et al, 2007)

The Diabetes Knowledge Questionnaire (DKQ) will be used to assess understanding of the cause, self-management, and complications of DMII. Response options are ''yes,'' ''no,'' or ''don't know.'' The final score is calculated as the percentage of correct answers with a maximal possible score of 100%. Higher scores indicate greater knowledge of DMII. Garcia et al found that the DKQ demonstrates sensitivity, construct validity and internal consistency reliability when used with persons with DMII. (Garcia et al, 2001)

The ActiGraph wireless activity monitor (ActiGraph, Pensacola, Fl), a small, uniaxial accelerometer worn on the waist, will be used to wirelessly measure physical activity in the way, which will be recorded as average weekly energy expenditure (EE). Various researchers have demonstrated validity and reliability of accelerometry use in monitoring EE both in clinic and field settings. (Trost et al, 1998; Easton et al, 1998; Sirard et al, 2000)

The Fred Hutchinson Cancer Research Center 12-page Food Frequency Questionnaire (FFQ) will be used to assess changes in dietary intake. Kristal et al found that this questionnaire demonstrates validity with dietary education interventions and reliability (Kristal et al, 1997).

Goals:
Process goals will include improved scores on the HPSS and DKQ, and ultimate outcome goals will include improved energy balance (i.e., difference between average daily energy intake [EI] and energy expenditure [EE]) and dietary characteristics (recorded on the FFQ). Participants will be asked to keep a diary of EI and EE will be recorded from the ActiGraph wireless activity monitor for 7 days prior to assessment periods.

Evaluation

To evaluate the effectiveness of this DMII prevention program, a series of linear regression analyses using the Stata version 12 data analysis and statistical software (StataCorp LP, College Station, Tx) with a two-tailed α of 0.05 will be conducted to determine if the program as a whole results in improved process and ultimate outcomes, to determine the program periods that were most significant in promoting improved outcomes, and to determine which process outcomes (i.e., changes in HPSS and DKQ scores) mediate progress toward the ultimate outcomes (i.e., energy balance and dietary characteristics).

There are a few possible limitations to this DMII prevention approach. First, recruitment relies on third party PCPs to mail invitations to their patients who are at risk of developing DMII, and to provide the program counselors with a list of these potential program participants with their contact information. Additionally, contacting potential participants by phone to complete recruitment may be too impersonal. Therefore, it may be difficult to recruit participants and effect a significant change in the target population. Second, the study design does not allow for evaluation of particular program components on outcome. Specifically, for months 2-4, communications with group "buddies" and communications with program counselors cannot be separated to determine how much of an effect each component had on changes in outcome.

This intervention approach has the potential of reducing the prevalence of DMII in Durham veterans 45 years of age and older, more so than other interventions in the past, because this population has become used to a team approach in solving problems in their military careers and they feel a strong camaraderie between each other as they have experienced combat together. Similarly, this approach may be appropriate for use within organizations, including religious groups, corporations, specific ethnic groups (e.g., Native Americans, African Americans, Mexican Americans, Chinese Americans, etc.), public schools, etc., as these individuals often have similar beliefs and interests that can be taken advantage of in customizing problem-solving training sessions.

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I have neither given nor received unauthorized aid on this assignment.