

2007

A home-based intervention to promote physical activity in low income African American adults

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A HOME-BASED INTERVENTION TO PROMOTE PHYSICAL ACTIVITY IN LOW
INCOME AFRICAN AMERICAN ADULTS

A Dissertation

Submitted to the Graduate Faculty of
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Psychology

By

Dorothy Fauntleroy Whitehead
B.S., University of Alabama, 2002
M.A., Louisiana State University, 2004
August 2007

Dedication

I would like to dedicate this dissertation to my parents and my husband. Thank you for all the love and support!

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Abstract

Physical activity has long been regarded as a key component to a healthy lifestyle; however, the U.S. has disturbingly high rates of sedentary behavior and related chronic illnesses (National Center for Chronic Disease Prevention and Health Promotion, 2003). While many studies have attempted to address inactive lifestyle, few have reached out to high risk groups, such as African Americans and low income individuals. A recent review of the physical activity literature among African Americans called for more research with this population and encouraged future studies to focus on enduring exercise behavior (at least 6 months post intervention) and use theory-based interventions (Banks-Wallace & Conn, 2002).

The transtheoretical model (TTM) is the predominant theoretical model utilized in the physical activity promotion literature. TTM-based studies have shown promising results in promoting physical activity among Caucasians. Recently, a stage-matched mail-delivered intervention was implemented among a predominantly African American low income sample (Whitehead, Bodenlos, Jones, Cowles, & Brantley, 2007). Results indicated that the intervention produced modest increases in self-reported physical activity at one month, but effects were diminished by six months. Thus, the current study sought to maintain these gains by supplementing the mail-delivered intervention with two telephone-delivered motivational interviews and five monthly newsletters, while also addressing methodological problems common to this research area.

Overall, results from the current study indicated that participants increased in stage of change and self-reported PA from baseline to six months; however, there were no significant group differences in changes in PA, self efficacy, or decisional balance.

These findings suggest that the physical activity intervention needs and preferences of low income African Americans require further examination. While 90% of this sample reported preferring to receive physical activity information in the mail, as opposed to telephone or Internet, the current intervention was developed and tested among mostly Caucasians and may not be appropriate for use among African Americans due to cultural differences regarding physical activity. Future researchers should consider using qualitative methods to develop culturally sensitive physical activity print materials for low income African Americans.

Introduction

Health Benefits of Physical Activity

Physical activity is defined as “bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above the basal level” and has long been regarded as an important component of a healthy lifestyle (U.S. Department of Health and Human Services, 1996). In fact, individuals participating in moderate to high levels of physical activity have a lower overall mortality rate than those who are sedentary. Several prospective studies have reported that sedentary participants have approximately twice the risk of dying during follow-up intervals ranging from several months to years than the most active participants (Slattery & Jacobs, 1988; Slattery, Jacobs, & Nichaman, 1989; Leon & Connett, 1991; Stender, Hense, Doring, & Keil, 1993; Sandvik et al., 1993; Chang-Claude & Frenzel-Beyme, 1993; Kaplan, Seeman, Cohen, Knudsen, & Guralnik, 1987; Arraiz, Wigle, & Mao, 1992; Paffenberger et al., 1993).

Past research has also shown that regular physical activity can reduce the likelihood of dying from heart disease (Blair et al., 1995). It can decrease the risk for developing many diseases, including diabetes mellitus type 2 (Helmrich, Ragland, Leung, & Paffenbarger, 1991), colon cancer (Gerhardsson, Steineck, Hagman, Rieger, & Norell, 1990; Slattery, Schumacher, Smith, West, & Abd-Elghany, 1988), and hypertension (Paffenberger, Wing, Hyde, & Jung, 1983; Kaye, Folsom, Sprafka, Prineas, & Wallace, 1991). Physical activity is also helpful in relieving symptoms of arthritis and maintaining healthy bones, muscles, and joints (Ettinger & Afable, 1994; Fisher, Pendergast, Gresham, & Calkins, 1991).

Physical activity is important in both weight loss and maintenance (DiPietro, 1995; Ching et al., 1996). In fact, several review articles (Oscari, 1973; Stefanick, 1993; Thompson, Jarvie, Lahey, & Cureton, 1982; Wilmore, 1983) and meta-analyses (Ballor & Keeseey, 1991; Epstein & Wing, 1980) conclude that (1) exercise promotes fat loss while increasing lean mass, (2) the rate of weight loss is positively associated with the frequency and duration of physical activity, and (3) increased physical activity and dieting in combination are more effective in controlling weight in the long term than dieting alone.

Physical activity has shown psychological benefits in addition to physical improvements. Not only does physical activity reduce symptoms of anxiety and depression (Ross & Hayes, 1988; Stephens, 1988), it can result in fewer hospitalizations, doctor visits, and medications by controlling and preventing chronic diseases (National Center for Chronic Disease Prevention and Health Promotion, 2002).

Physical Activity Recommendations

Physical activity does not have to be strenuous or time-consuming in order to reap health benefits. Moderate amounts of physical activity can prevent and control chronic disease. While more protection from chronic disease is achieved by increasing the frequency, intensity, and duration of the exercise, recent efforts to promote physical activity have shifted the emphasis from high intensity endurance exercise towards regular short bouts of moderate-intensity physical activity, such as brisk walking. In fact, the Centers for Disease Control and Prevention and the American College of Sports Medicine (1995) recommendations call for “thirty minutes or more of moderate-intensity physical activity on most, preferably all, days of the week” in order to receive substantial

health benefits. The rationale is that smaller increases in physical activity are easier to achieve and sustain for many years than more drastic changes for sedentary individuals, who are at the greatest risk for related chronic diseases. The recommendations also provide encouragement for individuals who are already physically active to continue to strive for further health benefits by increasing the intensity, duration, and frequency of their exercise.

The Measurement of Physical Activity

There is no “gold standard” for the measurement of physical activity. Techniques for measuring activity levels can be divided into two categories: self-report and direct monitoring. While there are advantages and disadvantages to both types of measurement, self report is the most common method of assessing physical activity due to low cost, ease of administration, and general acceptability to participants (Montoye & Taylor, 1984). Data obtained from these self-report instruments can be converted into estimates of energy expenditure (i.e. kilocalories; metabolic equivalents) and then used to categorize the participants by their physical activity level. Examples of self-report physical activity measures include diaries, logs, retrospective quantitative histories, global self-reports, and recall surveys. Surveys are less likely to influence behavior and require less effort by the participants and, thus, more popular than diaries or logs (Baranowski, 1985). The Weekly Leisure Time Exercise Questionnaire will be utilized in the current study and was selected based on its significant correlations with objective measures of physical activity, well-established reliability and validity, brevity, and prior use among African American samples (Cardinal & Sachs, 1996; Whitehead et al., 2007).

Direct measurement of physical activity is typically accomplished through behavioral observation, mechanical or electronic devices (i.e., heart rate monitors, pedometers, accelerometers), or physiologic measurements (i.e., direct calorimetry, doubly labeled water). Advantages to direct measurement include eliminating the problems of poor memory and bias; however, disadvantages, such as high cost and burden on participants and staff, often limit the feasibility of direct measurement. At first, such techniques were used only in small-scale studies, but direct measurement has been utilized in larger scale studies with increasing frequency in the past decade (Lakka, Nyssonen, & Salonen, 1994).

Prevalence of Physical Activity in the U.S.

Despite the numerous health benefits to be derived from low levels of moderate-intensity physical activity, the U.S. population is disturbingly inactive. In 2001, only 45.2% of adults engaged in activities consistent with physical activity recommendations (i.e., moderate exercise ≥ 30 min per day, ≥ 5 days per week or vigorous exercise ≥ 20 min per day, ≥ 3 days per week) (Macera et al., 2003). It is likely that such inactivity plays a role in the high rates of chronic disease found in the U.S. Approximately 13.5 million people have coronary heart disease, 8 million people have diabetes mellitus type 2, 50 million have high blood pressure, and over 60 million people, or a third of the population, are overweight (U.S. Department of Health and Human Services, 1996). Not only are there health consequences related to physical inactivity, but there also are also financial costs. For instance, the estimated direct medical costs associated with physical inactivity were approximately \$76 billion in 2000 (National Center for Chronic Disease

Prevention and Health Promotion, 2003). Thus, finding ways to promote physical activity is of great medical and financial importance in the U.S.

African American and low-income populations are at increased risk for physical inactivity and related chronic diseases. Adults with incomes below the poverty level are three times as likely to be sedentary as adults with incomes four times above the poverty level or more (Barnes & Schoenborn, 2003). The National Health Interview Survey (NHIS, 1999) and Behavioral Risk Factor Surveillance System (BRFSS, 2000) reported slightly higher rates of heart disease, diabetes, obesity, and hypertension among individuals classified as poor or below the Census Bureau's poverty threshold. Several possible reasons for such a discrepancy may include decreased access to facilities, exercise equipment, and neighborhoods in which it is safe to exercise outdoors.

Higher rates of sedentary lifestyle and chronic illnesses are also found among African Americans. In fact, African Americans were 36 % more likely than Caucasians to report no leisure time physical activity in 2000. The rates of death from heart disease and the prevalence of diabetes, hypertension, and obesity were also higher among African Americans than Caucasians (National Center for Chronic Disease Prevention and Health Promotion, 2002; National Center for Health Statistics, 2002, 1999). Kumanyika (2001, 2002) suggests that many cultural differences, such as positive cultural value for large body size and increased family duties, could account for decreased physical activity among African Americans.

Exercise Promotion Among African Americans

Despite their increased risk for physical inactivity and related chronic illnesses, there has unfortunately been little physical activity research conducted among African

Americans. Baranowski et al. (1990) is an example of an unsuccessful center-based effort to promote physical activity among 94 African American families. The intervention consisted of individual counseling, small group education, aerobic activity, incentives, and telephone prompts, while the control group received assessment only. No differences in energy expenditure were found between the two groups and rates of participation (20 %) were low. The authors concluded that center-based programs have limited utility in promoting physical activity among healthy, low income African Americans families with young children.

Several other studies have attempted to increase physical activity levels in African American communities in different parts of the U.S. The Bootheel Heart Health project was a five year intervention, which involved forming six coalitions in rural Missouri. Each coalition received \$5,000 from the state health department to use for newspaper articles, sermons, exercise classes, walking clubs, new walking trails, and community physical activity events. While results indicated that there was no difference in physical activity levels in the Bootheel and the rest of Missouri at follow-up, coalition communities experienced a 3 % decrease in physical inactivity and the physical inactivity rates of communities without coalitions increased 3.8 % (Brownson et al., 1996).

The Wellness Within REACH (WWR) project focused on reducing cardiovascular disease by increasing activity levels among African Americans living in Portland, Oregon (McKeever, Faddis, Koroloff & Henn, 2004). Participants were referred by interventionists of another study (“Lookin Tight, Livin’ Right”) after receiving information on cardiovascular disease risk factors to “start them on the path through the stages of change” and indicating readiness “to be proactive in taking charge of their

health”. WWR provided the participants with no-cost physical activity opportunities through exercise classes led by certified African American instructors at community venues. 58 percent of a small sample (N=75) reported increases in physical activity, as compared to activity levels six months prior to joining the program.

Physical Activity for Risk Reduction (PARR), a constituency-based physical activity promotion program, produced a limited positive impact on physical activity among public housing residents in Birmingham, Alabama. The first phase of the intervention involved collecting survey data on the residents’ exercise patterns, knowledge of PA, beliefs, barriers, determinants, social support, and self-efficacy. This data along with health education and social cognitive theories were utilized to design and conduct the intervention programs. In the basic intervention groups, community leaders provided physical activity programs and informational pamphlets on exercise. The enhanced intervention included all aspects of the basic intervention plus behavioral techniques, such as overcoming barriers by offering child care, setting goals through exercise program attendance competitions, and increasing social support by encouraging community and church leaders to stress the benefits of physical activity. Three communities participated in the enhanced intervention. Two control communities received no intervention until after the conclusion of the project, at which time they received similar exercise programs and funding. Overall, the intervention communities did not report significant increases in physical activity at the one year follow-up (Lewis et al., 1993). However, the authors suggest that such results could be due to variability among the intervention communities. The organized communities with regular, well-attended meetings and involved leaders and residents reported significant increases in

exercise at follow-up, unlike unorganized communities with poor attendance at meetings and less involved residents.

Several church-based interventions have achieved promising results in physical activity promotion among African Americans. For example, in the Fitness Through the Churches project, Hatch, Cunningham, Woods, and Snipes (1986) recruited participants from local African American churches, held pastoral workshops, conducted a pilot study, and then trained church members to lead exercise classes held at the church. While exploratory in nature, the results indicate that physical activity programs offered at church were acceptable and appealing to African American clergy and congregations.

Other church-based interventions, such as the PATHWAYS program, Project Joy, and Kennedy et al. (2005), have attempted to decrease sedentary behavior among African Americans in addition to improving dietary habits. In Pathways, 39 obese African American women were assigned to a waitlist control group or participated in a weekly weight loss group (McNabb, Quinn, Kerver, Cook & Karrison, 1997). The 14 group sessions lasted an hour and a half and entailed guided learning activities (setting behavior change goals, group problem solving to help identify and overcome obstacles, self monitoring). Development of this program was guided by focus groups on cultural factors mediating obesity, such as poverty, limited access to health services, and different social norms and perceptions of obesity. The experimental group ($M = 36.7$ minutes, $SD = 42.5$) reported greater increases in weekly minutes of exercise than the control group ($M = 21.3$ minutes, $SD = 22.5$) at the completion of the program ($p > 0.05$).

Project Joy examined the efficacy of three culturally adapted intervention strategies for cardiovascular health promotion among urban African Americans women

over 40 years of age (Yanek, Becker, Moy, Gittelsohn, & Koffman, 2001). The standard behavioral intervention strategies included weekly sessions on nutrition and physical activity at the churches with weigh-ins and group discussion. Another intervention strategy offered the same sessions as the standard behavioral intervention with additional spiritual components, such as group prayer, relevant scripture included in health messages, aerobics to gospel music, health messages in the church bulletin and in the sermon, church-sponsored walk-a-thons, and worship dance recitals. The self help intervention strategy involved feedback about health screening results, self-monitoring materials, and information on the behavioral goals for the standard and spiritual groups. Although not significant, differences in energy expenditure between the active intervention groups and self help group approached significance at one year follow-up ($p < 0.0654$).

Kennedy and colleagues (2005) implemented a 6 month pilot weight loss program which emphasized increasing physical activity among 40 African American church members. Peer-educators delivered the intervention in group or individual settings after receiving two days of training in the study protocol, motivational interviewing, and behavioral modification techniques. Approximately 83 % of all participants reported an increase in leisure time and sport activity; however, such findings should be considered cautiously due to small sample size, unvalidated physical activity measures, and the absence of a control group.

Weight loss studies have also shown potential for promoting physical activity among African Americans when delivered outside the churches. For instance, participants in the Black American Lifestyle Intervention (BALI) study attended hour-long group

sessions on goal setting, problem solving, and role playing along with handouts on nutrition, exercise, and behavior modification. Groups were led by African American health professionals and materials were developed from survey results from African American females on the attitudes, beliefs, and perceived obstacles towards dieting, exercise, and behavior modification. While the sample size was small and the design did not include a control group, the 61 participants who did complete the study reported significant increases in time spent exercising from baseline to follow-up (Kanders, 1994).

A controlled weight loss trial was conducted among urban African American nutrition aides (Reames & Burnett, 1991). The intervention consisted of six Healthy Weight Workshops, which focused on life-style changes in exercise, diet, and eating behaviors. While this study also suffered from a small sample size, exercise adjusted mean scores of the treatment group were significantly higher ($p < 0.001$) than the control group at six month follow-up. In addition, the nutrition aides reported forming walking groups in their neighborhoods, walking to work, and walking to make client visits after attending the workshops.

Another weight loss program was implemented among 64 overweight African-Americans adults with non-insulin-dependent diabetes mellitus. Participants were randomly assigned to usual care group, which included a class on glycemic control and two mailings of nutrition information, or the culturally appropriate weight loss program led by African American interventionists (Agurs-Collins, Kumanyika, Ten Have, & Adams-Campbell, 1997). The first 3 months of the weight loss program consisted of weekly group sessions based on social action theory principles, such as relapse prevention, goal setting, controlling triggers to eat, and self monitoring, along with

nutrition education and exercise sessions. In the following three months, the intervention participants attended one individual diet counseling session and 12 biweekly group sessions, which focused on support and problem solving. Intervention participants were encouraged to engage in moderate physical activity at least three days a week; however, some participants reported having difficulty finding a safe place to exercise outside of the intervention exercise sessions. There was an increase in mean activity score of the intervention group at 3 months, but changes in physical activity decreased and were no longer statistically significant by 6 months.

A review of the intervention research literature examining strategies to increase activity among African American women (Banks-Wallace & Conn, 2002) concluded that African Americans can and do increase their physical activity in response to interventions. While the changes in activity are inconsistent and modest, the authors call for further physical activity research among this at-risk group and point out several methodological issues plaguing this literature, including small sample size, lack of random assignment, using instruments without documented reliability and validity, significant attrition, single-group design, treatment integrity problems, and infrequent use of theoretical frameworks for designing interventions

Transtheoretical Model

The transtheoretical model is currently one of the most popular theoretical models of physical activity promotion. The transtheoretical model, or TTM, (Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992; Prochaska & Velicer, 1997) has shown success in promoting numerous health behaviors, including smoking cessation, adhering to a low-fat diet, condom use for HIV protection, weight control,

stress management, use of sunscreen to prevent skin cancer, medical compliance, mammography screening, and exercise. The TTM focuses on recognizing individual differences in motivational readiness to adopt new health behaviors and explains behavior change in terms of four main constructs: stages of change, processes of change, decisional balance, and self-efficacy.

The TTM suggests that behavior change involves progressing through five stages of motivational readiness (e.g., stages of change) to adopt a health behavior known as precontemplation, contemplation, preparation, action, and maintenance. In the precontemplation stage, individuals have no intention of adopting the health behavior in the future. Individuals in this stage are often completely unaware of or lack a proper appreciation of the benefits of the health behavior. Individuals in contemplation are aware of the benefits of adopting the health behavior and are considering adopting it, but have not committed to change. The preparation stage involves awareness and intent to take action in the next month. Individuals in this stage have often made unsuccessful attempts to adopt the health behavior in the past year. The action stage is when behavior change actually occurs. Maintenance consists of adhering to the health behavior for at least six months and attempting to avoid relapse. While most research has identified five stages of change for physical activity behavior, Cardinal (1999) posited an additional “transformed” stage of change. In this stage, participants indicate five or more years of continuous physical activity involvement and 100% confidence in their ability to remain physically active for life. Results suggest that participants classified into this stage differed significantly from participants in the maintenance stage on both self-reported exercise and attitudes toward role modeling. The TTM suggests that interventions be

matched to the individual's current stage of change and that most people go through the cycle of stages several times before successfully achieving behavior change.

The processes of change are the techniques that individuals utilize to progress through the stages of change (Velicer, Prochaska, Fava, Norman, & Redding, 1998). The ten processes can be divided into two groups: cognitive and behavioral processes of change. The cognitive processes include consciousness raising, dramatic relief, environmental reevaluation, self reevaluation, and social liberation. Consciousness raising involves gaining new information and understanding about oneself and health behaviors through observations, confrontations, and reading. A physician counseling an overweight patient on the benefits of walking would constitute an example of consciousness raising. Dramatic relief is the process of expressing feelings about the health problem and discussing potential solutions through such methods as role playing. Environmental reevaluation involves considering how the behavior affects the physical and social environment. This concept could involve concerns about a parent with a sedentary lifestyle serving as a negative role model for children. Self-reevaluation is the assessment of an individual's self image in relation to a particular health behavior through techniques such as value clarification or imagery. Social liberation is increasing the opportunity for alternative, healthier behaviors in society. For example, recent changes in communities, like more parks and walking tracks, have made it easier for people to engage in physical activity.

The behavioral processes include counter conditioning, helping relationships, reinforcement management, self liberation, and stimulus control (Velicer, Prochaska, Fava, Norman, & Redding, 1998). Counter conditioning is typically achieved by

substituting alternatives for the problem behavior. A common counter conditioning technique is to take a walk rather than eat unhealthy snacks when feeling stressed. Another important aspect to effective behavior change is helping relationships. Maintaining a strong social support network (i.e., family, friends) can prevent discouragement and increase the chance of success. Reinforcement management refers to rewarding oneself or receiving rewards from others for making changes. Self-liberation involves committing to adopting the health behavior and increasing confidence in one's ability to change. A well-known self-liberation technique is the New Year's resolution to start exercising regularly. Stimulus control involves avoiding or countering triggers for unhealthy behaviors and prompting healthy behavior. Individuals often use stimulus control to increase physical activity by placing their walking shoes in a highly visible spot the night before so they will be prompted to walk in the mornings (Velicer, Prochaska, Fava, Norman, & Redding, 1998). Thus, while the stages of change describe when shifts in intent and behavior occur, the ten processes describe how these changes occur.

Previous studies on increasing physical activity indicated that participants used different processes of change depending on their current stage of change (Marcus et al., 1992). Precontemplators are the least likely group to use any of the processes of change. While individuals in the stages of contemplation and preparation are equally likely to use cognitive processes, individuals in the preparation stage are more likely to use behavioral processes. Individuals in the action stage are more likely to use both types of processes than participants in the preparation stage. Individuals in the maintenance stage reported using less cognitive processes than, but similar numbers of behavioral processes as, those

in the action stage. Such results indicate that process-oriented interventions targeted to the participant's stage of change can facilitate progress towards the action and maintenance phases of exercise behavior.

Decisional balance is another important construct in the TTM. It involves weighing the pros and cons of behavior change. Narrative reviews of physical activity studies indicate that the pros of behavior change increase with advancing stage, reaching a peak in the Action stage, while cons decrease across the stages of change. The decisional balance construct is an important predictor of stage progression, particularly between precontemplation, contemplation, and preparation, but less so for action and maintenance (Marshall & Biddle, 2001).

Self-efficacy is a concept borrowed from the social cognitive theory that describes the individual's level of confidence in his/her ability to adopt health behaviors and cope with high-risk situations without relapsing to unhealthy habits. Many studies based on the TTM have revealed a consistent positive linear relationship between exercise self-efficacy and stage of change (Marshall & Biddle, 2001). The TTM argues that the constructs of processes of change, decisional balance, and self-efficacy have a strong influence on progression through the stages of behavior change.

While the application of the TTM to physical activity promotion has not been without criticism (Adams & White, 2003), there are still many advantages to using the TTM as a theoretical framework for physical activity intervention. For example, the TTM appreciates individual differences in motivational readiness and encourages tailoring behavior change messages to make them appropriate for the individual's specific stage of change. The increased level of personally relevant content can often inspire more

adherence and retention in the participants, particularly as TTM-based studies are less likely to suggest a level of behavior change that the participant is hesitant to adopt. In fact, studies show that motivationally tailored physical activity interventions are most effective among less active participants (Marcus, Owen, et al., 1998). Thus, interventions based on the TTM can have a considerable impact on community health by increasing the physical activity levels of at risk groups and reducing chronic disease rates.

Past Research Utilizing TTM-Based Physical Activity Interventions

Early efforts to increase physical activity utilizing the TTM were greeted with much encouragement and enthusiasm (Dishman, 1991; NIH Consensus Development Panel on Physical Activity and Cardiovascular Health, 1996). A recent non-systematic, critical review (Adams & White, 2003) found 26 articles describing 16 TTM-based physical activity intervention programs. Seven programs involved counseling, four utilized written materials, and the remaining five included combinations of counseling and written materials. Eleven of the fifteen (73%) studies which followed participants for less than six months found stage-based interventions more effective than control conditions. However, only two of seven studies which followed participants for more than six months indicated that stage-based interventions were more effective at increasing physical activity than the control conditions.

Another recent study (Riemsma et al., 2002) systematically reviewed the effectiveness of stage-based interventions for several health behaviors, including 7 randomized controlled trials in the area of physical activity. While three of the seven studies reported that stage-based interventions produced a greater effect on physical activity than control conditions, none of the studies included reported effects that lasted

more than 12 weeks. Thus, researchers have concluded that such interventions are 'effective in promoting physical activity in the short term [e.g. less than 6 months]. Evidence on longer term [e.g. longer than 6 months] is limited but currently disappointing.' (Adams & White, 2003).

Face-To-Face Provider Counseling Interventions

Numerous studies have examined the efficacy of TTM-based physical activity interventions as disseminated through various delivery channels (provider-counseling, internet, telephone, mail) and among different samples (the elderly, WIC mothers, cancer patients). Provider counseling based on the TTM has been utilized in several exercise promotion studies with mixed results, particularly when administered by physicians. Project PACE (Provider-based Assessment and Counseling for Exercise) compared an intervention group of 12 primary care physicians, who were trained to provide stage-targeted physical activity counseling, to a control group of 10 physicians, who were trained in hepatitis B detection. At the four to six week follow-up, patients of physicians in the intervention group were significantly more likely to report increases in physical activity (52 % versus 12 %) and motivational readiness to exercise than the patients of physicians in the control group (Calfas et al., 1996). Furthermore, research has supported the feasibility of implementing the PACE intervention in primary care settings in the United States (Long et al., 1996)

The effectiveness of physician-based assessment and counseling for exercise (PACE) was also evaluated in a randomized controlled trial among Dutch general practice settings (Van Sluijs et al., 2005). Results indicated increased physical activity and weight loss one year after baseline; however, the PACE intervention was not more

effective than standard physician advice. Process evaluation revealed that most intervention providers discussed the same topics with all patients and failed to tailor their counseling to the individual stages of changes. The authors suggested that these process shortcomings may account for their failure to replicate the initial PACE study. However, other methodological issues in the initial PACE study are of note and may also help explain the lack of similar findings between Calfas et al. (1996) and Van Sluijs et al. (2005). The first PACE study was designed as a non-randomized controlled trial, selected intervention providers due to their interest in promoting physical activity, only included patients in contemplation and preparation, provided the intervention during a routine care visit, trained control providers in hepatitis B detection rather than another physical activity intervention, and only assessed short term effectiveness, as opposed to the 1 year follow-up in the Van Sluijs et al. (2005) study.

A PACE study conducted by different researchers (Norris et al., 2000) corroborated the findings of Van Sluijs et al. (2005) Results indicated an overall increase in physical activity levels among participants at six months follow-up without a specific intervention effect. The authors hypothesized that these negative results may be due to high baseline physical activity levels, providers that were already very prevention-oriented, seasonal influence, increased physical activity counseling by the control providers, and lack of sufficient reinforcement of the intervention over the follow-up period. This study called for future studies to examine long-term, repeated counseling interventions, particularly focusing on inner-city and minority populations whose physical activity, education, and income levels are lower.

Marcus and colleagues (1997) examined TTM-based physician exercise counseling. The design of this study differed from that of the first PACE study by including older participants with lower levels of motivational readiness for physical activity, recommending moderate physical activity throughout the day rather than continuous vigorous exercise, and distributing more comprehensive motivation-matched self instructional print materials. In addition, follow-up visits were conducted in the office with physicians rather than by phone with health educators. The intervention program consisted of physician training on physical activity counseling, 5 minutes of patient counseling, behavior change materials based on the TTM, office support system, and follow-up. Control participants completed the study before the physicians received training on physical activity counseling. Both groups reported increases in their physical activity at the six week follow-up, but greater increases were reported among patients who received more physician counseling on exercise. In this study, a physician delivered intervention based on TTM produced short term increases in the physical activity level among sedentary older adults.

Physical activity counseling based on the TTM has also been administered by health professionals other than physicians. In a randomized pilot test among low-income mothers enrolled in the Women, Infants, and Children (WIC) program, “Moms on the Move”, physical activity counseling was supplemented by an interactive brochure and four telephone follow-ups over 8 weeks (Fahrenwald, Atwood, Walker, Johnson, & Berg, 2004). Results indicated that participants reported more stage progression and physical activity behavior two weeks after completing the intervention than the control participants who received counseling on self-breast examination.

Kirk, MacIntyre, Mutrie, & Fischer (2003) evaluated the effect of a TTM-based physical activity counseling intervention among 70 inactive participants with type 2 diabetes. The intervention group received a 30-minute exercise consultation provided by a trained research assistant and 2 follow-up support telephone calls, while the control group received a standard exercise leaflet and telephone calls on unrelated topics to control for additional contact. Data collected from treadmill tests, accelerometers, and self-report measures indicated improvement in motivational readiness for physical activity, cardiorespiratory fitness, and physical activity levels among intervention group participants, while no significant changes were recorded in the control group at six months follow-up.

Several studies examining physical activity counseling show promising results; however, research suggests that few providers receive training in physical activity counseling, routinely offer it to patients, view it as a central part of their services, or receive reimbursement for physical activity counseling (Frank & Kunovich-Frieze, 1995; Walsh, Swangard, Davis, & McPhee, 1999; Wee, McCarthy, Davis, & Phillips, 1999; National Center for Health Statistics, 2000). Not only does face-to-face physical activity counseling require larger investments of time and effort from health care providers than perhaps feasible, but these interventions can also be expensive to implement. For example, in the ACT trial, the incremental cost alone of the assistance group as compared with the advice group was \$500 a participant and the incremental cost of the counseling group was \$1100 a participant (Simons-Morton et al., 2001). As large staffs and budgets are often not available, the time-consuming, costly nature of provider counseling interventions may decrease its generalizability.

Home-Based Interventions

Alternatives to interventions requiring face-to-face contact with health professionals include interventions delivered by mail, Internet, or telephone. Such home-based interventions are growing in popularity and may be particularly attractive to participants with transportation and time demands that often preclude clinic visits (Gillis, Stewart, McLellan, & King, 1998; King & Brassington, 1997).

Several studies utilizing TTM-based physical activity interventions delivered by telephone have yielded promising results. For example, Pinto and colleagues (2002) investigated the use of a fully-automated TTM-based physical activity counseling system (telephone-linked communication) among 298 sedentary adults (45% African American) from a multi-site medical practice. Among study completers, a larger proportion of the intervention group met recommendations for moderate-intensity physical activity at three months than the control group, who received an automated intervention promoting healthy eating. However, the effects of the intervention were not maintained at six months, which may have been due to a decrease in the number of participants who continued to use the automated physical activity counseling system.

In a study conducted among sedentary women who recently completed treatment for early stage breast cancer (Pinto, Frierson, Rabin, Trunzo, & Marcus, 2005), the intervention involved 12 weeks of telephone-delivered physical activity counseling along with weekly exercise tip sheets. Results indicated that the intervention participants were more likely to report increased motivational readiness to adopt physical activity and meet CDC/ACSM recommendations for moderate physical activity post-treatment than the control participants. Another noteworthy finding was that the intervention group

improved significantly on a field test of fitness after treatment, completing a 1-mile walk test in less time than the control group.

Past studies have also successfully used mailed self-instructional materials based on the TTM to promote physical activity. One of the earliest studies in this area was a six-week community intervention (“Imagine Action”) consisting of written materials based on TTM and Social Cognitive Theory (SCT), weekly fun walks, and activity nights (Marcus et al., 1992). While there was no control condition, findings indicated that the intervention was associated with increased motivational readiness for physical activity among the community volunteers.

Next, these mail-delivered interventions based on TTM and SCT were compared to standardized physical activity materials in a randomized controlled trial (“Jump Start to Health”). Significantly more participants in the intervention group reported stage progression at three months (37 % versus 27 %), thus providing additional support for the theory-backed self-help materials (Marcus, Emmons, et al., 1998).

Then, Marcus, Bock, and colleagues (1998) utilized a combination of the mail-delivered self help materials and computer generated, individually tailored feedback reports on motivational readiness, self-efficacy, decisional balance, cognitive/behavioral processes, and progress among a sample of community volunteers. The control group received standardized booklets on physical activity. Both conditions reported significant short term increases in physical activity, continued to increase their physical activity up to six months after the intervention, and then maintained these gains for a year (Bock et al., 2001). The intervention’s long term impact on physical activity is impressive and may have been due to multiple mailings or the tailored intervention strategy.

Recently, investigators compared the relative efficacy of this home-based intervention as delivered through two different channels (print versus telephone; Marcus, Napolitano, King, et al., 2007). Results suggested that both print (129.4 minutes; $p < .05$) and telephone (123.3 minutes; $p < .05$) groups reported significantly greater increases in weekly minutes of moderate intensity physical activity relative to the contact controls at six months (77.7 minutes). At 12 months after the start of the intervention, the print group continued to increase their physical activity, whereas participants receiving the intervention via telephone reported decreased activity at levels similar to the control group.

In another trial testing different delivery channels, Marcus and colleagues (2007) randomly assigned 249 sedentary adults to receive either 1) the previously discussed TTM and SCT based print intervention (Tailored Print); 2) the same information delivered via a website (Tailored Internet); or 3) six physical activity websites currently available to the public (Standard Internet). At 6 months, the Tailored Print participants reported a median of 112.5 weekly minutes of physical activity, whereas the Tailored Internet and Standard Internet arms reported 120 and 90 minutes, respectively ($p = 0.15$). At 12 months, the median weekly minutes of physical activity were 90, 90, and 80 for the Tailored Internet, Tailored Print, and Standard Internet arms, respectively ($p = 0.74$). Results indicated no significant differences between conditions; however, all three groups significantly increased from baseline to 6 months and from baseline to 12 months. Findings from the two previously discussed studies suggest that TTM-based interventions delivered via print materials are equally or perhaps even more efficacious in promoting physical activity than other home-based approaches (e.g. telephone, Internet).

While Marcus and colleagues have tested the print-based interventions among mostly middle class, Caucasian samples of community volunteers, recent studies have attempted to validate these findings in varying samples. For example, Marshall et al. (2003) evaluated the efficacy of a similar intervention within a randomly selected community sample. This study is important because nonvolunteer participants are more likely to be in the earlier exercise stages of change than volunteers and, thus, in greater need of intervention. The intervention consisted of personally addressed letters and stage targeted “Active Living” booklets. After 2 months, participants in the intervention group were significantly more likely than the control group to report meeting the ACSM/CDC recommendations for sufficient physical activity. Intervention participants who reported receiving and reading the intervention materials were significantly more likely to be meeting the sufficient physical activity criterion and 1.54 times more likely to have progressed in exercise stage of change by six months, as compared with the control group. Marshall et al. demonstrated that mailed stage-targeted print materials were not only effective in promoting physical activity among self-selected Caucasian American participants, but also within a randomly-selected community sample of Australian adults. The authors called for replication of this trial in other populations as such interventions have the potential to reach socially disadvantaged groups without access to newer forms of communication.

Whitehead and colleagues (2007) utilized a mailed, stage-targeted physical activity intervention with predominantly African American low-income adults attending primary care outpatient clinics and presenting with high rates of chronic illnesses, such as obesity (59%), diabetes (30%), hypertension (66%), and hyperlipidemia (41%). Analyses

indicated that the intervention produced a modest impact on self-reported physical activity and movement through the stages of change at 1 month as compared to an attention control, however these gains had attenuated by 6 months. These findings are particularly interesting as effects from similar interventions were maintained at six months post intervention in two Caucasian samples (Marcus et al., 1998; Marshall et al., 2003). Mail-delivered stage-matched interventions show great potential as a tool for reaching patients in need of health promotion because they can be disseminated at little cost or effort and have yielded promising results among varying populations. However, the gains in physical activity tend to be modest and short term, particularly among low income African Americans. Thus, Whitehead et al. (2007) called for further research including additional contact after the mail-delivered intervention to determine if effects can be maintained. The authors expressed concern about not sufficiently reinforcing the intervention over the follow-up period. Additional contacts provide opportunities for brief theory-based interventions to encourage adherence to exercise and may even improve retention.

Motivational Interviewing

Originally developed for treatment of addictions, brief interventions based on motivational interviewing (MI) have also shown success in encouraging change in physical activity and other chronic disease behaviors such as diet, cancer screening, and medical adherence (Emmons & Rollnick, 2001; Resnicow, Di Iorio, Soet, Borrelli, Ernst, & Hect, 2002). Miller and Rollnick (2002) defined MI as “a client-centered yet directive method for enhancing intrinsic motivation to change by exploring and resolving client ambivalence”. This theoretical approach integrates the relationship building principles of

humanistic therapy (Rogers, 1951) with more active cognitive-behavioral strategies targeted to the client's stage of change (Prochaska, DiClemente, & Norcross, 1992).

There are four guiding principles of MI: expressing empathy, rolling with resistance, developing discrepancy, and supporting self-efficacy. Expressing empathy is an important component of most therapeutic approaches and often achieved through reflective listening, in which the counselor attempts to understand the client's reluctance to change without judging or criticizing. MI emphasizes an attitude of acceptance, so the client's ambivalence towards behavior change is considered normal.

The next principle further elaborates on how to approach the client's reluctance to change their behavior. MI encourages therapists to "roll with" and explore this resistance, rather than directly oppose it. As the client is the primary source for finding solutions, the counselor does not impose goals for change, but instead often turns questions and problems back to the client. In addition, resistance is viewed as a signal for the counselor to shift approaches.

Developing discrepancy is a third principle of MI that emphasizes an intentionally directive nature and thus represents a point of departure from classic client-centered therapy. Increasing the importance of change from the client's viewpoint is the key goal. This is typically achieved by creating and amplifying dissonance between the client's present behavior and important personal goals or values.

Supporting self-efficacy, the fourth principle of MI, is borrowed from social cognitive theory and TTM. This construct is defined as the client's confidence in his/her ability to overcome obstacles and successfully achieve behavior change. Self-efficacy is

often an important predictor of treatment outcomes and can be enhanced by highlighting the successful behavior change of others or the client's own past successes.

Miller and Rollnick (2002) describe MI as occurring in two phases with different goals. The therapist attempts to build the client's motivation for change in the first phase and then strengthens this commitment to change and develops a plan to accomplish it in the second phase. The first phase typically focuses on eliciting change talk from the client through four early methods called OARS: 1) asking Open questions that pull for change talk; 2) Affirming and reinforcing the client for change talk; 3) Reflecting back, sometimes selectively, change talk that the client has voiced; and 4) Summarizing change talk. Other methods, such as objective feedback and values exploration through importance ruler and decisional balance exercises, can also serve to increase perceived discrepancy.

Once goals shift to strengthening commitment to a change plan, the second phase of MI begins. The first step is termed "recapitulation" and consists of pulling together what has been discussed so far, for the purpose of deciding what to do next. This typically includes summarizing the client's ambivalence and perception of the problem, objective evidence to the importance of change, any indications the client has offered of wanting to change, and, finally, the therapist's own assessment of the situation. Recapitulation leads directly to key questions, such as "What changes, if any, are you thinking about making?", or simply "What happens next?" Through the client's responses to key questions and the provision of information and advice from the therapist, a plan for change emerges. The four stages of negotiating a change plan include 1) setting goals, 2)

considering change options, 3) arriving at a plan, and 4) eliciting commitment.

Committing to a change plan typically draws the formal MI cycle to a close.

Physical Activity Interventions Based on Motivational Interviewing

Three recently published reviews of MI research (Dunn, DeRoo, & Rivara, 2001; Burke, Arkowitz, & Dunn, 2002; Burke, Arkowitz, & Menchola, 2003) included studies in the area of exercise promotion. While Dunn, DeRoo, and Rivara (2001) described the evidence as consistently supporting the dissemination of MI for increasing exercise, Burke et al. (2002) reported finding mixed support. The first meta-analytic examination of the MI literature (Burke, Arkowitz, & Menchola, 2003) reported that the efficacy of physical activity interventions based on MI was in the medium range overall (*ds* around 0.50) and appeared to be equivalent to other active treatments and superior to no-treatment or placebo controls.

One of the first studies in this area involved 22 older obese women (41% African American) with non-insulin-dependent diabetes mellitus who were randomly assigned to 16 week group behavioral weight control program or the same program with three MI sessions (Smith et al., 1996). Results indicated that adding the MI sessions to the program enhanced adherence to treatment recommendations; in fact, the MI group demonstrated a tendency towards a greater number of days exercised.

Two studies successfully utilized MI-based interventions to increase physical activity among patients with heart conditions. Brodie and Inoue (2004) randomly assigned 60 older heart failure patients to standard care (information and recommendations to increase activity), MI, or both treatments. After five months, the MI and both treatments groups reported an increase in their level and type of activities, while

the standard care group did not. All groups significantly improved their 6-minute walk distance.

In a similar study, Cardiovascular Health Initiative and Lifestyle Education (CHILE) study, patients recovering from heart disease were randomly assigned to receive traditional cardiac rehabilitation alone or with additional MI and skill-building sessions (Scales, 1998). While the study was designed to enhance several health behaviors, intervention participants reported exercising at energy expenditures equivalent to 7.5 hours of brisk walking per week at completion of the 12 week program, compared to 3.5 hours for the control group. Three months later, the intervention group was still significantly more active and continued to increase their physical activity, unlike the control group (Scales, Atterbom & Lueker, 1998; Scales, Atterbom, Lueker, & Gibson, 1999).

Another multicomponent MI based intervention, the Healthy Body Healthy Spirit Trial, was delivered through African American churches and attempted to promote physical activity, along with fruit and vegetable consumption (Resnicow et al., 2005). Sixteen churches were randomly assigned to three conditions: standard education materials, culturally targeted self help materials, and the same intervention plus four MI-based telephone calls over a year. At one year, participants who received the culturally targeted self help materials showed significant changes in both health behaviors. For fruits and vegetables, there was a clear additive effect for the MI intervention, whereas MI did not appreciably enhance the impact of the culturally targeted physical activity materials. Resnicow et al. (2005) hypothesized that such findings could be due to participants being less willing to modify physical activity, as most elected to discuss

fruits and vegetables during the MI-based phone call when the choice was provided. The authors expressed concerns that results may have been impacted by socially desirable responding. Participants most likely realized that the goal of the intervention was to improve diet and activity levels; thus, some may have given inaccurate reports of their diet and exercise habits in an attempt to portray themselves in an overly positive light. Another weakness of the study was that there was no control for the additional attention received by the MI group. Thus, the additive effect of the MI telephone calls on fruit and vegetable consumption may be due to the extra attention from the clinic rather than the MI-based intervention.

Two other studies in this area focused specifically on promoting physical activity rather than numerous health-related behaviors with promising results. In Harland et al. (1999), 523 sedentary, socioeconomically disadvantaged adults were randomized to four intervention groups (40-minute MI session, MI session plus incentives, 6 MI sessions, 6 MI sessions plus incentives) or a control condition that received packets with information on the recommendations for and benefits of physical activity, 19 leaflets on facilities and activities available locally, and brief advice. At the 12-week follow-up, the intervention groups reported significant improvement in physical activity relative to the control group (38% improved vs. 16%). While no significant effect was due to incentives or extra MI sessions within the intervention groups, results suggested that the most effective intervention was the most intensive (six MI sessions plus incentives). Increases in physical activity reported at 12 weeks by the intervention groups were not maintained at one year, regardless of intensity of intervention. The authors encourage future research

in the development of cost-effective interventions that promote long term adherence to exercise.

MI-based physical activity counseling was utilized among older primary care patients in the Physically Active for Life 2 (PAL2) study (Pinto et al., 2001). The brief-advice condition consisted of brief advice from a physician, while the extended advice group received that component plus three face-to-face physical activity counseling sessions with a health educator, physical activity prescriptions tailored to individual levels of motivational readiness, 12 counseling calls, and 12 tip sheets sent by mail. The authors specified that “all counseling was tailored to the patient’s stage of readiness to increase PA levels” and “face to face visits and phone calls followed scripts in keeping with motivational interviewing techniques”. At six months, 60% of the extended advice group had progressed in level of motivational readiness for physical activity from baseline, as opposed to 30% of the brief advice group. In addition, the extended advice group reported significantly greater participation in moderate-intensity physical activity than the brief advice group at 3 and 6 months. Findings based on self-report measures were corroborated by accelerometry data. This study provided evidence that MI-based clinician advice and follow-up counseling can promote adoption of moderate intensity exercise among older, primary care patients. The authors emphasized the more sustained, patient-centered, multicomponent nature of the intervention as important to achieving improvement in physical activity and called for future research “with a broader sociodemographic population drawn from multiple regions of the country”.

Summary and Rationale

High prevalence rates of physical inactivity and related chronic disease exist in the U.S. While numerous interventions have been implemented to address this epidemic, few studies have included high risk groups, such as low income individuals and African Americans. In a recent review of physical activity studies conducted among African American women, Banks-Wallace and Conn (2002) concluded that African Americans show modest, inconsistent increases in physical activity in response to intervention. The authors called for more research among African Americans and encouraged shifting the focus towards achieving enduring physical activity change as two of three studies that followed participants for at least 6 months after the intervention reported no significant changes in physical activity (Chen et al. 1998; Kumanyika & Charleston, 1992; Pleas, 1988). This review also detailed numerous methodological flaws plaguing this literature, such as infrequent use of theoretical frameworks when designing interventions.

The TTM is the one of the main theoretical frameworks utilized in physical activity promotion research, but most TTM-based studies have been conducted among Caucasians. A previous study examined the efficacy of a mail-delivered stage-matched intervention among predominantly low income African Americans (Whitehead et al., 2007). Modest gains in physical activity were present at one month, but this effect had dissipated by six months. The authors speculated that the intervention was not sufficiently reinforced over the follow-up period and called for future research including additional contacts to see if the intervention effects could be maintained.

The current study implemented a home-based physical activity intervention among an African American low income sample. This multicomponent intervention

consisted of mail-delivered, stage-matched written materials, monthly newsletters, and two motivational interviews by telephone. The MI format for the additional telephone contacts was selected to reinforce the mailed intervention over the follow-up period due to its prior success in increasing physical activity levels among African Americans (Resnicow et al., 2005). In addition, the researchers hoped to reduce attrition by utilizing an appealing client centered approach.

Along with high attrition, the current study sought to address many of the methodological flaws common to this research area. For example, Banks-Wallace and Conn (2002) highlighted a need for randomized, controlled trials with at least six month delay in outcome measurement to move knowledge about physical activity promotion among African Americans forward. Other methodological improvements suggested by Banks-Wallace and Conn (2002) that the current study attempted to address include addressing treatment integrity issues, using validated physical activity measures, and a larger sample size (typically $N < 100$). In addition, several studies have expressed concern about results being confounded by socially desirable responding (Whitehead et al., 2007; Marshall et al., 2003; Resnicow et al., 2005); thus, the current study measured and statistically controlled for social desirability.

Given the findings and limitations of previous research, the primary aim of the current study was to determine whether a multi-component, home-based physical activity intervention produced enduring change in physical activity levels and associated process variables (i.e., self efficacy, decisional balance) among low income African Americans. The intervention group received a stage matched, mailed physical activity intervention along with five monthly newsletters and two telephone contacts using MI to promote PA

over the follow-up period. An attention control group condition also received a mailed intervention, five monthly newsletters, and two telephone calls; however, these contacts promoted a low sodium diet. The following hypotheses were tested.

Primary Hypotheses

1. Participants receiving the home-based physical activity intervention will report significantly greater increases in physical activity from baseline to six months than the control group.
2. The intervention participants will be more likely to progress in exercise stage of change from baseline to six months than the control group.

Secondary Hypotheses

3. The home-based physical activity intervention will produce significantly greater increases in self-efficacy for physical activity from baseline to six months than the control condition.
4. The home-based physical activity intervention will produce significantly greater increases in decisional balance scores, indicating the perception of fewer disadvantages to physical activity than advantages, at six months than the control condition.
5. Long-term gains (six months) in self-report physical activity, self-efficacy, and decisional balance produced by the home-based intervention will still be statistically significant after controlling for variance accounted for by socially desirable responding.

Methods

Participants

Participants for the current study were recruited from the waiting rooms of the outpatient clinics at Earl K. Long Medical Center (EKL). EKL is a teaching hospital affiliated with the Louisiana State University Health Sciences Center. This medical center provides services to a predominantly low income, African American population.

Inclusion criteria for the current study included being an EKL patient, African American, at least 18 years old, able to walk unassisted, and having access to a telephone.

Participants were excluded from participation in the study if they were not able to provide an address where they would be residing for six months or if their reading ability was below a 9th grade level as determined by the Passage Comprehension subtest of the Woodcock Johnson Tests of Achievement (Woodcock, McGrew, & Mather, 2001).

Measures

Weekly Leisure-Time Exercise Questionnaire (WLTEQ).

This measure was used to assess frequency, intensity, and duration of weekly leisure time exercise (Godin & Shephard, 1985). Respondents report the number of times they engaged in more than 15 minutes of strenuous, moderate, and mild physical activity during the course of the past week. Weekly leisure time exercise metabolic equivalents are calculated as a summed score of the number of exercise sessions multiplied by the appropriate metabolic equivalent value (9, 5, and 3 for strenuous through mild). The measure has acceptable two-week test-retest reliability ($r = 0.74$) and demonstrated concurrent validity with a separate 7-Day Physical Activity Recall ($r = 0.40$, $p < 0.001$). Convergent validity is supported by WLTEQ's modest relationship with VO2max and

body fat percentage (r 's = 0.24 and 0.13, respectively) (Godin & Shephard, 1985). Other benefits to using the Weekly Leisure Time Exercise Questionnaire (see Appendix A) in the current study included its brevity and prior use among African American samples (Cardinal & Sachs, 1996; Whitehead et al., 2007).

Physical Activity Stages of Change Questionnaire

A four-item self-report scale developed by Marcus and Simkin (1993) and adapted from Marcus, Rossi, Selby, Niaura, & Abrams (1992) categorized participants into one of the five stages of change (precontemplation, contemplation, preparation, action, and maintenance). The construct validity of this measure is supported by differences in self-report physical activity among stages of change. For example, participants in the action/maintenance and preparation stages of change reported more vigorous and moderate physical activity than participants in precontemplation/contemplation. In addition, participants in action/maintenance engaged in more vigorous activity than those in preparation (Marcus & Simkin, 1993). Good two-week test-retest reliability was demonstrated by a Kappa index of .78 (Marcus, Selby, et al., 1992). Concurrent validity was established by a significant association with the Seven Day Recall Physical Activity Questionnaire (Marcus & Simkin, 1993) and other measures assessing self-efficacy and decision making (Marcus & Own, 1992; Marcus, Rakowski, & Rossi, 1992; Marcus, Selby, et al. 1992). Advantages to using this measure (see Appendix A) also included the yes-no response format, which was recommended as the most reliable and valid in the exercise domain by Reed, Velicer, Prochaska, Rossi, & Marcus (1997), and its emphasis on moderate rather than vigorous physical activity.

Decisional Balance Scale For Exercise

Decisional balance for exercise was measured using a ten item scale developed by Plotnikoff, Blanchard, Hotz, & Rhodes (2001). This measure (see Appendix A) contains 2 five-item subscales concerning perceived advantages (“pros”) and disadvantages (“cons”) to engaging in physical activity. Items were assessed by a five-point response scale ranging from 1 (not at all) to 5 (very much). The reliability and validity of the decisional balance for exercise scale was tested among a large population based sample of Canadian adults (N=703). Results indicating that decisional balance scores were higher with advancing exercise stage of change provide evidence for construct validity. Both the pros and cons subscales showed good internal consistency (α 's = 0.69-0.83) and 2-week test-retest reliability (r 's = 0.74-0.84). Concurrent validity was established as self-efficacy and behavioral intention for exercise were correlated positively with the pros (r 's = 0.21-0.36) and negatively with the cons (r 's ranging from -0.27 to -0.43).

Self-Efficacy Scale

A five-item scale developed by Marcus, Selby and colleagues (1992) examined confidence in one's ability to persist with exercising in various situations, such as when feeling fatigued or encountering inclement weather. Items represented three areas which previous exercise research (Sallis, Pinski, Patterson, & Nader, 1988) have shown to be important: negative affect, resisting relapse, and making time for exercise. Construct validity was supported by differences in total scores on the self-efficacy items across the various stages of change; for example, precontemplators and maintainers received the lowest and highest, respectively, self-efficacy scores. The measure (see Appendix A)

demonstrated good test-retest reliability over a two week period ($r = 0.90$, $n=20$) and internal consistency in both eleven point ($r = .82$) and five point likert scale response formats ($r = .74$) (Marcus, Selby, et al., 1992; Pinto et al., 2001). The five point likert scale version (not at all confident to extremely confident) was used in the current study to simplify administrating the measure by telephone.

Other Measures

Participants completed a demographic questionnaire and social desirability measure (see Appendix A) at baseline. The demographic questionnaire assessed age, gender, race, height, weight, marital status, educational and income level, and chronic disease status. A short form version of the Marlowe-Crowne Social Desirability scale (Ray, 1984) screened for socially desirable responding. The measure has well documented validity and reliability (α 's= 0.74-0.77) (Ray, 1981; Ray & Lovejoy, 1984; Ray, 1984).

Intervention

The intervention for the current study included mailed, stage-matched exercise promotion materials (see Appendix B). The intervention materials were modeled after those utilized by Marshall et al. (2003), which were written at a 9th grade reading level. The main revisions consisted of changing certain phrases used with the Australian sample, such as “bushwalking”, to make the language more appropriate for the current sample and including pictures of African Americans exercising. The format was also changed from a pamphlet to an individually tailored letter.

In addition, participants received two phone delivered brief (15-20 minutes) interventions adapted from motivational interviewing during the follow-up period. The

masters level therapist who conducted the sessions has received training in MI techniques (e.g., attended an eight hour workshop on MI and read “Motivational interviewing: Preparing people for change” by Miller and Rollnick twice). These sessions were scripted (see Appendix B) in order to ensure that the primary strategies were delivered, while allowing for spontaneous discussion and reflective listening. To discourage therapist drift and safeguard treatment integrity, the telephone calls were audiotaped and the therapist self rated her fidelity to the protocol after each call using a standardized form. A clinical supervisor reviewed the audiotapes and met with the therapist to discuss areas for improvement.

To further reinforce the intervention message over the follow-up period, participants in the intervention group also received a one page monthly physical activity newsletter (see Appendix B). The newsletter primarily served as a reminder to continue being physically active and included tips on fun ways to be physically active.

Procedure

Study participants were recruited from sequential clinic attendees who met inclusion criteria for the study. After providing informed consent (see Appendix A), participants completed a demographic questionnaire, social desirability scale, and four self-report physical activity measures. Research assistants then randomly assigned the participants to control or intervention groups using a table of random numbers and mailed stage-matched physical activity materials to the intervention participants in the following week. The control group received mailed information on reducing the sodium in their diet (see Appendix B).

At two and four months post baseline, a masters level therapist contacted the intervention participants by telephone and conducted brief motivational interviewing sessions for physical activity promotion. The control group also received telephone calls at two and four months regarding a different topic, low sodium diet.

All participants received five monthly newsletters over the follow-up period. Intervention participants received a physical activity newsletter, while the newsletter sent to control participants emphasized reducing sodium intake (see Appendix B). The four physical activity measures were readministered over the telephone to all participants at six months. Researchers conducting the follow-up interviews were blind to group status and made four attempts at contacting the participants by phone before considering them lost to follow-up. In addition, researchers attempted to update the contact information of participants at every telephone contact in order to improve retention rates. Medical charts were reviewed for height, weight, and presence of chronic disease, specifically hypertension, hyperlipidemia, and diabetes mellitus.

Results

Sample Characteristics

Baseline data was collected on 214 participants. The sample was comprised of low income (59.3% with monthly household income < \$1,000), African American (100%) females (90.7%) with high rates of chronic diseases. Reviews of 156 available medical charts indicated that 67% were diagnosed with hypertension, 37% with diabetes mellitus, 33% with hyperlipidemia, and 60% were obese (BMI>30). The mean age was 47.25 (SD=13.26). The average level of education was a high school diploma (M years = 12.04, SD=2.07). Sample characteristics are summarized in Appendix C.

Differences at Baseline Between Control and Intervention Group

T-tests and chi square analyses were conducted to determine if the control and experimental groups differed on demographic indices or on baseline scores of the physical activity measures. Independent samples t-tests indicated no significant differences in age, years of education, number of chronic illnesses, body mass index, and baseline scores on two of the physical activity measures (WLTEQ and self efficacy) between groups. However, intervention participants (M=2.18, SD=1.17) did record significantly higher decisional balance scores at baseline than the control participants (M=1.8, SD=1.16), $t(208) = 2.39, p < .05$. Chi square analyses indicated no significant differences in gender, income level, marital status, and baseline exercise stage of change between groups.

Differences at Baseline Between Completers and Non-completers

As previously mentioned, 214 participants completed baseline data and were then randomly assigned either to the control (N= 98) or intervention (N=116) group. The

researchers were able to contact 96 participants (44.86%) for follow up data, including 46 control and 50 experimental group participants. Unfortunately, the researchers were not able to contact 118 participants (52 control and 66 experimental) for follow up data (see Appendix C).

There are various reasons for the follow up measures not being completed. For example, 97 participants were called four times without establishing contact. These participants typically either had disconnected telephone numbers or chose not to respond to 4 messages (left on voicemail or with family members). Eight participants were contacted, but then declined to continue participating in the study. Another four participants passed away (due to reasons unrelated to the study). Finally, there were nine cases involving incorrect telephone numbers and home addresses.

Independent sample t-tests and chi square analyses were conducted to determine if participants who completed the follow up interviews differed from participants who did not in terms of demographic indices, group assignment, or baseline scores on the physical activity measures. Chi square analyses indicated no significant differences in group assignment, gender, marital status, income level, and baseline exercise stage of change between completers and non-completers. Independent sample t-tests indicated no significant differences in years of education, number of chronic illnesses, body mass index, and baseline scores on the physical activity measures between completers and non-completers. However, individuals who completed six months follow up ($M=49.8$, $SD=13.01$) were significantly older than non-completers ($M=45.17$, $SD=13.16$), $t(212) = 2.57$, $p < 0.01$. These results are similar to those found in another physical activity intervention study conducted in this population (Whitehead et al., 2007). The authors

hypothesized that older participants are less likely to be working (e.g. retired) and thus at home when the research assistants called to complete follow up interviews.

Hypothesis 2

McNemar's chi square analyses were conducted to examine movement through the exercise stages of change from baseline to six months follow up (see Appendix C). Overall, 40.62% (n= 39) of the participants who completed follow up measures progressed in exercise stage of change from baseline to six months, whereas 29.2% (n= 28) maintained and 30.2% (n= 29) regressed. In the intervention group, 30.9% progressed, 38.2% maintained and 30.9% regressed in exercise stage of change (McNemar's χ^2 , $p < 1.00$), while 53.7% of the control group progressed, 17.1% maintained, and 29.3% regressed (McNemar's χ^2 , $p < .12$).

Hypotheses 1, 3, and 4

To test hypotheses 1, 3, and 4, a 2 x 2 multivariate analysis of variance was conducted to assess for differential treatment effects on self-reported physical activity (Weekly Leisure-Time Exercise Questionnaire), self efficacy, and decisional balance between groups. Data were analyzed by intention to treat. Baseline scores were carried forward in the case of missing data points at six months. The independent variables for this analysis included a between groups factor, Treatment, and within groups factor, Time. The Treatment factor consisted of two levels: intervention vs. control. The Time factor consisted of two levels: baseline and six months. The three dependent variables in this analysis were self-efficacy, decisional balance, and self-report physical activity. While there were significant main effects for both Treatment, $F(3, 206) = 2.66$, $p < .05$, and Time, $F(3, 206) = 14.29$, $p < .001$, the Treatment x Time interaction was not

significant, $F(3, 206) = .43, p < .73$. Thus, follow up post hoc analyses were not conducted.

Interestingly, trends in the means indicated no changes in self efficacy or decisional balance scores, but both groups reported increasing their physical activity from baseline to six months (see Appendix C). In the intervention group, estimated marginal means for the Weekly Leisure Time Exercise Questionnaire scores increased from 15.96 (SE=1.7) at baseline to 20.86 (SE=2.03) at 6 months, which is similar to the changes from baseline (M=11.77, SE=1.85) to six months (M=18.62, SE=2.21) reported by the control group. Such increases are roughly equivalent to participating in an additional 15 minute (or longer) session of moderate exercise (e.g. brisk walking) per week.

To explore the influence of missing data, the analyses were repeated including only the participants with complete 6-month follow-up data (n= 86). Once again, there was a significant main effect for Time, $F(3, 82) = 1.04, p < .001$, but not a significant Treatment x Time interaction, $F(3,82) = 1.07, p < .37$.

Hypothesis 5

Hypothesis 5 was tested by repeating the analyses and statistically controlling for the variance accounted for by socially desirable responding. A MANCOVA was run and the Treatment x Time interaction was still not significant, $F(3,201) = 0.43, p < .73$.

Social desirability scores were also not significantly correlated with stage of change, self efficacy, and self reported physical activity at baseline and six months (p 's $> .05$). However, there was a significant positive correlation between social desirability and baseline decisional balance scores ($r = .27, p < .001$), which indicated an association

between the tendency to respond in a socially desirable manner and reporting more advantages than disadvantages to exercising regularly at baseline.

Interestingly, social desirability was not significantly correlated with decisional balance scores at six months. These results may reflect the decrease in social pressure as the six months follow up data were collected in a more anonymous fashion over the telephone and baseline data were gathered during a one-on-one interview in a medical setting.

Discussion

Summary

The results from the current study suggest that the home-based physical activity intervention did not produce enduring changes in the activity levels and associated process variables among a sample of low income African Americans with high rates of chronic illnesses. These findings are disappointing yet not surprising as baseline data indicated that the participants were in great need of intervention, but would be a challenge in terms of motivation for behavior change.

Overall, participants in the current study reported low levels of physical activity at baseline, particularly when compared to a sample of 306 healthy Canadian adults (mean WLTEQ scores of 14.1 versus 45.8) (Godin & Shepard, 1985). On average, participants reported engaging in mild, moderate, and strenuous exercise (for more than 15 minutes) 2, 1, and .25 times, respectively, each week during their leisure time. As for level of motivational readiness for physical activity, 67.3% reported being in the earlier stages of change (not in action/maintenance). Self efficacy also appeared to be low ($M=2.62$, $SD=0.92$) as the scale ranged from 1 to 5, with higher scores indicating greater self efficacy. While this sample reportedly perceived more advantages than disadvantages to adopting physical activity at baseline; decisional balance ($M=2.00$, $SD=1.19$) was the only physical activity variable significantly correlated with socially desirable responding ($r = 0.26$, $p < .0001$).

Follow up measures were collected after six months of intervention. Overall, 40.62% of the participants who completed follow up measures progressed in exercise stage of change from baseline to six months, whereas 29.2% maintained and 30.2%

regressed. There were no statistically significant changes in level of motivational readiness from baseline to six months for either group. Trends in the means suggest that both the intervention and control group reported increases in their physical activity from baseline to six months; however, these increases in physical activity did not differ significantly by group. In addition, results indicated no statistically significant changes in scores on self efficacy and decisional balance measures from baseline to six months for either group.

Social desirability was not significantly correlated with any of the self report physical activity measures, except baseline decisional balance scores ($r = .27, p < .001$). The participants may have felt more social pressure to report advantages to exercise during the one-on-one baseline interviews as opposed to over the telephone at six months follow up.

Limitations

The limitations of the current study include small sample size, high attrition rate, high social desirability scores, and concerns regarding possible contamination of groups and seasonal effects on physical activity. We recruited 214 participants at baseline, as a conservative power analysis estimated that a sample size of 200 would be necessary for an 80% chance of detecting an expected effect size of 0.50 standard deviation change with alpha set at 0.05. Unfortunately, the sample size diminished to 96 at six months due to attrition. The 55.1% attrition rate most likely reduced power and thus our ability to detect significant group differences in physical activity.

As the rate of attrition in a previous physical activity intervention study conducted among low income African Americans recruited from Earl K. Long Hospital

(Whitehead et al., 2007) was also high (64%) compared to studies (11% at 6 months) conducted with middle class Caucasian samples (Marcus et al., 2007), several steps were taken in the current study to address this concern. For example, we over-recruited at baseline and contacted the participants more frequently. In the previous study, participants received one mailing from the clinic and then were contacted by telephone to complete follow up measures at one and six months. In the current study, the participants received monthly newsletters to help maintain their interest and commitment to the study through frequent, colorful reminders. In addition, the intervention was supplemented with 2 one-on-one telephone contacts by a masters level therapist to allow for a more personalized, engaging approach. We anticipated that the client-centered, MI-based format of these telephone contacts would be appealing to participants and hopefully increase the personal relevance of these health promotion messages. The additional contacts with participants also allowed the project staff multiple opportunities to update participant contact information during the follow up period. Overall, our efforts to retain participants appear to have not been sufficient. Future researchers may find using incentives and even more frequent prompts helpful with retention of participants (particularly in African American and low income samples) in physical activity clinical trials. Regrettably, such precautions were not realistic in the current study due to budget and staff limits.

Another limitation of the current study was the sample's tendency to respond in a socially desirable manner. Social desirability scores ($M=20.89$, $SD=2.94$) appeared high based on the scale range of 8 to 24, with higher scores indicating a tendency towards socially desirable responding, and in comparison to scores ($M=15.61$, $SD= 3.82$) from a

sample of 136 German participants (Ray & Kiefler, 1984). While the fact that participants reported an overall trend of attempting to portray themselves in an overly positive light raises concern regarding the accuracy of reporting, non-significant findings minimize such concerns for the purposes of these analyses.

There was also concern regarding contamination of the conditions, particularly as increases in self reported physical activity were found among both the intervention and control groups. The participants were all recruited from the outpatient clinics of the same hospital. While we did not inquire about the personal relationships of our participants during the baseline and follow up interviews, many of the hospital patients live in the surrounding neighborhoods. There is a possibility that some participants knew each other and may have even discussed their involvement in this research project. Other physical activity researchers have begun taking precautions against such contamination of groups by allowing only one member per household to participate in their studies (B. Marcus, personal communication, May 24, 2007). In hindsight, such an addition to the inclusion criteria would have strengthened the methodology of the current study; however, data had already been collected by the time this information was received.

In the current study, physical activity levels were first assessed during the summer and then reassessed six months later during the winter. Thus, seasonal effects on physical activity may have also played a role in producing non-significant results. Past research has suggested that activity levels are significantly higher during the summer months and lower during the winter months (Plasqui & Westerterp, 2004). For example, in another study conducted in the southeastern U.S. (Tennessee and South Carolina), data from pedometers suggested that, during the summer, participants logged approximately 900

more steps per day than during the winter (Tudor-Locke et al., 2004). The authors recommended collecting data regarding physical activity levels in the fall or spring to lessen the impact of seasonal effects.

Future Directions

The current study attempted to extend past research, which indicated that a stage matched mail-delivered intervention produced modest increases in self-reported physical activity among a predominantly African American low income sample at one month (Whitehead et al., 2007). As the gains produced by one mailing of intervention materials deteriorated by six months, the authors hypothesized that the intervention was not sufficiently reinforced over the follow up period. So, in the current study, the researchers developed and tested an enhanced version of this home-based physical activity intervention, which included two additional telephone contacts based on motivational interviewing techniques and five monthly newsletters. However, results indicated that more contact still did not produce enduring change in physical activity levels and associated process variables (i.e., self efficacy, decisional balance).

As current efforts have been minimally successful (Whitehead et al. 2007, Banks-Wallace & Conn, 2002), future researchers may wish to consider using qualitative research methods to further examine the physical activity intervention needs and preferences of low income African Americans. Such formative research would be helpful as many of the currently available empirically validated physical activity interventions, such as the one utilized in the current study, were developed among middle class Caucasian participants and may not be as appropriate for use among (or appealing to) other groups.

Studies suggest that there are cultural differences regarding physical activity. For example, African American women described different reasons for not being active (lacking safe place to exercise or walk) than Caucasian (too tired, self-conscious) and Hispanic (lacked time, too tired) women (Heesch, Brown, and Blanton, 2000). In addition, studies have reported unique attitudes regarding body image, concerns about safety in their neighborhoods, burden of redoing their hair after exercise, and lack of time for exercise due to extensive family and church commitments (Resnicow et al., 2002). Effective health interventions must be consistent with the shared beliefs, values, and practices of the target population (USDHS, 2000). Therefore, future researchers may wish to obtain focus group data from low income African Americans on how to improve the cultural appropriateness and appeal of physical activity intervention materials.

Cultural sensitivity has been described as having two primary dimensions: surface structure and deep structure (Resnicow et al, 2000 & 2001). Surface structure involves matching intervention materials and messages to observable social and behavioral characteristics of a particular group, such as appearances, places, activities, language, and music familiar to and preferred by the target audience. For example, participants may suggest including more pictures of African Americans in the materials. African American focus groups have described basketball, housework for job, and jump rope as “mostly black”, so participants might suggest focusing more on these “mostly black” activities and less on the “mostly white” activities (aerobics at a club, square dancing, hiking, squash, ice skating, and swimming at a beach) (Resnicow et al., 1999, 2001). Revisions to the intervention materials could also include emphasizing health benefits to physical

activity other than weight control, as large body size may be culturally more acceptable among African Americans (Banks-Wallace & Conn, 2002).

As part of addressing surface structure issues, future researchers may wish to inquire about culturally sensitive methods of recruitment and retention, incentives for participation, and modes of intervention delivery. In the current study, 91 low income African Americans provided data on preferred mode of intervention delivery and 90.1% preferred receiving information on exercise through the mail. While four people reported being equally interested in receiving information by mail and telephone, only one person expressed a preference for receiving information on physical activity by telephone. The lack of interest in being contacted by telephone may have contributed to the high attrition rate at six months.

When asked about the Internet, 70.3% reported not having access to a computer and only four participants expressed a preference for receiving information on exercise via the Internet. The prevalence of Internet access among this sample is lower than the general population. According to a March 18, 2004 press release from Nielsen//NetRatings, nearly 75% (or 204.3 million) of Americans have Internet access from home. However, this discrepancy is not surprising as the average monthly household income of this sample was quite low. Gathering more information regarding preferred mode of intervention delivery and other surface structure issues may help inform future studies.

Researchers should also attempt to address the deep structure issues. Deep structure refers to social and psychological factors rooted in a group's historical

experiences, beliefs, and values. Addressing deep structure issues may include placing more emphasis on social support for physical activity (i.e., walking partners) as family and friends are highly valued by African Americans (Banks-Wallace & Conn, 2002). The literature also suggests using scripture and religious themes as well as focusing on improving the health of the community as opposed to the individual (Resnicow et al., 2002). While these examples are given to illustrate the type of changes that could be suggested, the intervention material should be modified for improved cultural sensitivity in response to actual focus group data from African Americans. Upon completing this step, researchers may wish to test the efficacy of these modified physical activity intervention materials in a randomized controlled trial.

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Appendix A: Questionnaires

LOUISIANA STATE UNIVERSITY INFORMED CONSENT FORM

1. STUDY TITLE:

A Home-Based Intervention to Promote Physical Activity in Low Income African American Adults

2. PERFORMANCE SITE:

Earl K. Long Medical Center, Baton Rouge, LA

3. NAMES AND TELEPHONE NUMBERS OF INVESTIGATORS:

Phillip J. Brantley, Ph.D. (225) 763-3046

Dori Whitehead, M.A. (225) 354-2064

4. PURPOSE OF THE STUDY:

The purpose of this study is to find out if an intervention delivered by mail and telephone will be associated with enduring increases in physical activity among African American adults.

5. SUBJECTS:

There will be approximately 300 participants. Inclusion criteria for the current study include: being an EKL patient, African American, at least 18 years old, able to walk unassisted, and having access to a telephone (for follow up). Patients will be excluded from participation in the study if they are not able to provide an address where they will be residing for six months or if their reading ability is below a 9th grade level.

6. PROCEDURES:

Dr. Brantley will be directing this study. This study will take place over six months. All participants will complete five questionnaires on site, which should take 15 minutes. Next, they will be randomly assigned to either the intervention or control group. Intervention participants will receive physical activity materials in the mail, while control participants will be mailed a brochure on low sodium diet. All participants will receive brief telephone contacts at 2 and 4 months regarding either physical activity or low sodium diet along with five one-page monthly newsletters. Four questionnaires will be re-administered by telephone at six months. Height, weight, and chronic disease status will be gathered from the participants' medical charts.

7. BENEFITS TO SUBJECT:

All participants will learn more about their own attitudes and behavior regarding physical activity and diet.

8. RISKS TO SUBJECT:

While there are no known risks to participating in this study, participants are advised that they should consult with their physician before making changes to their physical activity routines. In addition, participants may experience boredom while completing the questionnaires.

9. ALTERNATIVES TO PARTICIPATION IN THE STUDY:

If you choose not to participate in this study at this time, there will be no alternatives offered to you. If you decide to participate in this study, you can stop at any time without consequence.

10. SUBJECT REMOVAL

There are no circumstances under which the subjects would be removed

11. SUBJECT'S RIGHT TO REFUSE TO PARTICIPATE OR WITHDRAW:

Participation is voluntary. Refusal to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled, and the subject may discontinue participation at any time without penalty or loss of benefits to which the subject is otherwise entitled. Should significant new findings develop during the course of the research which may relate to the subjects' willingness to continue participation, that information will be provided to the subject.

12. SUBJECT'S RIGHT TO PRIVACY:

Records that you give us permission to keep, and that identify you, will be kept confidential as required by law. The results of the study may be published. The privacy of subjects will be protected and subjects will not be identified in any way in published results. The research team will make every effort to keep your information confidential. For example, your identity will be kept confidential by not writing your name on any of the materials, destroying all references to participants' names after publishing the study or within three years of completing the study, and not allowing access to data by any persons other than those running the study. While every effort will be made to maintain your privacy, absolute confidentiality cannot be guaranteed. Records will be kept private to the extent allowed by law.

13. FINANCIAL INFORMATION:

Participation in this study will not result in any extra charges above and beyond those routinely incurred by patients with similar conditions.

- A) There will be no payment for participating in this study.
- B) There will be no costs for participating in this study.

14. SIGNATURES

The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Institutional Review Board, (225) 578-8692. I agree to participate in the study described above and acknowledge the investigator's obligation to provide me with a signed copy of the consent form.

Signature of Subject

Date

Signature of Witness

Date

Demographic Questionnaire

- 1) **Age:** _____
- 2) **Gender:** M / F
- 3) **Race:** W / B / O
- 4) **Height:** _____
- 5) **Weight:** _____
- 6) **Marital Status:** _____
- 7) **Educational Level:** ____ years
- 8) **Chronic Diseases:** _____

- 9) **Monthly Household Income:** 0-1000 / 1000-2000 / 2000+

Physical Activity Stages of Change Questionnaire

For each of the following questions please circle Yes or No. Please be sure to read the questions carefully.

Physical activity or exercise includes activities such as walking briskly, jogging, bicycling, swimming, or any other activity in which the exertion is at least as intense as these activities.

1) I am currently physically active. **NO YES**

2) I intend to become more physically active in the next 6 months. **NO YES**

For activity to be regular, it must add up to a total of 30 minutes or more per day and be done at least 5 days per week. For example, you could take one 30-minute walk or take three 10-minute walks for a daily total of 30 minutes.

3) I currently engage in regular physical activity. **NO YES**

4) I have been regularly physically active for the past 6 months. **NO YES**

Self Efficacy Questionnaire

Physical activity or exercise includes activities such as walking briskly, jogging, bicycling, swimming, or any other activity in which the exertion is at least as intense as these activities.

Circle the number that indicates how confident you are that you could be physically active in each of the following situations:

1 = not at all confident
2 = slightly confident
3 = moderately confident
4 = very confident
5 = extremely confident

- | | | | | | |
|----------------------------------|---|---|---|---|---|
| 1) When I am tired. | 1 | 2 | 3 | 4 | 5 |
| 2) I am in a bad mood. | 1 | 2 | 3 | 4 | 5 |
| 3) I feel I don't have the time. | 1 | 2 | 3 | 4 | 5 |
| 4) I am on vacation. | 1 | 2 | 3 | 4 | 5 |
| 5) It is raining or snowing. | 1 | 2 | 3 | 4 | 5 |

Weekly Leisure Time Exercise Questionnaire

1. Considering a 7-day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time? Write the appropriate number in each circle.

	Times Per Week
a. STRENUOUS EXERCISE (heart beats rapidly) (i.e. running, jogging, soccer, football, hockey, basketball, judo, roller skating, vigorous swimming, vigorous bicycling)	<input type="text"/>
b. MODERATE EXERCISE (not exhausting) (i.e., fast walking, baseball, tennis, dancing volleyball, easy bicycling, easy swimming)	<input type="text"/>
c. MILD EXERCISE (minimal exercise) (i.e., easy walking, yoga, fishing, bowling, horseshoes, golf)	<input type="text"/>

2. Considering a 7-day period (a week), during your leisure time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)? Please circle the appropriate answer.

OFTEN

SOMETIMES

NEVER/RARELY

Decisional Balance Measure

To what extent will the following ideas influence your decision to do regular physical activity over the next 6 months?

Remember, we are not asking you how much you agree or disagree with these statements, but rather how much each may influence your decision to do regular physical activity over the next 6 months.

		Not at all	A little	Somewhat	Quite a lot	Very much
1.	Physical activity would help me reduce tension or manage stress.	1	2	3	4	5
2.	I would feel more confident about my health by getting regular physical activity.	1	2	3	4	5
3.	I would sleep better.	1	2	3	4	5
4.	Physical activity would take too much of my time.	1	2	3	4	5
5.	I would have less time for my family and friends if I participated in physical activity.	1	2	3	4	5
6.	I'd be too tired to get physical activity because of my other daily responsibilities.	1	2	3	4	5
7.	Physical activity would help me have a more positive outlook.	1	2	3	4	5
8.	Physical activity would help me control my weight.	1	2	3	4	5
9.	I'd worry about looking awkward if others saw me being physically active.	1	2	3	4	5
10.	Participating in physical activity would cost too much money.	1	2	3	4	5
11.	Regular physical activity would cause me injury.	1	2	3	4	5

Short Form Version of Marlowe-Crowne Social Desirability Scale

For each of the following questions, please circle "Yes", "No", or "Not Sure".

1. Have there been occasions when you took advantage of someone?

Yes No Not sure

2. Have you sometimes taken unfair advantage of another person?

Yes No Not sure

3. Are you always willing to admit when you make a mistake?

Yes No Not sure

4. Are you quick to admit making a mistake?

Yes No Not sure

5. Do you sometimes try to get even rather than forgive and forget?

Yes No Not sure

6. Do you sometimes feel resentful when you don't get your own way?

Yes No Not sure

7. Are you always courteous, even to people who are disagreeable?

Yes No Not sure

8. Are you always a good listener, no matter whom you are talking to?

Yes No Not sure

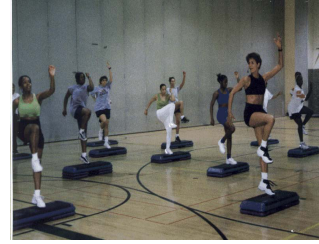
Example of Stage Matched Physical Activity Intervention Materials

Dear Mrs. Johnson,

Thank you so much for your time and effort in filling out the questionnaires on physical activity earlier this week at Earl K. Long Hospital! I really appreciate your help. When we met in the hospital, I said that I would look over your answers and send you some helpful information on physical activity in the mail. Your answers indicated that you are exercising on a regular basis. Way to go! I am enclosing some information that I hope will help you to keep up the good work and overcome any problems you may face in the future.

GOOD JOB!

You have made moving around more a regular part of your life! Moving around regularly is important for everyone. Let's think about all the good things moving around brings you!



Feeling Better..

- It gives you more energy
- It helps you sleep
- It helps you to relax

Improved Health..

- It controls your weight
- It controls your blood pressure and cholesterol
- It reduces your risk of heart disease and stroke
- It prevents bone loss (osteoporosis)
- It controls chronic conditions like arthritis
- It adds years to your life

Better State of Mind..

- It reduces stress and anxiety
- It improves concentration
- It can help you feel better about yourself



LET'S

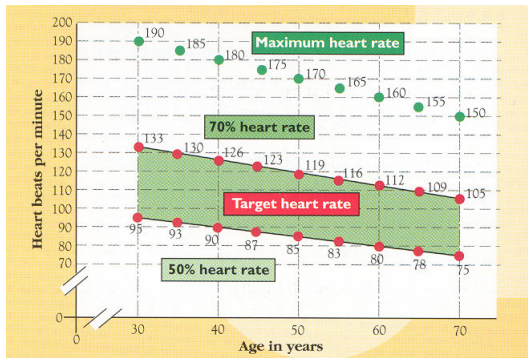
KEEP

MOVING!

HAVE YOU GOT IT RIGHT?

How long and how often should you be moving around? Medical experts suggest moving around for at least 30 minutes a day on most days of the week. The goal is to get your heart beating faster, but this doesn't have to involve puffing, panting or even sweating. Walking, swimming, mowing the lawn, & dancing are good examples of ways to move around more. The more activity you do the better off you will be!

HOW HARD SHOULD YOU BE EXERCISING?



Try to keep your heart rate level above 50% and below 70% of your maximum heart rate when moving around. For example, if you are 45, then you want to increase your heart rate to above 87 and below 123 beats per minute (that's between 50% and 70% of the maximum rate of 175 for 45 years old)

HOW DO YOU ESTIMATE YOUR HEART RATE?

- Place your 1st and 2nd finger on the thumb side of your wrist (or on your neck half way between your chin and ear) then press lightly until you feel a throb or beat
- Look at your watch or clock that shows the seconds and count the beats you feel under your fingers for 10 seconds
- Multiply the beats you counted by 6 for your heart rate per minute

It's a good idea to notice how your body is feeling when you're moving around-stop if you feel sick or dizzy

LET'S
KEEP
MOVING!

BE ACTIVE SAFELY!!

Wear comfortable clothes and supportive shoes

- Loose fitting clothes will allow you to move freely and not get too hot
- Comfortable, supportive shoes will help prevent blisters and muscle pain

Warm up and cool down

- Take 5 minutes to warm up and cool down before and after you move around
- Do some stretches to help you avoid injury

Drink enough water

- Drink lots of water before, during, and after moving around (even if you're not thirsty or sweating)

Set the right pace

- You should be able to talk without losing your breath when you are moving around, but not be able to sing.

Build up your activity slowly

- Increase how much activity you do in small amounts
- Remember to not overdo it, especially if you're feeling sore or recovering from an injury

Note: Talk to your doctor before you start doing more activity than you are used to, especially if you have a chronic disease or are worried about the risks.



HOW TO STAY ON TRACK!

Even people who have been moving around on a regular basis for a long time can get off track! The trick is to try again! Take steps to get back into your routine. Here are some tips on getting around some common barriers



LET'S
KEEP
MOVING!

SET SMALL, EASY GOALS

- Easy, short term goals will help you keep to going and make you feel confident.
- After a break from moving around, setting new goals is a good way to get back into the habit!

REWARD YOURSELF

- Reward yourself when you reach your goal for moving around. For example, watch your favorite movie, take a nice long relaxing bath, or read an interesting magazine or book

MOVE AROUND WITH SOMEONE

- This will help you stick with it and have more fun!



CHANGE IT UP!

- Move around at different times and places!
- Pick new activities-It'll keep it interesting! Try dancing, golf, walking with the family, play Frisbee in the park

MAKE IT EASIER ON YOURSELF!

USE REMINDERS

- Place notes around the house, on the fridge, and in your car to help you remember to move around more
- Put your workout clothes and shoes out the night before so you will be reminded to move around when you see them

GET INTO THE HABIT

- Move around at the same times each week

PAT YOURSELF ON THE BACK

- Look at how far you've come!



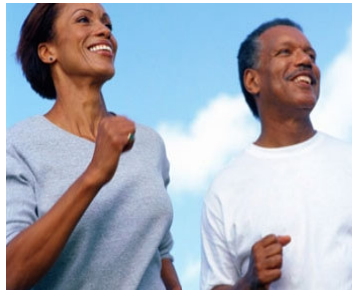
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LET'S
KEEP
MOVING!

This information is designed to help you keep moving around on a regular basis. Please use it to overcome any barriers to moving around on a regular basis you may face in the future. If you would like more information on how to become more physically active, you can also call me (Dori Whitehead) at 358-1105. I will be glad to provide more information on the benefits of physical activity.



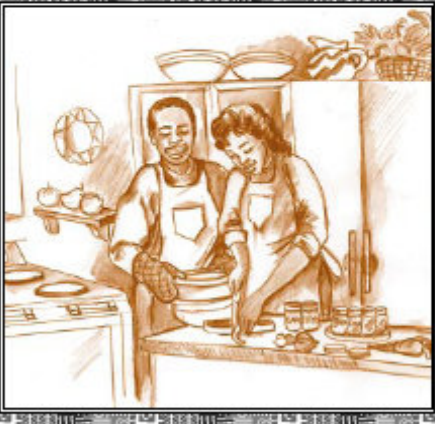
Thanks again,

Dori Whitehead, MA

Low Sodium Diet Materials

Spice Up Your Life!

Eat Less Salt and Sodium



**NATIONAL INSTITUTES OF HEALTH
NATIONAL HEART, LUNG, AND BLOOD INSTITUTE
AND OFFICE OF RESEARCH ON MINORITY HEALTH**

Why should you eat less salt and sodium?

You should cut back on salt and sodium in your diet to help prevent or lower high blood pressure. If you have high blood pressure lowering it can reduce your chances of heart disease and stroke.



Did you know....

Table salt is made up of two compounds—sodium and chloride. Most of the sodium in your diet comes from processed foods. The remaining comes from the salt added at the table, and salt added while cooking. Limit the amount of sodium that you consume from all these sources to no more than 2,400 milligrams (mg) each day which is equal to about 1 teaspoon of salt.



2

Tips to Eating Less Salt and Sodium

Be a smart shopper.

- Read the food label to find out more about what is in the foods you eat. This will help you choose foods to limit the amount of sodium you eat to 2,400 mg each day.

Nutrition Facts	
Serving Size: 1 cup (228 g)	
Serving Per Package: 2	
Amount Per Serving	
Calories 200 Calories from Fat 120	
% Daily Value*	
Total Fat 13g	25%
Saturated Fat 6g	10%
Cholesterol 20mg	10%
Sodium 600mg	12%
Total Carbohydrate 21g	10%
Dietary Fiber 5g	10%
Protein 5g	
Vitamins A, C, E • Vitamins B, K	
Calcium 10% • Iron 4%	
*Percent Daily Values are based on a diet of other people's misdeeds.	
	Calories: 200 100
Sodium	1000mg 20%
Cholesterol	20mg 4%
Saturated Fat	6g 12%
Total Carbohydrate	21g 7%
Dietary Fiber	5g 10%
Calories per gram:	
Fat 9 • Carbohydrate 4 • Protein 4	



- Size up your food. Compare the amounts you will eat to the serving size given. If you eat 2 cups and the serving size is 1 cup, you have to double the amounts of nutrients and calories listed.
- Read the nutrition information. Use the Percent Daily Value to compare the amount of sodium among brands. Choose those foods that have lower values. One serving of this product contains 28 percent, or about 1/4 of the amount of sodium you should have for the entire day.

- Buy foods with these claims more often. The food label may include terms such as:
 - sodium free
 - very low sodium
 - low sodium
 - reduced (or less) sodium
 - light in sodium
 - unsalted


3

Choose More Often:


- Chicken and turkey (take off skin)
- Lean cuts of meat
- Fish: Fresh or frozen
- Skim or 1% milk, evaporated skim milk
- Cheese: lower or reduced in sodium
- Loaf breads, dinner rolls, English muffin, bagels, pita, and salt-free chips
- Cereals: some hot cereals and some ready-to-eat cold cereals lowest in sodium*
- Plain rice and noodles
- Fresh, frozen, or no salt added canned vegetables
- Fruits
- Soups: lower or reduced in sodium
- Margarine, vegetable oils
- Spices, herbs, and flavorings like oregano, garlic powder, onion powder, salt free seasoning blends, vinegar, and fruit juices

4




Choose Less Often:



- Hogwarts, ribs, and chitterlings
- Smoked or cured meats like bacon, bologna, hot dogs, ham, corned beef, luncheon meats, and sausage
- Canned fish like tuna, salmon, sardines, and mackerel**
- Buttermilk*
- Most cheese spreads and cheeses
- Salty chips, nuts, pretzels, or pork rinds
- Some cold (ready to eat) cereals highest in sodium, instant hot cereals
- Quick cooking rice and instant noodles, boxed mixes like rice, scalloped potatoes, macaroni and cheese,** and some frozen dinners, pot pies and pizzas*
- Regular canned vegetables**
- Pickled foods like herring, pickles, relish, olives, or sauerkraut
- Regular canned soups, instant soups
- Bacon, fatback, and salt pork
- Soy sauce, steak sauce, salad dressing, ketchup, barbecue sauce, garlic salt, onion salt, seasoned salts like lemon pepper, bouillon cubes, meat tenderizer, and monosodium glutamate (MSG)*

*Use of the food listed to choose lower sodium is optional.
**Choose canned fish or vegetables before using.
***Choose low-sodium or no-salt-added, 1 percent or less fat with oil to use in cooking to replace whole salt or fat.
****Use dry cooking sherry and prepare with low salt, if possible.

5




Go easy in the kitchen.

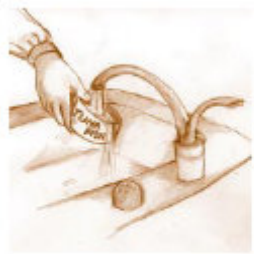
- Use less salt and seasoned salt when you cook.
- Use spices and herbs or low sodium seasonings like sodium free bouillon or onion powder, garlic powder, and sodium free seasoning blends.

Try these:


- Sprinkle lemon juice over vegetables.
- Season or marinate meat, poultry, and fish ahead of time with onion, garlic, and your favorite herbs before cooking to bring out the flavor.



- Take steps to make meals lower in salt and sodium.
- Use smoked or salt-cured meat products only in small amounts for flavoring.
- Prepare fresh lean pork roast instead of country ham.
- Rinse canned vegetables and fish such as tuna to remove some sodium.



6




Take the lead at the table.


- Remove the salt shaker. Keep the pepper shaker.
- Taste the food first. If you must add salt, use one "shake" instead of two or more.
- Cut down on the amount of salty prepared sauces or condiments you use.

Be in control at the restaurant.

- Choose foods without sauces. If you prefer, ask for sauce and salad dressing to be served "on the side."
- Ask for your meal to be prepared without salt or monosodium glutamate (MSG). Then if you must, you can add a small amount of salt.




7

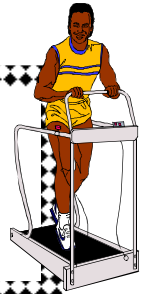
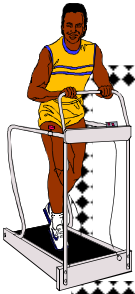


Check the things you will do to eat less salt and sodium.

- Read food labels. Choose foods that have the lowest Percent Daily Value for sodium. Also buy foods that are labeled "reduced sodium," "low sodium," "sodium free," or "no salt added."
- Buy fruits and vegetables for snacks. Choose chips, crackers, or nuts that are lower in sodium.
- Take the salt shaker off the table.
- Choose no salt added regular canned vegetables, vegetable juices, soups, sauces, and gravies. Most frozen vegetables without sauces are low in sodium.
- Choose fresh or frozen lean cuts of meat, fish, and poultry.
- Season your food with herbs and spices instead of salt.



80



LET'S GET MOVING!!

(Physical activity ideas for people who like to have fun!)

Newsletter #2

Welcome to the 2nd Let's Get Moving Newsletter!! Each month we will highlight creative, fun ways to be active in the lovely state of Louisiana.

**All the activities will be easy, enjoyable, & low cost.....
so give them a try!!**

TIP OF THE MONTH

Want to move around more during the summer, but it's just too hot? Hop in a pool!! If you live near BR, you can go swimming at the BREC pools for \$1.25 per person. Bring a friend to play with, or maybe even the kids or grandkids. Be active while having fun & keeping cool!!

Brooks Park Pool

1650 Fannie St. 387-9488

Public Hours: 1:00-5:00 p.m., Saturday-Thursday

Howell Park Pool

5509 Winbourne Ave. 357-8332

Public Hours: 1:00 p.m.-5:00 p.m., Saturday-Thursday

Barringer Road Pool

7401 Barringer Rd. 751-3733

Public Hours: 2:00-7:00 p.m., Saturday-Thursday

Gus Young Pool

4201 Gus Young Ave. 926-0588

Public Hours: 2:00-5:30 p.m., Monday-Thursday
1:00-5:00 p.m., Saturday and Sunday

Anna T. Jordan Pool

1750 Stilt St. 775-9284

Public Hours: 2:00-5:30 p.m., Monday-Thursday
1:00-5:00 p.m., Saturday and Sunday

Webb Park Pool

1351 Country Club Dr. 381-9725

Public Hours: 3:00-5:00 p.m., Monday-Thursday
1:00-6:00 p.m., Saturday and Sunday

Jefferson Highway Pool

8133 Jefferson Hwy 926-9834

Public Hours: 2:00-6:00 p.m., Monday-Thursday
1:00-6:00 p.m., Saturday and Sunday





Why exercise in a pool?

Exercising in the water is comfortable, fun, and effective as a flexibility, strengthening, and aerobic activity. The buoyancy of the water takes weight off hips, knees, feet, and back. People who have trouble walking for endurance can usually do water exercises.

To get started, you could walk or jog in place in the water or stretch while holding on to the side of the pool. Or try a kickboard, a flat piece of styrofoam you hang on to so that you can kick without paddling or arm strokes. Of course, always check with your doctor before starting any new exercise program.

The Research.

A study published in the American College of Sports Medicine's journal, *Medicine and Science in Sports and Exercise*, found that water exercise improved the health of elderly participants. In the study, women between the ages of 60 and 75 years were divided into two groups: one group participated in water exercise for 12 weeks, while the other didn't.

The health benefits for those who exercised in water included:

- Increased muscle strength
- Improved oxygen intake
- Greater flexibility
- Loss of excess body fat
- Increased agility
- No exercise-related injuries



HEART HEALTHY COOKING
(That really does taste good!!)

Welcome to the 3rd Heart Healthy Cooking newsletter!!
2 fun, new recipes will be featured each month!
All the recipes are low sodium/low fat AND tasty...so give them a try!

Spicy Ginger / Orange Chicken

4 servings

30 minutes 5 mins prep

1/2 cup orange marmalade

1/2 cup orange juice

1/2 teaspoon fresh ginger, grated

1 tablespoon Dijon mustard

1/4 teaspoon Tabasco sauce (or more)

pepper

2 boneless skinless chicken breasts

1. Heat oven to 350F degrees
2. Blend together all the ingredients except the chicken.
3. Brush the breasts all over with the marmalade mixture.
4. Place in a baking dish lined with foil (easy cleanup).
5. Bake for 20-25 minutes until done, basting every 8 minutes.
6. If there is any sauce left, heat, and serve along side the chicken.
7. Serve.



Nutrition Facts

Calculated for 1 serving (94g)
Recipe makes 4 servings

Calories 179

Calories from Fat 8 (4%)

Amount Per Serving	%DV
Total Fat 0.9g	1%
Saturated Fat 0.2g	1%
Polyunsat. Fat 0.2g	
Monounsat. Fat 0.3g	
Trans Fat 0.0g	
Cholesterol 34mg	11%
Sodium 103mg	4%
Potassium 234mg	6%
Total Carbohydrate 30.1g	10%
Dietary Fiber 0.5g	1%
Sugars 26.7g	
Protein 14.1g	28%
Vitamin A 105mcg	2%
Vitamin B ₆ 0.4mg	17%
Vitamin B ₁₂ 0.2mcg	3%
Vitamin C 18mg	30%
Vitamin E 0mcg	0%
Calcium 28mg	2%
Magnesium 22mg	5%
Iron 0mg	3%
Alcohol 0.0g Caffeine 0.0mg	

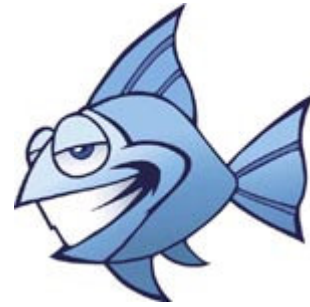
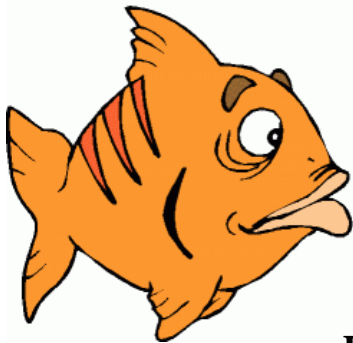


Orange Roughy with Veggies

6 servings

- 1 medium-size zucchini
- 1 small onion, sliced
- 1 cup mushrooms, sliced
- 3 lemon slices
- 1 tablespoon olive oil
- 1 tablespoon margarine
- 2 tablespoons parmesan cheese, grated
- 1/4 teaspoon pepper
- 1/8 teaspoon garlic powder
- 3 lbs orange roughy fillets

1. Saute zucchini, onion, mushrooms and lemon slices in olive oil and margarine until tender, about 3 min.
2. Remove lemon slices and set aside. Stir Parmesan cheese, pepper and garlic powder into vegetables.
3. Place fish in 13x9 sprayed with pan coating.
4. Top with vegetable mixture, put lemon slices on top, and bake at 375o F. until fish flakes easily, about 30 to 35 min.
5. Alternate fish: Red snapper, perch, catfish, flounder, or cod.



Nutrition Facts

Calculated for **1 serving** (293g)
Recipe makes 6 servings

Calories 230

Calories from Fat 56 (24%)

Amount Per Serving	%DV
Total Fat 6.3g	9%
Saturated Fat 1.0g	4%
Polyunsat. Fat 1.1g	
Monounsat. Fat 3.2g	
Trans Fat 0.0g	
Cholesterol 137mg	45%
Sodium 215mg	8%
Potassium 528mg	15%
Total Carbohydrate 3.2g	1%
Dietary Fiber 0.8g	3%
Sugars 1.4g	
Protein 38.9g	77%
Vitamin A 317mcg	6%
Vitamin B ₆ 0.2mg	11%
Vitamin B ₁₂ 0.9mcg	15%
Vitamin C 8mg	14%
Vitamin E 0mcg	2%
Calcium 48mg	4%
Magnesium 47mg	11%
Iron 2mg	14%
Alcohol 0.0g Caffeine 0.0mg	

Helpful Hints:

This is in no way intended to be a diet plan-we're just sharing some good recipes! Please consult your doctor before making changes in your diet. All the nutritional information & recipes were found on <http://www.recipezaar.com> -so please check out this helpful website, but let's take the nutritional information with a grain of salt. Speaking of salt-please be careful not to add sodium by salting!! Don't worry..these recipes have plenty of flavor!

Script For MI-Based Telephone Contact

- On a scale of 0-10 (with 10 being the highest), how interested are you in increasing your physical activity?
 - Why did you not choose a lower number, like a 1 or 2?
 - Why did you not choose a higher number?
 - Prompt to solve barriers
 - If none, ask permission to list solutions that have worked for other people
- On a scale of 0-10 (with 10 being the highest), assuming you wanted to, how confident are you that you could increase your physical activity?
 - Why did you not choose a lower number, like a 1 or 2?
 - Why did you not choose a higher number?
 - Prompt to solve barriers
 - Then, ask permission to list solutions that have worked for other people
- Select the 3 important values or goals from this list:
 - good parent
 - good husband/wife
 - good Christian
 - spiritual/religious
 - responsible
 - considerate
 - disciplined
 - independent
- Why is the value/goal important to you?
- How would increasing your physical activity help you achieve these goals or live out these values?

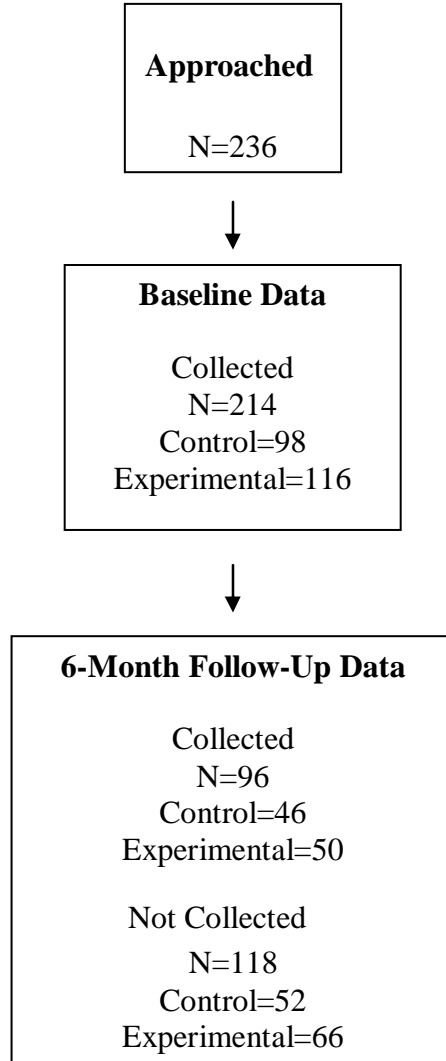
Appendix C: Tables and Figures

Demographic Characteristics of Participants (N=214)

Characteristic	N	%
Female	194	90.7%
African American	214	100%
Monthly Household Income		
\$0-1000	127	59.3%
\$1000-2000	71	33.2%
\$2000+	16	7.5%
BMI Category*		
Underweight	2	1.2%
Normal	25	16.1%
Overweight	35	22.6%
Obese	93	60%
Medical Diagnoses*		
Hypertension	105	67.3%
Hyperlipidemia	52	33.3%
Diabetes Mellitus	57	36.5%
Marital Status		
Divorced	31	14.5%
Married	54	25.2%
Single	102	47.7%
Separated	11	5.1%
Widowed	16	7.5%

*Data collected from reviews of 156 available medical charts

Participation Flow Chart



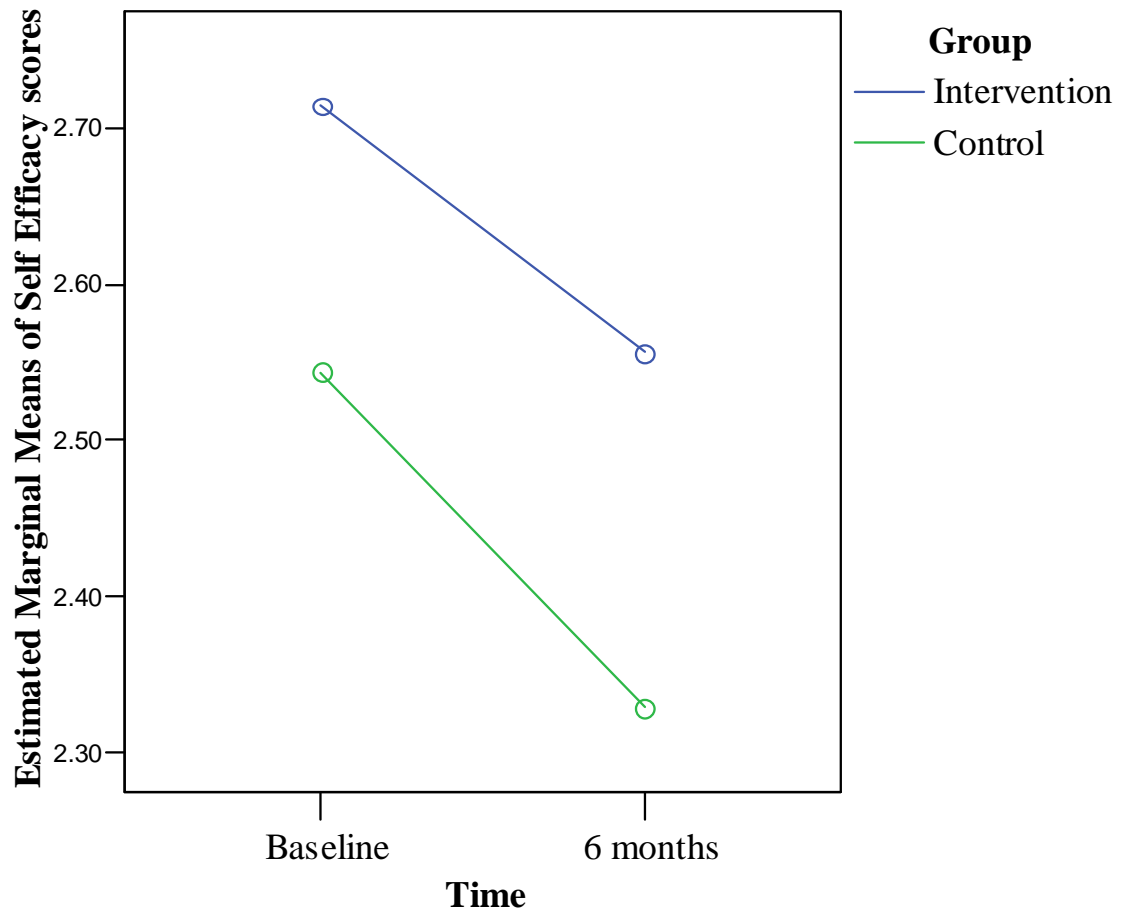
Movement Through Stages of Change at 6-Month Follow-Up

	Progression	Regression	Maintenance
Intervention *	17 (30.9%)	17 (30.9%)	21 (38.2%)
Control**	22 (53.7%)	12 (29.3%)	7 (17.1%)
Total	39 (40.6%)	29 (30.2%)	28 (29.2%)

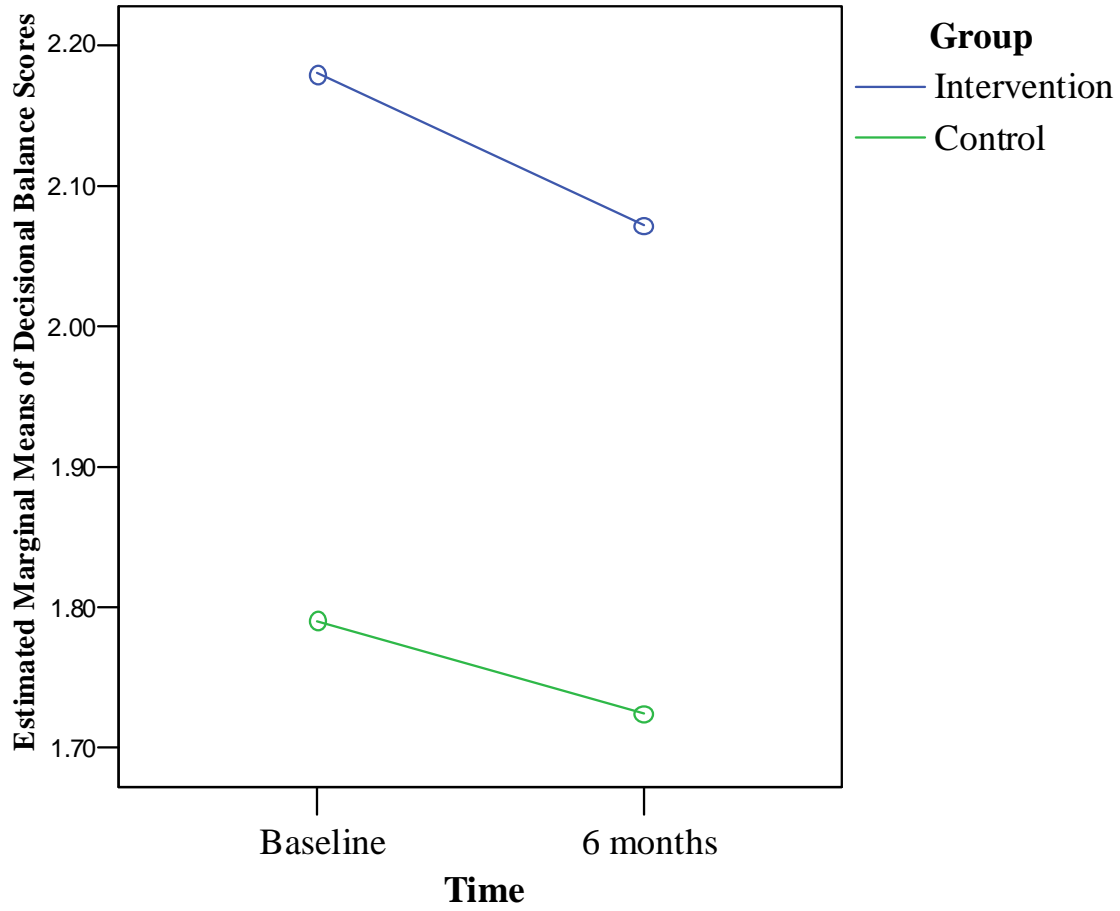
*McNemar's χ^2 , $p < 1.00$

**McNemar's χ^2 , $p < .12$

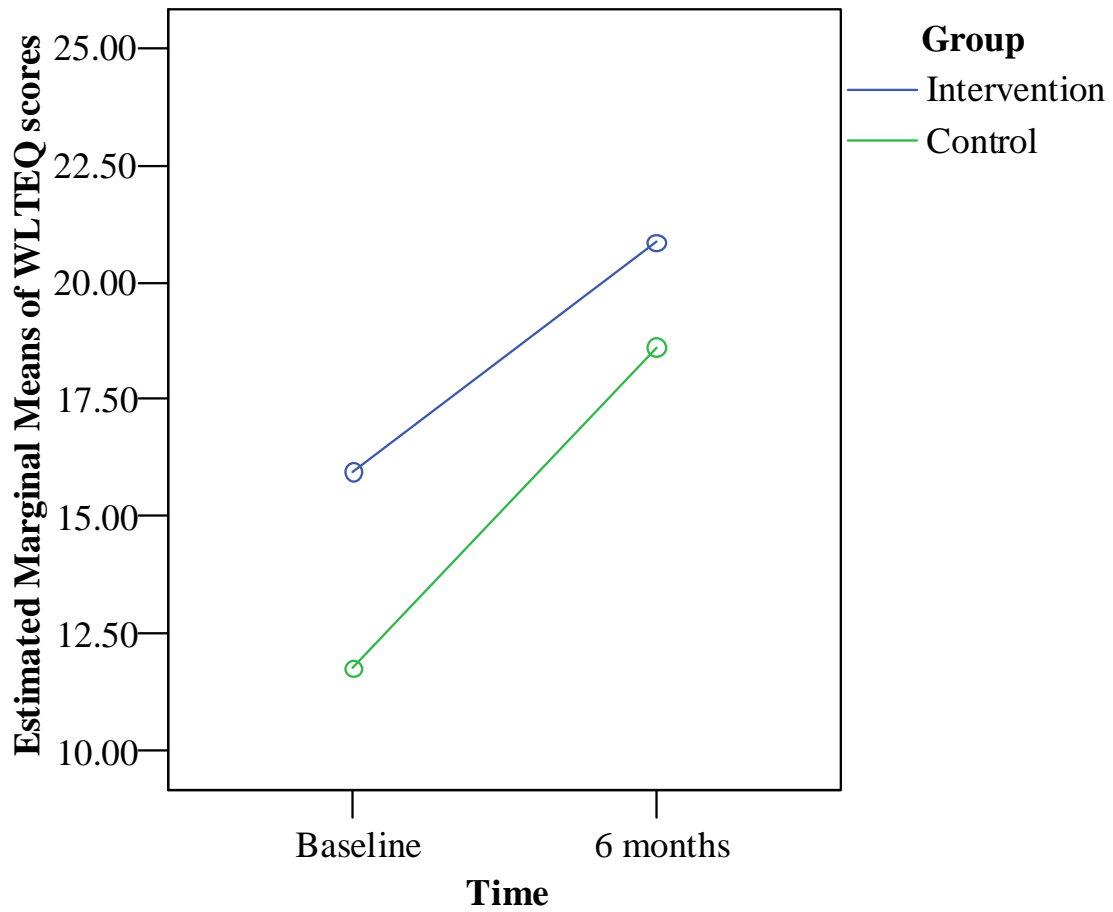
Changes in Self Efficacy Scores from Baseline to Six Months



Changes in Decisional Balance Scores from Baseline to Six Months



Changes in Self Reported Physical Activity from Baseline to Six Months



Vita

Dori Whitehead is originally from Montgomery, Alabama. After completing her undergraduate degree *magna cum laude* at the University of Alabama in 2002, Dori began her graduate training under Dr. Phillip J. Brantley in the clinical psychology doctoral program at Louisiana State University. Her research interests include physical activity promotion among underserved populations. Dori completed her master's degree at LSU in December 2004, clinical psychology predoctoral internship at Brown Medical School in June 2007, and will graduate from LSU with her doctorate in August 2007. Upon graduation, Dori will begin a NIH-funded postdoctoral fellowship in cardiovascular behavioral medicine research at Brown Medical School under the mentorship of Bess H. Marcus, Ph.D.