ENCOURAGING EXERCISE AMONG WOMEN WITH DIABETES:
A PROPOSAL FOR PRIMARY CARE PREVENTION OF CARDIOVASCULAR DISEASE

by

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ABSTRACT

Cardiovascular disease (CVD) is the leading cause of diabetic-related deaths among women with diabetes (CDC, 2001, ADA, 2004). Diabetes alone increases the risk for CVD. Adequate levels of physical activity are known to decrease CVD risk especially among women with diabetes (Hu et al., 2001). Primary health care providers are in a key position to promote increased levels of exercise to decrease CVD risk among women with diabetes. The purpose of this proposal is to describe a primary care intervention to promote exercise among women with diabetes, and to present a plan to evaluate the feasibility and effectiveness of the intervention.
CHAPTER I: Diabetes and CVD

Introduction

The purpose of this paper is to describe a primary care intervention to promote exercise among women with diabetes, and to present a plan to evaluate the feasibility and effectiveness of the intervention. This first chapter provides a review of the physiological factors contributing to increased risk of CVD among women with diabetes and details the significance of the problem in terms of the number of women affected and the personal and economic costs of increased CVD among women with diabetes.

Diabetes and CVD: Significance of the Problem

Over 18 million people, or 6.3% of the entire population, had been diagnosed with diabetes by 2002 (CDC, 2004). More than half of Americans with diabetes were women over age 20 (CDC, 2004), with more than one-third unaware that they had diabetes (ADA, 2004). Heart disease among people with diabetes was 2 to 4 times higher than adults without diabetes (CDC, 2001). In addition, the incidence of CVD among women with diabetes has been increasing even as the incidence of CVD in the general population has been declining (ADA, 2004). This phenomenon may be the result of the pathophysiology of diabetes and its relationship to the development of CVD. Currently, researchers consider having diabetes as a CVD equivalent risk factors for death from heart disease; thus, it is synonymous with already having a myocardial infarction (MI) (Willie, 2001). And, for women with diabetes, the diagnosis of diabetes erases any protective advantage for CVD related to being female (ADA/American College of Cardiology Coronary Heart, 2003, p. 1).
Results of the Framingham study indicated that women with diabetes had a five-fold increased risk of CVD over women without diabetes (ADA/American College of Cardiology, 2003). Diabetes is reported to increase one’s risk of CVD two to four fold due to a number of risk factors: high blood pressure, lipid disorders (high LDL bad cholesterol, high triglycerides, low HDL good cholesterol), smoking, obesity, and lack of physical activity (ADA/American College of Cardiology, 2003). In addition, glycemic control (Hba1c target 6.5 to 7.0) is positively correlated with CVD risk (ADA/American College of Cardiology 2003). Next, the financial implications of both diabetes and CVD cannot be ignored. In 2002, “The total annual economic cost of diabetes in 2002 was estimated to be $132 billion, or one out of every 10 health care dollars spent in the United States”(ADA, 2004). However, “when CVD was present with diabetes, initial postdiagnostic costs were very high, $14,595 per person per year” (Nichols & Brown, 2001, p. 485).

Decreasing CVD Risk Among Women with Diabetes

Despite the clear evidence that women with diabetes are at much higher risk for CVD, the majority of people (68%) with diabetes do not consider cardiovascular disease to be a serious complication of diabetes (ADA, 2002) and “about half of those surveyed (via telephone interviews) reported that their health care provider never discussed lowering blood pressure or lowering cholesterol” (ADA, 2002). Thus, this survey supports that health care providers are failing to address primary prevention of CVD in these diabetic patients (i.e. not discussing BP, cholesterol risk to CVD). In addition, even though prevention has been proven to decrease CVD morbidity and mortality, many
health care providers are not delivering this care to their patients according to evidence-based guidelines (Burke & Fair, 2003). The reason for the lack of prevention oriented care includes issues such as a lack of confidence in the provider’s skill to impact health behavior change as well as a lack in skill to provide this type of counseling (Burke & Fair, 2003). This is discouraging as there is evidence to support that primary provider’s role in patient’s health promotion can actually increase adherence to an action. For example, a group of 13 heart failure patients participated in an intervention of provider guidance to a supported home exercise adherence program. The participants received graphs every 3 weeks for a 12 week period which showed their provider and patient agreed goals compared to their actual level of exercise. Patients who received this intervention had greater adherence in addition to greater confidence to continuing exercise in the future (Duncan & Pozehl, 2002). Thus, provider guidance and support is positively correlated with exercise adherence.

The organizational factors of health care delivery may function to discourage health teaching by primary providers. However, they are likely to have more opportunities than any other providers and to have more potential influence than most. Practical reasons (limited time with patients) precludes careful assessment and development of individualized plans—components essential to effective interventions for health behavior change.

The purpose of this paper is to propose an economical, theoretically sound intervention for use in primary care clinics. The following chapter, organized using Pender’s Health Promotion Model (HPM), presents a review of research regarding CVD
in women with diabetes and describes essential components of interventions to promote health behavior. The last chapter describes a primary care intervention along with a plan to evaluate the feasibility and effectiveness of the intervention.

Summary

CVD in diabetic women is a problem that will not resolve on its own. A gap exists between the knowledge of diabetics understanding their risk of CVD and an interest in the providers to deliver the message. With the increased CVD risk of diabetes, it is imperative that health care professionals take an active interest in addressing modifiable risk factors. The long term goal of the proposed intervention is to decrease modifiable risk factors in diabetic women. The next chapter will focus on the theoretical framework of the proposal as well as review of literature.
CHAPTER II: Theoretical Underpinnings and Literature Review

Introduction

Pender’s Health Promotion Model (HPM) provides the organizing framework for the proposed primary care intervention designed to increase exercise among women with diabetes. An overview of the HPM is followed by a review of research regarding CVD in women with diabetes. Next is a section reviewing selected research about interventions to promote health behavior change. Finally, a summary and conclusion suggest the impracticality of implementing the usual health behavior change interventions in primary care, where there are unmined opportunities for encouraging exercise among women with diabetes. The proposed intervention, derived from the foundation presented in this chapter, is presented in chapter three along with a plan to evaluate the feasibility and effectiveness of the intervention.

Pender’s Health Promotion Model

Pender’s HPM model provides the organizing framework for the proposed project. Pender’s HPM integrates nursing and behavioral science with factors that influence people’s ability to engage in and/or change health behaviors. This model has been used to guide the exploration of biopsychosocial processes that influence one’s decisions to engage in health behaviors and as a framework to predict health-promoting lifestyles as well (McEwen & Wills, 2002).

There are many assumptions within the context of the HPM. For the purpose of this project, there are three applicable assumptions. They are: 1) Persons have the capacity for reflective self-awareness, including assessment of their own competencies,
2) Individuals seek to actively regulate their own behavior, and 3) Health professionals constitute a part of the interpersonal environment, which exerts influence on persons throughout their lifespan. The major concepts are individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes (McEwen & Wills, 2002). Figure 1 describes Pender’s HPM theory in a schematic representation.

FIGURE 1

Schematic Representation of Pender’s HPM

(Pender, Murdaugh, and Parsons, 2002)
Pender’s HPM will be used to guide the assessment of the ability of diabetic women to incorporate exercise intervention in their daily life. This program is guided directly by the HPM model. The goal is to decrease perceived barriers, increase perceived benefits, provide interpersonal support (the clinicians) and promote health care behavior modification. Theoretically per Pender’s HPM, if the participant perceives these decreased barriers and increased benefits of engaging in exercise, the interpersonal support should help enable them to successfully change behavior.

It is important to reiterate that according to the American Heart Association (AHA), risk factors are defined as “those that research has shown significantly increase the risk of heart and blood vessel (cardiovascular) disease” (AHA, 2004). Although the diabetes is a significant risk factor already, efforts will be focused on modifiable factors, such as exercise, to decrease CVD incidence. The following literature review will discuss diabetes and heart disease as well as exercise and engagement in health promotion behaviors.

Review of Literature: CVD and Diabetes

An article titled, “Coronary Heart Disease in Women with Diabetes”, was published in 2003 as a result of the combined efforts of the American Diabetes Association and the American College of Cardiology, Make a Link! Initiative. This review article specified particular risk factors associated with diabetic women and their risk of CVD. Although many articles have been published regarding diabetics and CVD, this paper was gender specific to women. Factors that contribute to accelerated CVD risk in this population include: “greater tendency for poor glycemic control, more severe
elevations in blood pressure and circulating lipids, the development of central obesity, higher rates of depression, and low socioeconomic status” (ADA/AHA, 2003, p.1). The authors reiterate that glycemic control is imperative in CVD prevention; however, women have particular factors that contribute to CVD, such as increased blood sugars and poorer control. For example, “higher frequency of eating disorders, use of hormonal contraception, menstrual variability in glucose control and insulin sensitivity, pregnancy, and variability in glucose control in perimenopause” (p.1). Health care providers usually consider modifying diet and exercise when a patient has poor glycemic control; however, additional factors may be considered when that patient is a female. In addition, while body mass index (BMI) is used in general CVD screening to predict CVD risk, this article suggests that central obesity tendency is more sensitive to predicting CVD risk within this population. Overall, this article gives further sensitive insight to risk factors associated with diabetic women and CVD (ADA/AHA, 2003).

Lu, Resnick, Jablonski, Jones, Jain, Howard, et al. performed a study, The Strong Heart Study, (2003) regarding non-HDL as a possible predictor of CVD in diabetic patients. They defined non-HDL as a measurement of total cholesterol minus HDL cholesterol. Samples have drawn from three geographic areas in the U.S. to gather data about CVD and its associated risk factors in 13 American Indian communities. Data included interviews about diabetes, physical examination, and laboratory tests. Upon baseline, 2,108 people of the total 4,549 women and men (aged 45-74) had diabetes but no CVD. During the next 9 years, data was collected about fatal and nonfatal CVD episodes. Data analysis showed that non-HDL cholesterol was a strong predictor of CVD
in both men and women with diabetes. Although the hazard ratios in both men and women were higher using the non-HDL in comparison to either the LDL or triglyceride figures alone, the total/HDL ratios were even higher in women. Thus, results suggested that total/HDL ratios are more sensitive than standard lipid panels as an indicator of a CVD risk factor in diabetic women (Lu et al., 2003).

Hu, Stampfer, Hafner, Solomon, Willett, and Manson (2002) researched the possibility of the risk of CVD being elevated before actual clinical diagnosis of type 2 diabetes in women. In Female nurses (n 117,629) aged 30-55 years of age that were free of CVD at the time of baseline were followed for the 20 years. At baseline, 1,508 women were already diagnosed with type 2 diabetes. Between 1976-1996, 5,896 women developed type 2 diabetes; 1,556 new cases of MI, 1,405 strokes, 815 fatal CVD, and 300 fatal strokes were documented. Of the women who developed diabetes in the 20 years post baseline assessment, “the age-adjusted relative risk (RR) of MI were 3.75 for the period before diagnosis and 4.57 for the period after diagnosis” (Hu et al., 2002, p.1129). This is in comparison to the 110,227 women who remained free of the diabetes diagnosis throughout the follow-up period. In addition, “the multivariate related risks (RRs) further adjusting for BMI, smoking, and other cardiovascular risk factors were 3.17 and 3.97…the risk of stroke was also significantly elevated before diagnosis of diabetes” (Hu et al., 2002, p.1129). Overall, the data indicates that there is a definite increased risk of CVD before the clinical diagnosis of type 2 diabetes in women. These results support aggressive management of CVD risk in those at risk for the development of diabetes as well as those currently surviving the disease (Hu et al., 2002).
Rexrode, Carey, Hennekens, Walters, Colditz, Stampfer, et al. (1998) studied fat distribution as an independent risk factor to CVD. Research question was whether waist-hip ratio (WHR) or waist circumference were better indicative of risk of CVD in women. They performed a prospective cohort study using US female nurses involved in the Nurse’s Health Study. Subjects completed a questionnaire in 1986 and again in 1994. The 44,702 nurses whom provided waist and hip circumferences were between 40-65 years of age; free of previous diagnoses of CVD, stroke, or cancer at baseline. From 1986-1994, there were 320 CVD events documented, 251 MIs and 69 CVD deaths. The researchers correlated a higher WHR and larger waist circumference that were independently associated with an increased risk of CVD. Specifically, women with a WHR of 0.88 of higher had a relative risk (RR) of 3.25 compared with women with a WHR less than 0.72. In addition, a waist circumference of 96.5cm (38in.) or more was positively correlated with an RR of 3.06. For women with reported “hypertension, diabetes, and high cholesterol, a WHR of 0.76 of higher or waist circumference of 76.2cm (30in.) or more was associated with more than a 2-fold higher risk of CVD” (Rexrode et al., 1998, p. 1843). Overall, the study supports that WHR and waist circumference are independently associated with risk of CVD amongst women. More importantly, the risk of CVD increases in 2-fold when taking into account co-morbidities, such as diabetes, in women with a waist circumference of 30in. (notice, 8 in. less than women without co-morbidities). As an aside, after personally measuring a BMI and waist circumference, there was no associated CVD risk with the BMI result but a positive result related to the waist circumference measurement. Thus, this suggests that the waist
circumference measurement is possibly a more sensitive indicator for risk factor detection, because it takes into account central obesity versus overall body mass. In addition, the study tightens the value for accepted WHR associated with existing co-morbidities. Rexrode et al. (1998) stress that “prevention of obesity is the most effective means of reducing risk of abdominal adiposity…WHR and waist circumference may be modified by behavioral factors, such as increased physical activity, smoking cessation, and changes in dietary intake” (p.1848).

Next, in 2000, Solomon, Hu, Stampfer, Colditz, Speizer, Rimm et al. looked at the effects of moderate alcohol consumption and risk of CVD in diabetic women. They worked from the assumption that moderate alcohol consumption is positively associated with decreased CVD development in healthy people, but they wanted to look at the effects in a high risk population, diabetic women. The population was women in the Nurses’ Health Study who were reported diabetic and 30 years or older in age. From 1980 to 1994, a total of 295 CVD events were reported; 194 cases were nonfatal MIs and 101 fatal cases of CVD. Diabetic women without alcohol consumption were used as the control group. Compared to the control group, those women taking 0.1 to 4.9 g of daily alcohol had a RR of 0.74 whereas those taking >=5 g daily had a risk of 0.48. Thus, this study suggests that moderate consumption of alcohol shows benefits to decreased risk of CVD among diabetic women. This can effectively be used when discussing one’s social history related to alcohol intake. The research article supports encouragement of alcohol consumption; of course, one must heed potential risks of this behavior and consider the
overall best interest of the patient when discussing lifestyle modifications (Solomon, et al., 2000).

Caixas, Ordonez-Llanos, Leiva, Payes, Homs & Perez (1997) conducted a study to evaluate the effect of glycemic control on low density lipoprotein (LDL) particle size. They approached their research with the understanding that small LDL particle size (B phenotype) is more atherogenic in nature. They evaluated a 3 month period of “optimized glycemic control” of 37 insulin dependent diabetes mellitus (IDDM) patients and 33 non-insulin dependent diabetes mellitus (NIDDM) and a control group matched for age, sex, and BMI (Caixas et al., 1997). While the IDDM group displayed a 19% non-A phenotype LDL prevalence before glucose optimization and a 11% post (with the control group at 12%), the NIDDM patients displayed a 51% pre-optimization and 30% post (with the control group at 28%). In addition, the researchers found that there was a higher proportion of small density LDL in NIDDM women when compared to non-diabetic women. Overall, results supported the emphasis on optimal glycemic control in all people with diabetes in respect to decreased proportion of atherogenic small density LDL. Specifically, study results suggested that diabetic women, already prone to increased levels of small density LDL, have a greater need for optimal glycemic control as well as particle size LDL monitoring in the prevention of cardiac disease (Caixas et al., 1997).

There is abundant data on the benefits of fish oils and omega three fatty acid consumption in decreasing CVD risk, but there is limited data on its efficacy for people with diabetes. One exception is a study by Hu, Cho, Rexrode, Albert, & Manson (2003).
The researchers conducted a prospective study of the association between fish consumption and omega-3 fatty acids and CVD risk with total mortality. The sample was 5,103 female nurses who had type 2 diabetes at baseline but were free of cardiovascular disease and cancer. During the time of 1980 to 1996, there were a total of 362 incidents of CVD and 468 deaths of all causes. The researchers compared the varying levels of fish consumption with RR of CVD and mortality. When comparing to those who seldom ate fish (less than one serving/month), those with fish consumption of 1 to 3 times a month had an RR of 0.70, for once per week, 0.64, 2 to 4 times a week had an RR of 0.60, and 0.36 for those for 5 of more times per week. There was a negative correlation between consumption of fish and omega-3 fatty acids with CVD and associated mortality. Thus, the inclusion of fish consumption in diet regimen would suggest efficacy in decreasing risk of CVD and associated mortality in diabetic women (Hu et al., 2003). This study has further implication in dietary management of diabetic women.

Implementation of the American Heart Association’s Heart at Work program was designed to produce positive health outcomes in the project’s site. Pegus, Bazzare, Brown and Menzin (2002) discussed the favorable results of implementing this cardiac program in increasing the awareness of risk factors, self-efficacy, and health behaviors. This quasi-experimental research design compared 2 factory sites, a control and the intervention site. In total, 633 participated in the study. The intervention group significantly increased their knowledge of blood pressure management, had increased knowledge about the strong relationship between nutrition and cardiovascular disease, and about risk factors for having a heart attack. In addition, participants in the
intervention group reported that they were more likely to begin treatment for hypertension, change their diet, lose weight, and they reported fewer sick days to their employment. Although this intervention looked at a time frame of one year, it suggested the need to look at its results at the end of the second year for further information on long-term effects. It is important to note that this study did not collect data about actual health behavior. However, the positive attitudes toward health change as well as the support of colleagues in the direction towards change are two important elements of Pender’s Health Promotion Model. Thus, it is promising to see a change in attitude within one year and a re-evaluation at year two might show effective results in change in behavior (i.e. actual change in diet, decreased weight, and treatment of hypertension) (Pegus et al., 2002).

Sorenson et al. (1998) conducted a 2 year study on health behavior changes in diet and smoking among employees at 24 manufacturing work sites in Massachusetts. It was a randomized, controlled intervention study including 2,386 employees. At baseline, behaviors were assessed via self-administered surveys. There were three key intervention pieces targeting health behavior changes: joint worker-management participation in planning and implementation, consultation with management work-site environmental changes, and health education programs. There was significant reduction in the intervention group’s percentage of calories consumed as fat as well as an increase in the servings of fruits and vegetables, and in an increase in fiber consumption. However, there was no significant decrease in smoking. It supports the use of peer groups and
personal responsibility to plan with managerial involvement as efficacious to the overall health behavior changes (Sorenson et al., 1998).

Galavotti, Pappas-DeLuca, and Lansky (2001) researched modeling and reinforcement techniques to help combat HIV and trigger behavior change. Although this study focused on HIV prevention, it has applicability to health promotion behavior change in general. Results suggest that individual, social, and cultural factors influence behavior change and must be addressed in efforts to adhere, and removing structural and environmental impediments to behavioral change is also a key factor. This study looked at 2 main components: entertainment as a vehicle for education and interpersonal support and reinforcement at the level of community. It suggested linking to already existing media resources, e.g. a long running local television program or radio station, as well as targeting existing community support, e.g. family members and church. Through impacting media, role modeling was achieved. For example, if television programs exposed a person with personal characteristics similar to target (e.g. demographics, race, sex, etc.) and members within that community could relate to their story, they would feel invested and this individual would serve as a role model. Then, the community would further support the health behaviors modeled by the individual and encourage the implementation and continuation of these efforts in the individuals. These ideas concur with Pender’s Health Promotion Model which support role modeling, positive attitude supporting change, decreased barriers supporting change, and support of family and peers supporting changed behaviors (Galavotti et al., 2002).
Warren-Findlow, Prohaska, and Freedman (2003) researched the challenges and opportunities that exist in recruiting and retaining underrepresented populations with health promotion research. This study looked at characteristics of 273 referrals and 103 enrollees and analyzed in conjunction with programmatic decisions about recruitment design and eligibility criteria. This study found that eligible participants who did not enroll were younger (under 60 years of age) and had self-reported diabetes. After one year of enrollment, there remained 70% of the originally enrolled participants. The attrition to the program was not associated with race, chronic illness, or randomization; however, there was an association between attrition and functional status, having a high school degree, and program site. The study found that if one pays attention to the program design, i.e. including activities to the more fit population, they might increase enrollment and recruitment of healthier and younger patients. Overall, this study is important to health promotion, because it promotes understanding the population and paying attention to design to increase the success of the program (Warren-Findlow et al., 2003).

Yanek, Becker, Moy, Gittelsohn, and Koffman (2001) researched the effects of integrating church culture and health promotion activities amongst African-American women. Historically, African-American women have a markedly increase risk of CVD due to their increased risk of obesity and sedentary lifestyle, and previous public health strategies to effect health behavior change have met little long-term success. Thus, this new research aimed to look at the impact of the church culture on active nutrition and physical activity interventions in a one-year study measuring correlations to lifestyle risk.
factors of heart disease and CVD risk profiles compared to a control group. In addition, the study looked at the extent that a strong spiritual component affected the ability to change health behaviors. In total, 490 women, aged 40 year of age or older, were obtained for participation in the study. Overall, the results were favorable. There were significantly improved blood pressure levels, diet, and physical activity. The spiritual and standard interventions operated almost identically; thus, there were not significant differences in the outcomes. This research study reiterates the positive effect of a strong support group, such as a church community, in influencing health behavior modifications (Yanek et al., 2001).

In 2001, Hu et al. researched the effect of physical activity and risk for cardiovascular events in diabetic women. This was a prospective cohort study; it included 5,125 female nurses who had diabetes. Level of physical activity was first assessed in 1980 and later updated in 1982, 1986, 1988, and 1992 through validated questionnaires. In addition, average hours of moderate exercise and a metabolic equivalent of task (MET) score were computed. This study found that levels of physical activity were inversely related to coronary heart disease and ischemic stroke. Overall, the study found strong evidence that increased physical activity is associated with substantial reductions in risk for cardiovascular complications among diabetic women (Hu et al., 2001).

Synthesis of Relevant Literature

Diabetes and CVD go hand in hand. There are many modifiable risk factors that are important to screen in diabetic women, such as diet, cholesterol, waist-hip
circumference, and physical activity. In addition, the best approach to decreasing CVD incidence in people with diabetes is aggressive management of CVD risk (Hu et al., 2002). Furthermore, adequate physical activity has been associated with substantial reduction in CVD risk in diabetic women (Hu et al., 2001). Health promotion behaviors have increased when people have had: managerial/supervisory support, peer role modeling, familial support, church support, and individualized attention to their specific needs. Thus, the review of literature supports the need for the proposed intervention. The development of an individualized and clinician supported approach to exercise as a means of CVD risk reduction.

Summary

There is substantial support that increased physical activity in diabetic women can lead to risk reduction for CVD. Success in health promoting behavior adherence has been positively influenced by individualizing the person’s needs and lending supervisory support. The proposed intervention addresses the sensitivity of these issues.
CHAPTER III: Description of Proposed Project

Introduction

The purpose of this chapter is to describe a primary care intervention to promote exercise among women with diabetes, and to present a plan to evaluate the feasibility and effectiveness of the intervention. The goal is that the participants in the intervention will increase their exercise, and lose weight as a means of decreasing CVD risk.

The Method

This will be a pilot test of an evidenced-based provider intervention designed to decrease CVD risk by increasing exercise and weight loss among diabetic women. The program evaluation will include evaluation of feasibility and effectiveness. Feasibility will be assessed through interviews with both providers and participants. Effectiveness will be assessed through pre and post-tests of the targeted health behaviors, exercise and weight loss. The following sections detail the criteria for participation, the steps in implementing the new intervention, measures to be used in pre-post tests, and data analysis plans.

Criteria for Patient Participation

Although the targeted population already has diabetes, they are without CVD at baseline. Thus, through primary intervention, risk factors for CVD can be minimized. Eligible participants for this study include women over the age of 18 with a diagnosis of diabetes without evidence of CVD who receive their routine diabetes care from their primary care provider (PCP). These will be identified through medical record review. Then, the chart of the eligible women will be tagged. When they call to schedule their
next 3 month follow-up visit, they will be introduced to the study and asked if they would be interested in participating so that when the front office calls to remind the patients of their appointment they can be asked if they would like to participate in the study. The targeted sample size is 20 women.

The Intervention

This section will describe all the steps necessary to prepare for and to implement the intervention: first, providers and office staff will be oriented and trained in the new protocol.

The consultant will conduct training as follows:

Provider training: 2-4 hours, content to include brief rational for importance of CVD risk reduction among women with diabetes, discussion of principles of health behavior change, importance of provider, and description of intervention (content, procedures, cost in time, provider support provided by consultant).

Staff training: 2 hours, content to include reviewing the purpose of the study, brief description of the intervention, training in the protocol (their role in approaching eligible patients, giving the participants the pre and post-tests before their appointment, support provided by the consultant).

The CVD risk reduction intervention:

1) identify potential participants through chart review
2) contact eligible patients re willingness to participate
3) if willing, ask to come 15 minutes early to next appointment.
4) when arrive, indicate they’re participating in new protocol
5) front office staff gives them the questionnaires
6) note next appointment

Measures Related to Health Behavior Change and CVD Risk

Feasibility: the consultant will conduct debriefings with the providers and office staff as well as phone interviews with the participants. The staff and provider debriefing as well as participant interviews will be conducted the week following each clinic diabetes day. The questions will focus on perceptions of positive aspects and any identified problems, satisfaction, sufficient time allotment, and opinion on usefulness of intervention.

Effectiveness: The health measures of interest are perceived benefits and barriers, plan of commitment to exercise, exercise plan, and weight. Each of these will be measured before the individual receives the intervention from the PCP, and 3 months after the intervention.

FIGURE 2

Health Measurement and Measurement Tool for Evaluation

<table>
<thead>
<tr>
<th>Health Measure</th>
<th>Measurement Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Benefits and Barriers</td>
<td>The Exercise Benefits/Barriers Scale (EBBS)(Pender, 2004)</td>
</tr>
<tr>
<td>Plan of Commitment to Exercise</td>
<td>Planning for Exercise (Pender, 2004)</td>
</tr>
<tr>
<td>Exercise Plan</td>
<td>Frequency, Intensity, Duration (AHA, 2004)</td>
</tr>
<tr>
<td>Weight</td>
<td>Weight (in lbs) and Waist-Hip Ratio (Rexrode et al., 1998)</td>
</tr>
</tbody>
</table>
Perceived Benefits & Barriers: the Exercise Benefits/Barriers Scale (EBBS) is a 43 item self-report questionnaire. There are 29 items related to perceived benefits and 14 items related to barriers to exercise. It will address questions such as: exercise frequency, types of exercise, perceived benefits to exercise, perceived barriers to exercise, specific types of exercise, and history with exercise. The scale ranges from 1-4; where a score of 4 denotes “strongly agree” down to a 1 denoting “strongly disagree” (Pender, 2004).

Planning for Exercise: this is the second tool that will address issues such as their individual experiences with exercise, perception of benefits from exercise, barriers to engaging in this behavior, and commitment to a plan of action. This consists of 11 questions with a scale of 1-3 (1=never, 2=sometimes, 3=often) pertaining to the commitment one might have to an exercise program (Pender, 2004).

Exercise Plan: focuses on three aspects: frequency, intensity, & duration. 1) How often do you exercise per week? 2) How intense is your exercise (low, moderate, high)? 3) How many minutes do you exercise each time?

Weight: The medical assistants will be trained to weigh all the patients the same way (no shoes, no socks). In addition to weight, the medical assistants will obtain the participant’s waist and hip measurements.
Research Question

Do diabetic women who receive an exercise provider intervention increase perceived benefits of exercise, decrease perceived barriers, increased commitment to exercise plan, increase exercise behavior, and decrease weight?

FIGURE 3

Schematic Representation of the Intervention

In conjunction with the agenda of the usual office visit, the clinician will use the assessment tools to help guide their patient’s exercise program if any needs are found from the questions. For example, if the clinician sees that the participant does not participate in exercise, the clinician could use that information to then educate their patient on the benefits of exercise in both diabetes and CVD prevention. On the other hand, if the participant engages in some exercise but not regularly, this patient would be approached differently than the previously mentioned patient. In either case, the provider
will check off which benefit/barrier was addressed at the visit, document any specific changes in approach to the plan of exercise, and acknowledge their current weight. One of the goals of a standard tool for the provider to chart on is to standardize the intervention for the patient; plus, it allows for easy follow-up by the provider even if the follow-up provider isn’t the patient’s primary provider who started the intervention. Following this provider intervention, the participant will be asked at their next 3 month diabetes follow-up to fill out the same instruments as a post-test as well as a routine weight serving as a post-intervention weight.

In order to insure that physicians are properly prepared to provide exercise support, they will be trained in the protocol. In addition, the providers will be educated on the problem identified, the theoretical context of the intervention, and the charting involved with the intervention. Clinician participation is pivotal to the success of this proposal. As described earlier, one reason providers have not focused on primary prevention is due to a lack of confidence. One of the focuses of the provider training is enabling them in feeling successful that their efforts will impact their client’s behavior to change. Both client and provider support will be a priority in the program. The use of a type of managerial check-in to hold the person responsible is supported in the Sorenson et al. article where they found an overall increase in health behavior change. In addition, one of the theoretical assumptions of Pender’s HPM is that “health professionals constitute a part of the interpersonal environment, which exerts influence on persons throughout their life span” (Pender, Murdaugh, and Parsons, 2002).
Summary

Overall, a targeted sample of 20 women with diabetes with no known history of CVD will be recruited for participation in this project. Questionnaires will be given pre and post-test that will help guide the clinician’s actions towards exercise support with their program compliance. The next chapter will address the evaluation of the proposed intervention.
CHAPTER IV: Evaluation Plan

Introduction

There are two different types of evaluations: feasibility and effectiveness. The feasibility of a project pertains to the ability to effectively implement the program. This entails meeting with the providers and participants in interviews or focus groups to determine the ease of doing the program realistically with feedback from the players involved. On the other hand, effectiveness pertains to assessing success in meeting outcome goals. For example, did the provider intervention successfully decrease perceived barriers, increase perceived benefits and result in increased exercise and weight loss, decreasing CVD risk by impacting minimizing known CVD risk factors? These two evaluation techniques are measured by collecting data and analyzing data apropos to the information collected. The data collection, analysis, effectiveness, and feasibility will be discussed in further detail.

Data Collection

Since the concept to be studied will be self-report data and discrete content, questionnaires will be used for data collection (LoBiondo-Wood and Haber, 2002). In addition to the data collected in the pre and post tests, the provider intervention will focus on delivering knowledge related to questions 2, 5, 13, 15, and 18. Thus, a subset of data will look specifically at a change in these specific questions.

There will be likert-type scales used for collection of data from the participants. The EBBS, Planning for exercise, and exercise plan, and weight are all formatted with the use of finite responses or closed-ended responses. One of the advantages of using
questionnaires is that they are inexpensive to administer. For example, if one had to interview a participant to obtain the same amount of data, it would cost money for the time of the interviewer in addition to requiring increased time of the interviewee which would further increase the cost of the data collection. Furthermore, questionnaires decrease interview bias. At times the tone of inflection in the interviewer’s voice could lead to a suggestive response from the interviewee; this potential bias would be avoided in using questionnaires.

In addition to questionnaires, focus groups and telephone interviews will be used to determine feasibility of the study. A disadvantage of verbal reports is the condition known as social desirability, the idea that people respond to questions as they perceive accepted and favorable to the interviewer. Thus, the interviewer must resign to assuming that they are being informed the truth as there is no true way to ascertain the answers are truthful otherwise.

Data Analysis

Due to the quantitative data measurement via the aforementioned questionnaires, t-test (paired) is the appropriate technique for data analysis. In addition to t-test analysis, demographic information of the participants will be collected. Information such as age, education, and marital status will be obtained from patient records. Then, ANOVA technique can be used to ascertain any correlations that might exist regarding demographic differences between the participants. For example, one could assess do younger married women have decreased perceived barriers and increased perceived benefits when compared to older, single women? The ANOVA analysis would enable
further assessment of the data in the questionnaires (dependent variables) in comparison to the demographics (independent variables). The data obtained from the focus groups and phone interviews is considered debriefing. After analyzing the information received, the study’s process might be revamped to incorporate the specific needs revealed from the debriefings.

Effectiveness

After collecting the data, the t-test results will serve as the evaluation of the success of the intervention. It is expected that after receiving the provider intervention, the participant’s perceived barriers will decrease, perceived benefits will increase, their exercise commitment will be increased, and decreased weight.

Feasibility

These debriefings are a critical part of the evaluation. The participant and clinician buy-in is absolutely essential for the success of the program. If there is low satisfaction, it is crucial to consider the needs of the participants and providers and revamp accordingly. For example, if the tool is considered too long by most participants, it is a feasible idea to change the tool or modify the existing tool to address this need. On the other hand, if the patients and providers have high satisfaction with the program, this pilot test would be considered a success and possibly be tested on wider sample sizes or with a possible variance of demographics. Thus, the process is important to the evaluating the feasibility of the project.
FIGURE 4

Schematic Representation of the Effectiveness of the Provider Intervention

![Proposed Result Diagram]

Time Table for Intervention

FIGURE 5

Delineated Time Table for Steps of Intervention Progression

<table>
<thead>
<tr>
<th>Weeks</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>8</th>
<th>9</th>
<th>12</th>
<th>13</th>
<th>16</th>
<th>17</th>
<th>20</th>
<th>21</th>
<th>24</th>
<th>25</th>
<th>31</th>
<th>32</th>
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<tbody>
<tr>
<td>Intervention</td>
<td>■</td>
<td></td>
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<tr>
<td>Staff Training</td>
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<tr>
<td>Induction of Participants</td>
<td>■</td>
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<tr>
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<td>■</td>
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<tr>
<td>Effectiveness</td>
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</tbody>
</table>
Staff Training (Weeks 1-3)

Week 1: General survey of the environment: the logistics of the flow of the office, charting, amount of time spent with each patient (10 hours)

Week 2: Meet with providers to train them in the protocol during lunch hour (1 hour). Meet with front office staff during their lunch hour to train in the protocol (1 hour) (10-15 hours with meetings and possible modifications)

Week 3: Meet with providers to continue to train in the protocol and clarify questions that were brought up in the previous meeting (1 hour). Meet with front office staff during their lunch hour to clarify questions regarding the protocol (1 hour). (10 hours)

Chart Review (Weeks 2-6)

Weeks 2-6: Begin chart reviews to compile a list of eligible women who can be contacted in regards to possible interest in the study. Communicate list to the trained front office personnel to begin the process within the protocol of the study.

Induction of Participants, Data Collection, Process Evaluation, and Effectiveness (Weeks 4-32)

Weeks 4-8: Begin to have front office approach diabetic women patients who are making their routine appointments. Begin the intervention to those who agree to participate. Since the diabetes clinic day is a designated day each month, debrief staff during the following week’s staff meeting (30 min-1 hour) in a focus group setting. During that time, phone each of the participants via phone and discuss the aforementioned process questions. Revamp any logistics that patients and/or staff felt were detrimental to the
health of the patients (i.e. not having enough time to talk about other issues due to the study needing too much time during the visit). (10 hours)

Weeks 8-12: Implement the intervention at the next diabetes day and again conduct a staff and participant debriefing. (10 hours/week)

Weeks 12-16: Continue implementing the intervention (depending on how many participants are enrolled) and administer the post-tests with the original intervention group. Conduct debriefings on both the pre and post-tests of the study. Present the first round of results from the pre and post-tests. (10-15 hours/week)

Weeks 16-20: Continue implementing the intervention (if need be) and with the second group and administer the post-tests. Conduct debriefings on both the pre and post-tests of the study. Present the first round of results from the pre and post-tests. Present the collective data of the first two groups. (10-15 hours a week)

Weeks 20-24: Continue implementing the intervention (if necessary depending on how many participants enrolled) and with the third group administer the post-tests. Conduct debriefings on both the pre and post-tests of the study. Present the first round of results from the pre and post-tests. Present the collective data of the first three groups. (10-15 hours a week)

Weeks 24-32: Determine how many participants have enrolled. Continue the cycles of the week 20-24 weeks until 20 participants are enrolled or until the beginning of week 32. After the 20 participants have finished the study or week 32 has arrived, have a final debriefing with the staff regarding the process of the study and present the compilation of data. (10-15 hours a week)
Budget

The total amount of hours for the 32 week course of the study is approximated at 415 hours. At a rate of $30/hour, the approximated cost of the study coordinator is $12,450. The budget of the study is based on it being conducted solely by the APN without help of a research assistant. In addition to time, the cost of a laptop with up to date software ($3000) and cell phone plan for accessibility ($60/month for approximately 8 months). The training of staff will be done during their normal working hours (during staff meetings). The total approximated cost is $15,930.
Summary

Implications for Nursing

This study is a powerful representation of nursing theory in action. Guided by Pender’s HPM, it depicts the power behind nursing guiding health behavior change in a primary care setting. With CVD as a top priority of Healthy People 2010, this primary prevention addresses the current needs of our population at large. Nurses are constantly educating on health promotion; this study could be applied to a myriad of settings involving health change.

Limitations

One of the limitations of the study is that it is a very short study. It only looks at the immediate effect health behavior change within a 3 month period. It doesn’t address the issue of maintaining long-term health behavior change in an exercise program. Next, the study is limited by the provider and participant commitment to the change in behavior. It is critical to have a vested interest in both for success. Lastly, this study is limited to only literate, English speaking, women with diabetes with the use of the pre and posttests.

Strengths

This study is cost-efficient. The provider and participant would routinely meet at this assigned visit for regular diabetes follow-up. Although the participant needs to arrive fifteen minutes early to fill out the pretests, it is a minimal amount of time when one thinks of the health benefits associated with a CVD primary prevention intervention. In addition, the intervention has built in the feasibility to continue the intervention even if
the original provider doesn’t consistently see the patient via the intervention charting in each participant’s medical record. Lastly, one of the strongest positive impacts of this study is the interpersonal rapport and relationship established between the provider and patient. Not only could this support system yield positive health behavior change in the proposed exercise plan, but it could facilitate further health promoting change related to the participant’s diabetes and overall health.

Expansion

One of the expansions would include a longitudinal study analyzing the maintenance of exercise within this sample. In addition, separate cross-sectional studies could look at the effect health promotion change in one area of their life affecting other areas of their health. For example, is there a correlation between exercise maintenance and lower HbA1c levels? Next, another area of expansion could lend to a support group. This could look at the relationship between health behavior change and the influence of support groups. Besides applying this study to CVD prevention in diabetic women, it has the applicability to other subpopulations, i.e. diabetic men or diabetic children, as well as primary prevention in chronic diseases in general. Lastly, this study’s intervention could be applied to other clinician settings. For example, with the increasing force of nurse practitioners (NP) in primary care setting, many of these diabetic women will be seeing NPs for their care. It would be beneficial to expand this study for use of NPs as the intervening practitioner. In addition, nurse case manager (NCM) could effectively serve as the intervening practitioner. Besides providing a fiscal benefit (NPs and NCM spend more time with each patient and have less reimbursement than an M.D.), advanced
practice nurses (APN) have more education in health promotion (via nursing curriculum) and would possibly be more effective in playing a role as a change catalyst. It would be interesting to expand this study to these APN roles and then compare the outcomes between the two.

Conclusion

Diabetes is a disease of epidemic proportion. CVD is the number one killer of diabetics. Although the incidence of CVD has decreased in the general population, it has increased among diabetic women. Reducing modifiable risk factors can decrease the incidence of CVD. If this study can convince one woman to increase exercise and decrease the incidence of CVD, then the study has effectively yielded success.
APPENDIX A

EXERCISE BENEFITS/BARRIERS SCALE
**EXERCISE BENEFITS/BARRIERS SCALE**

**DIRECTIONS**: Below are statements that relate to ideas about exercise. Please indicate the degree to which you agree or disagree with the statements by circling **SA** for strongly agree, **A** for agree, **D** for disagree or **SD** for strongly disagree.

<table>
<thead>
<tr>
<th>Number</th>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I enjoy exercise.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>2</td>
<td>Exercise decreases feelings of stress and tension for me.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>3</td>
<td>Exercise improves my mental health.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>4</td>
<td>Exercising takes too much of my time.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>5</td>
<td>I will prevent heart attacks by exercising.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>6</td>
<td>Exercise tires me.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>7</td>
<td>Exercise increases my muscle strength.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>8</td>
<td>Exercise gives me a sense of personal accomplishment.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>9</td>
<td>Places for me to exercise are too far away.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>10</td>
<td>Exercising makes me feel relaxed.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>11</td>
<td>Exercising lets me have contact with friends and persons I enjoy.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>12</td>
<td>I am too embarrassed to exercise.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>13</td>
<td>Exercising will keep me from having high blood pressure.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>14</td>
<td>It costs too much money to exercise.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>15</td>
<td>Exercising increases my level of physical fitness.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>16</td>
<td>Exercise facilities do not have convenient schedules for me.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>17</td>
<td>My muscle tone is improved with exercise.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>18</td>
<td>Exercising improves functioning of my cardiovascular system.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>19</td>
<td>I am fatigued by exercise.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>20</td>
<td>I have improved feelings of well being from exercise.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>21</td>
<td>My spouse (or significant other) does not encourage exercising.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>22</td>
<td>Exercise increases my stamina.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>23</td>
<td>Exercising improves my flexibility.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>24</td>
<td>Exercising takes too much time from family relationships.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>25</td>
<td>My disposition is improved by exercise.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>26</td>
<td>Exercising helps me sleep better at night.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>27</td>
<td>I will live longer if I exercise.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>28</td>
<td>I think people in exercise clothes look funny.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>29</td>
<td>Exercising helps me decrease fatigue.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>30</td>
<td>Exercising is a good way for me to meet new people.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>31</td>
<td>My physical endurance is improved by exercising.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>32</td>
<td>Exercising improves my self-concept.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>33</td>
<td>My family members do not encourage me to exercise.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>34</td>
<td>Exercising increases my mental alertness.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>35</td>
<td>Exercise allows me to carry out normal activities without becoming tired.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>36</td>
<td>Exercising improves the quality of my work.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td></td>
</tr>
<tr>
<td>---</td>
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<td>-------</td>
<td>----------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>37. Exercise takes too much time from my family responsibilities.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>38. Exercise is good entertainment for me.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>39. Exercising increases my acceptance by others.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>40. Exercise is hard work for me.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>41. Exercise improves overall body functioning for me.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>42. There are too few places for me to exercise.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>43. Exercise improves the way my body looks.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD</td>
<td></td>
</tr>
</tbody>
</table>

(Pender, 2004)
EXERCISE BENEFITS/BARRIERS SCALE
Instrument Development and Scoring Information

Instrument Development. The Exercise Benefits/Barriers Scale was developed in response to a need for an instrument to determine perceptions of individuals concerning the benefits of and barriers to participating in exercise. Items for the scale were obtained inductively from interviews (Pender & Pender, 1983) and from the literature. The resulting instrument has been tested for internal consistency, validity of its constructs and test-retest reliability.

A sample of 650 individuals, primarily from northern Illinois, responded to the instrument. Calculation of Cronbach’s alpha for the 43-item instrument yielded a standardized alpha of .954. The 29-item Benefits Scale has a standardized alpha of .954 and the 14-item Barriers Scale has a standardized alpha of .866. Factor analysis yielded a non-factor solution initially with an explained variance of 65.2%. Second order factor analysis yielded a two-factor solution, one a benefits factor and the other, a barriers factor. Test-retest reliability was accomplished with a sample of 66 health adults at a two-week interval. Test-retest reliability was found to be .89 on the total instrument, .89 on the Benefits Scale and .77 of the Barriers Scale.

Instrument Scoring. The instrument may be scored and used in its entirety or as two separate scales. The instrument has a four-response, forced-choice Likert format from 4 (strongly agree) to 1 (strongly disagree). Barrier Scale items are reverse-scored. Barrier Scale items are numbers 4, 6, 9, 12, 14, 16, 19, 21, 24, 28, 33, 37, 40, and 42.

Missing data may be handled in one of two ways. If more than five percent of the items are unanswered, it is recommended that the response be discarded. If the missing item response rate is less than five percent, median substitution prevents a falsely low score.

Scores on the total instrument can range from 43 to 172. The higher the score, the more positively the individual perceives exercise. When the Benefits Scale is used alone, the score range is between 116 and 29. When the Barriers Scale is used alone, scores range between 14 and 56. If used alone, the Barriers Scale does not need to be reverse scored. In this instance, the higher the score, the greater the perception of barriers to exercise.


(Pender, 2004)
APPENDIX B

PLANNING FOR EXERCISE
Planning for Exercise

Directions: Please think carefully about each statement below and indicate how often you do each of the following activities related to exercise (never, sometimes, or often).

1. I plan specific times for exercise or active sports in my weekly schedule.
   Never                        Sometimes            Often

2. I lay out my exercise shoes and clothes to remind me to exercise.
   Never                        Sometimes            Often

3. I exercise in a specific location or facility.
   Never                        Sometimes            Often

4. I keep written records of my exercise activity.
   Never                        Sometimes            Often

5. I reward myself for exercising.
   Never                        Sometimes            Often

6. I post notes where I can see them to remind me to exercise.
   Never                        Sometimes            Often

7. I vary my exercise routine to avoid boredom.
   Never                        Sometimes            Often

8. I work toward exercise goals that are progressively more challenging.
   Never                        Sometimes            Often

9. I consider exercise so important in my life that I allocate time for it.
   Never                        Sometimes            Often

10. I let people know about my commitment to exercise.
    Never                        Sometimes            Often

11. I encourage my friends to exercise.
    Never                        Sometimes            Often

(Pender, 2004)
Scoring instructions for *Planning for Exercise* as a measure of “Commitment to a Plan of Action,” a construct in the Health Promotion Model.

Never         = 1
Sometimes     = 2
Often         = 3

Add up scores across all items and divide by the number of items for a **mean score** on the total instrument.

(Pender, 2004)
APPENDIX C

WAIST-HIP RATIO (WHR) MEASUREMENT
WAIST-HIP RATIO (WHR) MEASUREMENT

The participating women will be measured at their level of the umbilicus for their waist measurement, and their hips will be measured at the largest circumference. Using a tape measure, the participant will stand relaxed, and the measurements will be documented to the nearest quarter inch. Then, the measurement for the waist will be divided by the measurement for the hip for a calculated waist-hip ratio. Since the participants have diabetes, a WHR of 0.76 or greater will be used as the cut off of risk for CVD. This WHR measurement has been associated with more than a 2-fold higher risk of CVD in a previous study with patients with diabetes (Rexrode et al., 1998).
REFERENCES


