

CARDIOVASCULAR DISEASE PREVENTION IN WOMEN PRISONERS:  
THE STAY FIT AND HEALTHY INTERVENTION

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## ABSTRACT

OCTAVIA LYNNE FLANAGAN: Cardiovascular Disease Prevention in Women Prisoners:  
The Stay Fit and Healthy Intervention  
(Under the direction of Catherine Ingram Fogel, PhD)

This paper introduces a health promotion intervention originally designed as a control attention arm for the HOPE Project, an HIV prevention intervention clinical trial. This study will evaluate the efficacy of the Stay Fit and Healthy Intervention on decreasing cardiovascular risk. *Methods:* The Stay Fit and Healthy intervention was a nine session program which incorporated educational and behavioral strategies to increase healthy behaviors and decrease cardiovascular disease risk. Session topics included nutrition, increased physical activity, and blood pressure reduction through smoking cessation and relaxation techniques. *Aims:* The purpose of this secondary data analysis is to compare the changes in cardiovascular-related healthy behaviors of the women who received Stay Fit intervention with the women who received the primary intervention designed to reduce HIV risk behaviors. *Results:* Healthy behaviors in this sample were significantly related to higher social support scores at baseline. Unadjusted analysis revealed improvement in treatment group on limiting fast food at three months post release. Adjusted analysis showed trends toward healthy behaviors at three months. Smoking behaviors improved in both groups following release. The results from this study emphasize the need for future interventions specifically designed to decrease cardiovascular disease within the population of incarcerated women.

## **DEDICATION**

This work is dedicated in the loving memory of my father, David Lewis Blackwelder, who by example instilled in me the love of learning and the art of caring. His humility and grace have been a guiding light to me as I completed this journey; gifts I carry with me as I work with and care for a population of women that struggle to be acknowledged and accepted, despite their shortcomings. My work with these women has forever changed me and I dedicate this work and my future endeavors to giving these women a voice.

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## **CHAPTER 1**

### **INTRODUCTION**

American women experience a myriad of health problems that place them at risk for cardiovascular disease (Eckel, 1997; Banks, 2003; Ostchega, Yoon, Hughes, & Louis, 2008; Ogden, Carroll, McDowell, & Flegal, 2007; Freudenberg, Daniels, Crum, Perkins, & Richie, 2005; Erez, 2000; Douglas, Plugge, & Fitzpatrick, 2008; Spaulding et al., 2009; Durrah, 2005; Peterson & Johnstone, 1995). Women in prison have the same cardiovascular risks as women on the outside. In addition, women who are incarcerated also report lifestyle behaviors such as inactivity, poor nutrition, and smoking, which are risk factors for the development of both cardiac and peripheral vascular disease (Hall, Prendergast, Wellisch, Patten, & Cae, 2004; Khavjou et al., 2007; Douglas et al., 2008). These women report continuing these behaviors while in prison and beyond their release (Freudenberg et al., 2005; Hall et al., 2004; Erez, 2000; Spaulding et al., 2009; Durrah, 2005; Peterson & Johnstone, 1995). Many effective interventions have been developed to reduce women's risk of heart disease; however, this work has not been tested with women prisoners (Douglas et al., 2008). Previous intervention studies with women prisoners on behavioral change related to substance abuse and HIV prevention have been well received by inmates, and participants have shown significant changes in behavior and maintained the changes over time (Fogel & Beylea, 1999; Freudenberg et al., 2005; Erez, 2000; Centers for Disease Control and

Prevention, 1996; Fogel & Martin, 1992; Fogel, 1993; Cropsey, Weaver, Villalobos, Stitzer, & Best, 2008; Durrah, 2005).

Cardiovascular disease is the number one cause of death in all women in the United States (Eckel, 1997). The prevalence of cardiovascular disease in women prisoners has not been well studied; however, extrapolating from data on women in the general population, we know that women who are socially disadvantaged have a higher incidence of chronic illness and early death related to chronic illness, than do women of higher socioeconomic status and educational background. Incarcerated women suffer more poverty, are less educated than other women, and have been marginalized much of their lifetimes (Banks, 2003). Further, women of color are over-represented in US prisons (Banks, 2003).

Hypertension and obesity are the leading causes of cardiovascular disease in the US today (Eckel, 1997). Women with hypertension and women who are overweight are more likely to develop cardiovascular disease than are women with normal blood pressure and normal BMI (Oshtega et al., 2008; Ogden et al., 2007). Women of color have twice the rate of hypertension of white women; and are more than two times as likely to be categorized as obese as Caucasian women. Inactivity, diets high in fats and calories, and smoking are all accepted modifiable risk factors for hypertension and obesity. Women in prison have a disproportionately higher prevalence of smoking, diets high in fat and calories, and more sedentary lifestyle than do women in the general population (Banks, 2003). Most female prisoners will return to society following incarceration and re-enter the workforce and continue to be at high risk (Banks, 2003).

Smoking has been identified as two to four times more common among incarcerated women as the general population, with up to 91% of incarcerated women self-identified as

smokers, compared to 23% of women in the general population (Morrill, Mastroleni, & Leibel, 1998; St. Lawrence et al., 1997). Despite this disparity, few studies on smoking cessation in women prisoners have been tested. Currently, a large majority of prisons are “smoke free”, however over 97% of incarcerated female smokers will return to smoking following release (Morrill et al., 1998).

### **Study Purpose**

The Stay Fit and Healthy Intervention (Stay Fit) was developed as an attention control arm of an HIV prevention study conducted between 2003 and 2008 at the North Carolina Correctional Institution for Women (NCCIW) in Raleigh, NC. The proposed study was a secondary data analysis of the changes in behavior of the women who received Stay Fit, as compared to the women who received the primary intervention designed to reduce HIV risk. The variables of fast food intake, eating breakfast, physical activity, and cigarette smoking were explored using the Lifestyle Assessment Questionnaire (Martin et al., 2009) to determine whether women receiving Stay Fit intervention decreased their risk factors for cardiovascular disease after their release and maintained these changes over time significantly more than the comparison group who received the HIV Risk reduction intervention. In addition, we examined whether women with more social support improved in healthy behavior scores than women with less social support at baseline, and following intervention.

### **Conceptual Framework**

The theoretical framework for this study is based on the three major theories of behavior change in the literature of incarcerated women. Social support is a common thread within these theories. The Risk Reduction Model developed by Catania, Kegeles, and Coates

(1990; el-Bassel et al., 1995) is based on concepts within Social Cognitive Theory and the Health Belief Model (Catinia et al., 1990). This model focuses on changing behavior only after the person realizes the reality of his or her risk and perceives that risk as a problem for them (Catinia et al., 1990). Social support is identified as the construct of “help seeking” when persons believe they are at risk and utilize the support of others to adopt and maintain new behaviors which will reduce their risk (28). The Enhancement Model (el-Bassel et al., 1995; Tripodi, Bledsoe, Kim, & Bender, 2011) focuses on building coping skills to reduce HIV/AIDS risk through the “enhancement of personal awareness, problem-solving, and coping skills” (el-Bassel et al., 1995, p. 133) using social support. Therapeutic Community was originally developed as an addiction treatment model, based on abstinence and focusing on not only treatment but prevention of relapse (DeLeon, 1986). Therapeutic Community is the concept of addicts and non-addicts living together, as they do in prison, working together in a supportive role to encourage new healthy behaviors, free of substances. Gender specific interventions in this design have been shown to be more efficacious with women when they mirror the lives of other women and experiences (Morrill et al., 1998; Lichtenstein & Malow, 2010; el-Bassel et al., 1995).

Social Cognitive Theory assumes that in order to change an individual’s behavior, the interaction between environment, person, and behavior must be considered and appreciated as dynamic (Bandura, 1977). The three components of this interaction influence each other simultaneously (Baranowski, Perry, & Parcel, 2002). The tenets of the three main theoretical frameworks used to design effective interventions for women prisoners are all based on improving self-esteem and encouraging support from one’s environment to encourage behavior change.

## **Components of Manuscript**

Chapters 2, 3 and 4 are separate manuscripts of the literature review, methodology and findings from this secondary data analysis. Chapter 2, “Cardiovascular Disease Prevention in Women Prisoners: A Literature Review”, is a review of interventions with women prisoners aimed at reducing cardiovascular disease risk. Chapter 3, “Stay Fit and Healthy Intervention: Cardiovascular Disease Prevention in Women Prisoners”, is a manuscript describing the design and methods of the Stay Fit and Healthy Intervention. Chapter 4, “ A Secondary Data Analysis of Cardiovascular Disease Prevention Program in Women Prisoners”, reviews the implementation and findings from the secondary data analysis, along with results and significant findings for treatment effect. The final chapter includes a summary of the findings and implications for future research in cardiovascular disease prevention within the population of incarcerated women.

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## CHAPTER 2

### CARDIOVASCULAR DISEASE PREVENTION IN WOMEN PRISONERS: A REVIEW OF THE LITERATURE

*Incarcerated women have multiple risk factors for cardiovascular disease including inactivity, poor nutrition and smoking. The literature on cardiovascular disease in women prisoners is very sparse and there have been no studies testing the effectiveness of cardiovascular disease prevention directed at the general population of incarcerated women. This article focuses on the need for such intervention research, along with the few studies in the literature which have explored the need for such programs.*

American women experience a myriad of health problems that place them at risk for cardiovascular disease (Eckel, 1997; Ostchega, Yoon, Hughes, & Louis, 2008; Ogden, Carroll, McDowell, & Flegal, 2007). Women in prison have the same cardiovascular risks as women on the outside (Banks, 2003; Fogel, 1999; Hall, Prendergast, Wellisch, Patten, & Cae, 2004; Khavjou et al., 2007; Douglas, Plugge, & Fitzpatrick, 2008; Fogel & Martin, 1992; Fogel, 1993). In addition, women who are incarcerated report lifestyle behaviors such as inactivity, poor nutrition, and smoking, which are risk factors for the development of both cardiac and peripheral vascular disease (Hall et al., 2004; Erez, 2000; Khavjou et al., 2007). These women report continuing these behaviors while in prison and beyond their release (Fogel & Belyea, 1999; Fredenberg, Daniels, Crum, Perkins, & Richie, 2005; Hall et al.,

2004; Erez, 2000; Douglas et al., 2008; Fogel & Martin, 1992; Peterson & Johnstone, 1995).

Many effective interventions have been developed to reduce women's risk of heart disease;

however, this work has not been tested with women prisoners (Khavjou et al., 2007).

Previous intervention studies with women prisoners on behavioral change related to substance abuse have been well received by inmates, and participants have shown significant changes in behavior and maintained the changes over time (Fogel & Belyea, 1999; Hall et al., 2004; Centers for Disease Control and Prevention, 1996; Spaulding et al., 2009).

### **Cardiovascular Disease and Women Prisoners**

Cardiovascular disease, caused by atherosclerosis, is the number one cause of death in all women in the U.S. (Eckel, 1997). Atherosclerosis is a form of arteriosclerosis, which is a chronic disease of the arterial system with abnormal thickening and hardening of vessel walls. In atherosclerosis, soft deposits of intra-arterial fat and fibrin harden over time, causing the lumen of the vessel to become smaller (McCance & Huether, 2002). At the cellular level, inflammatory processes resulting in endothelial injury causes the formation of fibrotic plaque in the arteries, leading to limited blood flow to the tissues. The major causes of endothelial injury include: hypertension, cigarette smoking, hyperlipidemia, toxins and viruses, along with immune reactions. The treatment of atherosclerosis focuses on the restoration of blood to affected tissues, removal of vessel damage, and prevention of progression of the complicated lesion produced by the fibrotic plaque. In addition to pharmacological measures, atherosclerosis is treated by lifestyle measures to remove the causes of endothelial injury. Some of these measures include: smoking cessation, obesity management and prevention, control of hypertension and diabetes, as well as lowering LDL levels. Goals of dietary treatment include the reduction of calories from fat to less than 30%

of total caloric intake, with only 10% of that fat intake coming from animal sources, in the form of saturated fat (McCance & Huether, 2002).

The prevalence of cardiovascular disease in women prisoners has not been well studied; however, extrapolating from data on women in the general population, we know that women who are socially disadvantaged have a higher incidence of chronic illness and early death related to chronic illness, than do women of higher socioeconomic status and educational background (Banks, 2003). Incarcerated women suffer more poverty, are less educated than other women, and have been marginalized for a majority of their lifetime (Banks, 2003).

Hypertension and obesity are the leading causes of cardiovascular disease in the US today (Eckel, 1997). Women with hypertension and women who are overweight are more likely to develop cardiovascular disease than are women with normal blood pressure and normal BMI (Ostchega et al., 2008; Ogden et al., 2007). Women from ethnic minorities have twice the rate of hypertension of white women; and are more than two times as likely to be categorized as obese as Caucasian women. Further, women from ethnic minorities are over-represented in US prisons (Banks, 2003).

Women from ethnic minorities suffer more poverty and lower educational status than white women (Fogel, 1993; Clark, Fong, & Romans, 2011). In addition, the health disparities between whites and women from ethnic minorities are numerous including a 33% higher mortality rate from breast cancer and heart disease, lower life expectancy by 6 years, obesity rates of 40% compared to 31% in white women and women of color are 2 to 4 times more likely to develop diabetes (Clark et al., 2011).

Inactivity, diets high in fats and calories, and smoking are all accepted modifiable risk factors for hypertension and obesity (Fogel & Belyea, 1999). Women in prison have a disproportionately higher prevalence of smoking, diets high in fat and calories, and more sedentary lifestyle than do women in the general population (Banks, 2003). These women will return to society following incarceration, re-enter the workforce and if they continue high risk behaviors will likely develop cardiovascular disease. Prevention care has been shown to be effective (Finkelstein, 2004) and can save society billions in lost productivity revenue (Cohen, Neumann, & Weinstein, 2008).

Smoking has been identified as two to four times more common among incarcerated women as the general population, with up to 91% of incarcerated women self-identified as smokers, compared to 23% of women in the general population (Cropsey et al., 2008; Durrah, 2005). Despite this disparity, few studies on smoking cessation in women prisoners have been tested (Cropsey, Weaver, Villalobos, Stitzer, & Best, 2008; Durrah, 2005). Currently, a large majority of prisons are “smoke free”, however over 97% of incarcerated female smokers will return to smoking following release (Cropsey, Weaver, Villalobos, Stitzer, & Best, 2008).

### **Method of Literature Review**

Articles were selected for review using a computer search of Medline (PUBMED), Cumulative Index to Nursing and Allied Health Literature (CINAHL), and PsychINFO comprehensive databases. Published research articles for intervention studies with women prisoners were reviewed between January 1995 and June 2011. The initial search terms used together and separately were: health behavior, women prisoners, cardiovascular disease,

health promotion, education, intervention, diet, exercise, physical activity, and smoking cessation.

A search for exercise or smoking cessation or diet yielded over 200,000 results, but when limited to prisoners, retrieved only 5 results. Health behavior and prisoners had high yields but when combined with intervention and women, only 8 results remained. From those eight studies, only two examined cardiovascular risk factors in women prisoners, the remaining six studies were eliminated as they examined either HIV prevention or substance abuse treatment.

Since the body of literature on cardiovascular disease prevention within the population of incarcerated women is so limited, a sampling of interventions for women in the general population was retrieved from CINAHL to explore published research currently conducted with women and cardiovascular disease prevention. This search was helpful to identify commonly examined health outcomes, successful intervention approaches, and theoretical frameworks used in health promotion interventions designed to decrease cardiovascular risk. Search terms used in combination included: cardiovascular disease prevention, interventions, and women. 23 articles were retrieved and the five articles presented in Table 2.1 were examined. The remaining 18 articles were excluded because they did not test interventions or were examining populations of women outside of the United States.

Common findings in the studies examined included significant increases in knowledge following intervention and improved blood pressure and lipid levels. Body weight was measured in a few of the studies and did not show significant reductions, however. Programs that incorporated traditional cultural components to the intervention were better

received and had higher attendance rates. Participants were motivated to change with incentives and with instructional materials given to them by intervention staff. In the studies that measured awareness of cardiovascular disease risks, interventions improved awareness significantly.

### **Cardiovascular Disease Prevention Interventions**

Khavjou et al. (2007) examined the benefits of using the WISEWOMAN program, an intervention designed to decrease cardiovascular disease risk in lower socioeconomic women, with a population of incarcerated women in a South Dakota prison. The researchers concluded that there is a significant need for cardiovascular disease screening and education programs in women's prisons, and that these programs also could improve planning for release and referrals to community health providers for women who need them.

The effectiveness of the WISEWOMAN intervention has not been tested with women prisoners. In the Khavjou et al. study (2007), the researchers were exploring if such an intervention might be beneficial for incarcerated women, not actually testing its effectiveness in preventing cardiovascular disease. However, data on numerous intervention studies dedicated to behavioral change related to substance abuse and HIV prevention in women prisoners have been favorable (Hall et al., 2004; Centers for Disease Control and Prevention, 1996; Peterson & Johnstone, 1995; Ferszt, Salgado, DeFedele, & Leveillee, 2009). For example, Hall and colleagues (2004) examined the effectiveness of the Forever Free Program, a cognitive behavioral intervention designed to treat substance abuse, for incarcerated women (Hall et al., 2004). Incarcerated women with a history of drug abuse were randomized into control and treatment groups, and those who received the intervention had significantly fewer arrests, less drug use and greater employment than those who did not

receive the intervention. The Forever Free Program was offered to female addicts in prison near the time of their scheduled release, lasted for six months and included treatment services once released into the community. The focus of the intervention was on relapse prevention, teaching skills and strategies to incorporate the new behavior of abstinence and avoiding relapse in order to maintain behavior change over time. This study pointed to the importance of social support in prison and on the outside in facilitating maintenance of behavior change. Studies on smoking cessation in the general population and with women prisoners have also supported the need for social support and goal setting, along with follow-up on behavior change maintenance, as essential elements of interventions (Tibbs & Haire-Joshu, 2002).

In 1994, Peterson and Johnstone explored the effectiveness of a wellness program entitled: “The Atwood Hall Health Promotion Program” at the Federal Medical Center in Lexington, Kentucky. The program was offered to women prisoners at the Atwood Hall residential treatment program, where they were receiving treatment for substance abuse and addiction. The premise of the study was to provide a holistic program of treatment for these women, not only focusing on their recovery from drugs, but also incorporating other healthy lifestyle behavior changes. Peterson and Johnstone used a mixed method approach in their quasi-experimental, pretest-posttest study design. The rationale for including a health promotion program within a substance addiction treatment program was supported by the literature, which shows increased wellbeing physically and mentally of physical activity and other healthy lifestyle behaviors (Martin et al., 2009; Fisher & Hatton, 2009; Ferszt et al., 2009). The cognitive-behavioral approach, used at Atwood Hall for substance abuse treatment, was used as the framework for this health promotion program. The Atwood Hall Substance Abuse Program utilized the concepts of self efficacy and self monitoring in relapse



prevention, and Peterson used the same constructs for the participants in the health promotion program. Participants were encouraged to use self efficacy and self monitoring measures to maintain their newly acquired health promotion behaviors. The intervention consisted of risk reduction and health promotion educational classes, as well as instructor-led exercise classes. Education classes were focused on health topics, nutrition and the benefit of exercise. A sample of 43 incarcerated women within this residential drug treatment program were enrolled in the health promotion intervention and pretest measures were compared to post test measures obtained following all sessions of the intervention. Results from the health and fitness assessment measured post intervention showed positive changes in all areas measured, with significant changes on means of diastolic blood pressure, aerobic capacity, number of pushups to fatigue, and number of sit-ups per minute. Qualitative data from focus groups of women who attended the health promotion program and were exiting the drug treatment program (n=22) were used to explore the components of the intervention and help to tailor the components to the population. Three general themes emerged from the focus groups: health awareness and consciousness, self-esteem, and relapse prevention with healthy lifestyle adoption. These findings supported the hypothesis that successful health related lifestyle modifications such as exercise, can heighten self efficacy and self awareness (Peterson & Johnstone, 1995). Additionally participants reported having camaraderie with the peer aerobics instructor, along with the other participants when attending exercise classes together providing support for the concept of social support as helping to improve self-awareness and self-efficacy (Peterson & Johnstone, 1995).

Table 2.2. summarizes the body of interventions studied in the population of incarcerated women targeting cardiovascular disease prevention.

## Critique of Literature

The current body of intervention literature with women prisoners does not include interventions designed specifically for the general population of women prisoners aimed at reducing heart disease risk. The work of Khavjou et al. (2007) have suggested a need for such an intervention in this vulnerable population (Douglas et al., 2008). Successful behavioral change interventions used with incarcerated women have been based on the Social Cognitive Theory and incorporated the concept of social support in their design (el-Bassel et al., 1995; DeLeon, 1986; Baranowski, Perry, & Parcel, 2002; Morrill, Mastroleni, & Leibel, 1998; St. Lawrence et al., 1997; Bandura, 1977; Catania, Kegeles, & Coates, 1990). The lifestyle behaviors of smoking, sedentary behavior, and poor nutritional habits have been identified as risk factors for heart disease (Ostchega et al., 2008; Freudenberg et al., 2005; Khavjou et al., 2007) and should be included in an intervention aimed at decreasing these risks. Female prisoners very often come from disadvantaged backgrounds (Fogel & Martin, 1992)) and the literature supports that vulnerable populations of women have high numbers of health risks, including cardiac illness (Eckel, 1997; Banks, 2003; Ostchega et al., 2008; Ogden et al., 2007). The economic impact of these risks is estimated to be over 200 billion dollars in treatment expenditures and lost productivity for heart disease alone (Milken Institute, 2011).

A cardiovascular risk reduction intervention designed for women prisoners based on a cognitive behavioral approach utilizing social support to encourage behavior change could be very effective in the high risk population of incarcerated women (el-Bassel, Ivanoff, Schilling, Born, & Gilbert, 1997; Tripodi, Bledsoe, Kim, & Bender, 2011; Lichtenstein & Malow, 2010; el-Bassel et al., 1995). Previous studies done with women prisoners have

shown that this population has numerous risk factors for cardiovascular disease (Freudenberg et al., 2005; Khavjou et al., 2007; Douglas et al., 2008; Spaulding et al., 2009) and that when these women are released from prison they will very likely develop chronic problems from these risk factors that will cost society in loss productivity and health care costs (Milken Institute, 2011). Substance abuse treatment and programs designed to reduce HIV/STD acquisition have had favorable results in women prisoners using a Cognitive Behavioral approach (el-Bassel et al., 1997; Tripodi et al., 2011; Lichtenstein & Malow, 2010; el-Bassel et al., 1995). Designing and evaluating the effectiveness of interventions aimed at cardiovascular risk reduction for women prisoners is a necessary and urgent issue to address in the public health of all citizens of this country.

Table 2.1

*Cardiovascular Disease Prevention Interventions for Women*

<b>Year of Publication</b>	<b>2010</b>	<b>2010</b>	<b>2010</b>	<b>2005</b>	<b>2004</b>
<b>Title</b>	Predictors of adherence to a Mediterranean-type diet in the PREDIMED trial	Outcomes of comprehensive heart care programs in high-risk women	The Office on Women’s Health Initiative to improve women’s heart health: program description, site characteristics and lessons learned	Development, adaptation, and implementation of a cardiovascular health program for Alaska Native women.	Health promotion interventions for disadvantaged women: overview of the WISEWOMAN projects
<b>Authors</b>	Zazpe, et al., 2010	Villablanca et al., 2010	Foody et al., 2010	Stefanich et al., 2005	Will, Farris, Sanders, Stockmyer, & Finkelstein, 2004
<b>Sample</b>	1048 men and women aged 55-80 with T2 DM and 3 or more CVD risk factors	1310 women at high risk for heart disease	6 different heart programs designed for women	44 healthy Alaska Native women aged 40-64.	8164 financially disadvantaged women aged 40-65
<b>Setting</b>	Clinical centers where men and women receive diabetes care	Hospitals, clinics, healthcare centers caring for women at high risk for heart disease	Heart Health Care programs in New York, Tennessee, Illinois, California, Minnesota, and Connecticut		Women enrolled in Breast and Cervical Cancer Screening programs in: California, North Carolina, Illinois, Iowa, Alaska, South

<b>Year of Publication</b>	<b>2010</b>	<b>2010</b>	<b>2010</b>	<b>2005</b>	<b>2004</b>
					Dakota, Massachusetts, Connecticut, Michigan, Nebraska
Variables	Changes in dietary goals: fruit consumption, vegetable consumption, fat intake ratio saturated vs unsaturated, simple sugar intake, meat consumption	Knowledge and awareness of cardiac event, physical activity, diet, smoking, body weight, BP, lipids	Focus of program	Acceptance of a healthy living intervention based on concepts of healthy eating, active living, stress management and tobacco cessation in this population	Objective measures: Blood pressure, lipid levels, and tobacco use. Self –reported: diet and physical activity, readiness for change, barriers to behavior change
Theoretical framework	None identified	Cognitive – Behavioral	None	Cognitive-Behavioral	Cognitive-Behavioral
Intervention components	Individual motivational interviews, group dietary education, written materials for food descriptions, shopping lists, meal plans, and recipes. Participants given mixed nuts and olive oil.	Heart health education, gender differences in CVD symptoms, risk factor prevalence, CVD as #1 killer of women. Heart healthy recipes and food preparation.	Pilot program to include five components: education and awareness, screening and risk assessment, diagnostic testing and treatment, lifestyle modification and rehab, tracking and evaluation	4 weekly sessions offered over 12 weeks. Topics included: physical activity, nutrition, traditional wellness, and tobacco information.	CVD screening and referral; Nutrition information; physical activity programs; coping strategies skill training; smoking cessation
Data	Self- reported	Baseline and 6	Over 12	Evaluation of	Baseline, 6 and

<b>Year of Publication</b>	<b>2010</b>	<b>2010</b>	<b>2010</b>	<b>2005</b>	<b>2004</b>
collection	dietary intake at baseline and 12 months after intervention	months post intervention	months in 6 centers. Baseline characteristics reported.	program following intervention	12 months post intervention
Outcomes	In men, positive dietary changes more frequent with those who had ate more meat and saturated fat/low consumption of fruits and vegetables at baseline; in women, positive dietary changes associated with being married and poor baseline dietary habits.	Significant increases in knowledge of CVD being #1 killer of women, of all S&S of cardiac event. Favorable changes in BP and lipids but not significantly. Results of physical activity and BMI were not favorable.	Women's heart programs focused on CVD prevention are feasible for delivering preventative strategies to high-risk women.	Themes/Lessons learned: using native traditions as a guideline for program components, having Native women on staff, using traditional wellness concepts improved attendance, incentives reinforced behavior change, use multi-disciplinary team approach, materials should be culturally sensitive and tailored.	Baseline data revealed 23% sample with hyperlipidemia, with 48% of the group as an initial diagnosis; 38% with hypertension (24% new diagnosis); 75% sample overweight or obese; 42% smokers. Post intervention outcomes increased amount of physical activity and improved nutrition but objective measures did not improve

Table 2.2

*Cardiovascular Disease Prevention Interventions for Incarcerated Women*

<b>Year of Publication</b>	<b>1995</b>	<b>2007</b>
Title	The Atwood Hall Health Promotion Program: Effects on Drug-Involved Federal Offenders	A Captive Audience: Bringing the WISEWOMAN Program to South Dakota Prisoners**
Authors	Peterson & Johnstone	Kahvjou et al.
Sample	43 incarcerated women in residential drug treatment program  42% White, 28% African American, 30% Hispanic	261 incarcerated women and 1427 low income, uninsured women from the general population in South Dakota  Incarcerated women: mean age 39, 56% white, 33% Native American, 4% African American, 6% Hispanic, over 50% finished high school  General Population of women in South Dakota: mean age 45, 77% white, 11% Native American, 8.5% Hispanic, over 50% finished high school
Setting	Federal medical center in Kentucky within federal correctional institution	South Dakota's Women's Prison
Variables	Health and fitness assessment: Body weight, resting heart rate, blood pressure, aerobic capacity, percent body fat, flexibility, push-ups to fatigue, and sit-ups per minute	Risk factor prevalence: hypertension, high cholesterol, smoking, obesity, awareness and treatment of hypertension and high cholesterol, attendance at intervention sessions

Theoretical Framework	Cognitive Behavioral approach to relapse prevention	Cognitive Behavioral approach to lifestyle behavior change
Intervention Components	<p>Initial health and fitness assessment</p> <p>Weekly 2 hour lecture/exercise sessions for at least 9 months</p> <p>Encouraged to participate in at least 2 exercise sessions a week and additional exercise on own.</p> <p>Lecture components: fat intake reduction, weight management, risk reduction for osteoporosis and arthritis, financial management, stress management and educational improvement</p>	<p>Risk factor assessment</p> <p>Referral services for treatment of identified conditions</p> <p>Lifestyle modification education classes. A total of 4 sessions are offered.</p>
Data Collection	<p>Pre and post intervention administration of Lifestyle Assessment Questionnaire</p> <p>Health and fitness assessment at baseline and following 9 month intervention</p> <p>Focus group to analyze behavioral and psychological effects from program- qualitative data from 22 subjects of study after completion</p>	<p>Baseline measures only on both groups for risk factor profile: blood pressure, total and HDL cholesterol levels, body weight , smoking status, medications taken for hypertension, BMI, levels of awareness of hypertension or high cholesterol (by asking subject if they had been told they had one or both of these conditions. Attendance at sessions was monitored and tallied</p>
Outcomes	<p>Significant decreases in diastolic BP. Significant increases in aerobic capacity, number of push-ups to fatigue and sit-ups in</p>	<p>Total cholesterol was the only risk factor identified as significantly different between groups: it was lower in the incarcerated subjects. Smoking levels</p>



	a minute	<p>were significantly lower in women prisoners, due to smoke free environment within the prison. No significant differences between groups on all other risk factor variables or on awareness of hypertension or high cholesterol.</p> <p>Incarcerated women attended an average of 1.9 educational sessions whereas general population averaged less than ½ session. 42% of inmates attended all 4 sessions whereas less than 4% of the general population completed intervention sessions.</p>
Limitations	<p>No control group</p> <p>Not tested on general prison population; limited to women in drug treatment program</p>	<p>Did not test effectiveness of educational sessions or risk factor assessment changes over time following sessions aimed at improving risk</p> <p>No control group</p> <p>Demographic representation can only generalize findings to South Dakota (or population with very low number of African Americans)</p>

*\*\*Not a clinical trial; paper discusses need for such a program in this population.*

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## CHAPTER 3

### STAY FIT AND HEALTHY INTERVENTION: CARDIOVASCULAR DISEASE PREVENTION IN WOMEN PRISONERS

*This paper introduces a health promotion intervention designed to decrease the risk of cardiovascular disease in women prisoners, originally designed as a control attention arm for the HOPE Project, which an HIV prevention intervention clinical trial. The Stay Fit and Healthy intervention was a nine session program which incorporated educational and behavioral strategies to increase healthy behaviors and decrease cardiovascular disease risk. Session topics included nutrition, increased physical activity, and blood pressure reduction through smoking cessation and relaxation techniques. The purpose of this secondary data analysis is to explore the changes in behavior of the women who received Stay Fit, as compared to the women who received the primary intervention designed to reduce HIV risk in order to determine whether women receiving Stay Fit intervention decreased their risk factors for cardiovascular disease after their release and maintained these changes over time significantly more than the comparison group who received the HIV Risk reduction intervention.*

Cardiovascular disease is the number one cause of death in women in the United States (Furie, et al, 2011). Incarcerated women in the United States suffer a variety of health problems which put them at risk for cardiovascular disease, including obesity, hypertension, hyperlipidemia, diabetes, and heart disease (Banks, 2003; Freudenberg, Daniels, Crum, Perkins, & Richie, 2005; Erez, 2000; Khavjou, Clarke, Hofeldt, Lihs, Loo, Prabhu, et al,

2007). The economic impact of these risks is estimated to be over 200 billion dollars in treatment expenditures and lost productivity for heart disease alone (DeVol, et al, 2011). The prevalence of cardiovascular disease in women prisoners has not been studied; however, we know that women in the general population who are socially disadvantaged have a higher incidence of chronic illness and early death related to chronic illness, than do women of higher socioeconomic status and educational background (Banks, 2003). Given that incarcerated women suffer more poverty, are less educated than the general population of women, and have been marginalized much of their lifetimes (Banks, 2003) suggest that they may experience more cardiovascular disease as well.

### **Risk Factors to Cardiovascular Disease and Women Prisoners**

Hypertension and obesity are the leading causes of cardiovascular disease in the United States today (Furie, et al , 2011). Inactivity, diets high in fats and calories, and smoking are all accepted modifiable risk factors for hypertension and obesity (Finkelstein, 2004). Women who are incarcerated report lifestyle behaviors such as inactivity, poor nutrition, and smoking, which are risk factors for the development of both cardiac and peripheral vascular disease (Freudenberg, Daniels, Crum, Perkins, & Richie, 2005; Erez, 2000; Khavjou, Clarke, Hofeldt, Lihs, Loo, Prabhu, et al, 2007). Women prisoners have a higher prevalence of smoking, diets that are high in fat and calories, and more sedentary lifestyle than do women in the general population (Banks, 2003). Despite this public health need, there are no studies designed for women prisoners in the literature since 1995 that are aimed at reducing these lifestyle risk factors. Prior to 1995, a study of weight gain and nutritional value for meals provided to incarcerated women was conducted (Shaw, Rutherford, & Kenny, 1985). It was not a health promotion intervention; however, it is of

note as it is the only study in the literature to explore weight and dietary behaviors of women prisoners. The women gained a mean of 14 pounds during incarceration and their dietary choices were lacking in nutritional value, as well as high in calorie and fat (Shaw, et al). Because of the limited research done in this area, incarcerated women do not receive the guidance they need at making healthy choices in lifestyle choices. In turn, most female prisoners will return to society following incarceration, re-enter the workforce and continue to be at high risk (Banks, 2003).

### **Review of the Literature**

Khavjou, and colleagues (2007) examined the benefits of using the WISEWOMAN program, an intervention designed to decrease cardiovascular disease risk in lower socioeconomic women, with a population of incarcerated women in a South Dakota prison (Khavjou, et al, 2007). The researchers concluded that there was a significant need for cardiovascular disease screening and education programs in women's prisons, and that these programs could also improve planning for release and referrals to community health providers for women who need them (Khavjou, et al, 2007).

The effectiveness of the WISEWOMAN intervention has not been tested with women prisoners. In the Khavjou (2007) study, the researchers were exploring if the intervention would be beneficial for incarcerated women, rather than testing its effectiveness in preventing cardiovascular disease. Numerous intervention studies dedicated to behavioral change related to substance abuse and HIV prevention in women prisoners have demonstrated favorable results (Centers for Disease Control (CDC), 1996; Cropsey, Weaver, Villalobos, Stitzer, & Best, 2008; St. Lawrence, Eldridge, Shelby, Little, Brasfield & O'Bannon, 1997). , Hall and colleagues (2004) examined the effectiveness of the Forever Free Program, a cognitive



behavioral intervention designed to treat substance abuse, for incarcerated women. ( Incarcerated women with a history of drug abuse were randomized to either the control or treatment groups. The Forever Free Program was offered to female addicts in prison near the time of their scheduled release, lasted for six months, and included treatment services once released into the community. The focus of the intervention was on relapse prevention, teaching skills and strategies to incorporate the new behavior of abstinence and avoiding relapse in order to maintain behavior change over time. Women who received the intervention had significantly fewer arrests, less drug use and greater employment than those who did not receive the intervention. This study pointed to the importance of social support in prison and on the outside in facilitating maintenance of behavior change. Studies on smoking cessation in the general population and with women prisoners have also supported the need for social support and goal setting, along with follow-up on behavior change maintenance, as essential elements of interventions (Tibbs & Haire-Joshu, 2002).

Peterson and Johnstone (1995) explored the effectiveness of a wellness program at the Federal Medical Center in Lexington, Kentucky. The program was offered to women prisoners at the Atwood Hall residential treatment program, where they were receiving treatment for substance abuse and addiction. The women were provided with a holistic program of treatment focusing on drug recovery, incorporating other healthy lifestyle behavior changes. (Peterson & Johnstone, 1995). A health promotion program imbedded within a substance addiction treatment program was found to increase feelings of wellbeing both physically and mentally, which in turn supported healthy behavior change (Martin, et al, 2006; Fisher & Hatton, 2009; Ferszt, Salgado, DeFedele, & Leveillee, 2009). The Atwood Hall Substance Abuse Program utilized a cognitive-behavioral approach, specifically the

concepts of self- efficacy and self-monitoring in relapse prevention. Peterson (1995) used the same constructs for the participants involved in the health promotion program. Participants were encouraged to use self- efficacy and self-monitoring measures to maintain their newly acquired health promotion behaviors. The intervention consisted of risk reduction and health promotion educational classes, as well as instructor-led exercise classes. Education classes focused on health topics, nutrition and the benefit of exercise. Forty-three incarcerated women within the residential drug treatment program were enrolled and pretest measures were compared to post-test measures obtained following all sessions of the intervention. Results from the health and fitness assessment measured post intervention showed positive changes in all areas measured, with significant changes in mean diastolic blood pressure, aerobic capacity, number of pushups to fatigue, and number of sit-ups per minute. Qualitative data from a focus group of women who attended the health promotion program and were exiting the drug treatment program (n=22) were used to explore the components of the intervention and help to tailor the components to the population. . Three general themes emerged from the focus groups: health awareness and consciousness, self-esteem, and relapse prevention with healthy lifestyle adoption. These findings supported the hypothesis that successful health-related lifestyle modifications such as exercise can heighten self-efficacy and self-awareness (Peterson & Johnstone). Participants expressed a sense of companionship with both the peer aerobics instructor and the other participants when attending exercise classes together. This data provided support for the concept of social support as helping to improve self-awareness and self-efficacy (Peterson & Johnstone).

## **Study Purpose and Aims**

The Stay Fit and Healthy Intervention (Stay Fit) was developed as the attention control arm of an HIV prevention study conducted between 2003 and 2008 at the North Carolina Correctional Institution for Women (NCCIW) in Raleigh, NC. Stay Fit and Healthy was originally designed to mirror the number and duration of contacts and health-related content of the HIV prevention intervention, which included 8 groups sessions, 1 graduation session, 1 booster group session, and 3 booster contacts by phone following release from prison. The study was a secondary data analysis of the changes in behavior of the women who received Stay Fit, as compared to the women who received the primary intervention designed to reduce HIV risk. The variables of fast food intake, eating breakfast, physical activity, and cigarette smoking were explored using the Lifestyle Assessment Questionnaire (National Wellness Institute, 1980) to determine whether women receiving the Stay Fit intervention decreased their risk factors for cardiovascular disease after their release and maintained those changes over time compared to the comparison group who received the HIV Risk reduction intervention. In addition, we will examine whether women with more social support will improve in healthy behavior scores than women with less social support at baseline, and following intervention.

Hypotheses included (1) Women who received Stay Fit will report a greater increase in the frequency of limiting fast food intake, eating breakfast, and participating in physical activity (walking) than women in the comparison group at 3 and 6 months following release from prison; (2) Women who received the Stay Fit intervention and reported smoking at baseline will report a greater decrease in the frequency of smoking cigarettes than women who report smoking in the comparison group, at three and six months following release from

prison; and (3) Women with more social support will improve in healthy behavior scores than women with less social support at baseline, and following intervention.

## **Method**

### **Original Study**

Stay Fit was a nine session program which incorporated educational and behavioral strategies to increase healthy behaviors and decrease cardiovascular disease risk. Session topics included nutrition, increased physical activity, and blood pressure reduction through smoking cessation and relaxation techniques. Stay Fit was designed using a Cognitive Behavioral approach and social support. Participants decided on one or two goals for healthy eating, increased physical activity or smoking cessation, and identified three ways they could accomplish these goals following release from prison. Social support was provided by interventionists and classmates during the intervention to support and encourage new behaviors learned in class. Group booster sessions, facilitated by the same interventionists who led the Stay Fit sessions, occurred within the prison one month following the end of Stay Fit. In addition to the in-prison booster session, interventionists made telephone booster calls to participants at two, six, and ten weeks following their release from prison. The intent of these calls was to reinforce the goals set by participants in changing lifestyle behaviors and maintaining those goals over time. Additional social support was given by a participant selected support person on the outside to help reinforce new behaviors and provide praise and encouragement as needed.

## **Secondary Data Analysis**

The secondary data analysis examined the efficacy of a healthy behavior change intervention which can reduce cardiovascular disease risk in women prisoners using a cognitive behavioral framework and social support. This study explored efficacy longitudinally, and following release from prison. The study explored the effect that the intervention had on participants in the Stay Fit group, compared to a group of women who received the HIV risk reduction intervention, to determine whether there were any differences between the two groups on the cardiovascular risk factor variables of nutrition, physical activity, and smoking.

## **Intervention Components**

The Stay Fit and Healthy Intervention consisted of eight group sessions, a graduation session, and one booster session prior to the women's release from prison. The eight intervention sessions focused on healthy behaviors including nutrition, physical activity, stress reduction, and smoking cessation. Following these sessions, participants received a "diploma" of completion and a graduation celebration. At each session, women were served a snack that consisted of healthy foods to reinforce the healthy food choices introduced in class.

One month later, participants attended the booster session, which was facilitated by the same interventionists who led the eight intervention and graduation sessions. When women were released from prison, participants were contacted by the same interventionist who conducted the three booster phone calls to review the goals set by the participant and assist with questions or barriers that participants were facing on the outside. The central theme of the Stay Fit intervention was developing healthy lifestyle

habits in order to attain and maintain healthy behaviors for life. The week that a participant was released, she received a Stay Fit kit containing a heart healthy cookbook, shower breast self-examination card and beads, relaxation tape and a pedometer.

A session by session outline of the Stay Fit intervention is provided in Table 3.1. An overview of the follow-up sessions can be found in Table 3.2.

### **Setting**

The North Carolina Correctional Institution for Women (NCCIW) is the largest maximum security prison for women in the state of North Carolina. It is located in Raleigh, North Carolina, and at the time of the study housed 1,241 women from all over the state (Beck-Warren, 2002). At the time of the initial recruitment of subjects, 44.5% of the inmates were Caucasian and 48% were African American, with the remaining 7.5% Hispanic, Native American, and other ethnicities (Beck-Warren, 2002).

### **Sample**

Each participant provided verbal and written consent to participate in the study. Because this was a HIV prevention study, all participants recruited had a negative HIV status and reported engaging in sex with men. Recruited subjects had to have access to a telephone for booster calls from interventionists and for follow-up data collection at 3, 6, and 9 months following release. At the time of the study, Census data revealed that 96.6% of Caucasian women prisoners and 97.9% of African American women prisoners reported having telephone access (Beck-Warren, 2002). The intervention was designed to change lifestyle behaviors that women had control over once released from prison, therefore, they were recruited for the study if they had less than a year left on their sentences and were eligible for release in 2-6 months. The time requirements of the

program mandated that each participant be incarcerated for at least 2 months prior to release. While in prison, participants completed all intervention sessions and met with data collectors twice, for Time 1 and Time 2 data collections. In addition, participants were required to be at least 18 years of age, planning to stay in the state following release, and able to speak English. Women with acute psychosis, cognitive impairment or severe developmental disability were excluded from the study.

Given the longitudinal nature of the study, attrition estimates were high because historically, women prisoners who are followed after release are difficult to retain due to drop out and moving out of state (Banks, 2003). The original study allowed for 30% attrition to meet power of 0.80.

### **Procedure for Sample Selection**

Women were identified as meeting the inclusion/exclusion criteria of having less than a year on their sentences and were eligible for release within 2-6 months from the prison's daily admission logs. Projected release dates were obtained from the Department of Corrections' public website to exclude inmates whose projected release dates were too soon or too late to meet study requirements. The public website list was then analyzed to identify inmates who spoke English and were at least 18 years old. The Principal Investigator, Social Work Supervisor and the Assistant Supervisor for the Diagnostic Center met to rule out women with acute psychosis, cognitive impairment, or severe developmental disability.

Each cohort of subjects consisted of 36 participants, randomly assigned to one of the three arms of the study, 12 per intervention. Women were recruited from month 4 of the study to month 36. Potential participants were contacted, the study explained to

them, and if they were interested, they were screened for inclusion/exclusion criteria. Following screening, informed consent was obtained in a private room, with no correctional officers or Administrator present. Participants were assured that their consent was voluntary and no coercion was involved. A Certificate of Confidentiality was obtained for the study.

### **Variables/Measures**

Variables included in this secondary data analysis included fast food intake, eating breakfast, smoking behavior, and physical activity. Fast food intake and skipping breakfast have been cited in numerous obesity studies as having negative effects on maintaining a healthy weight (Maddock, 2004; American Dietetic Association (ADA), 2010; CDC, 2010). Daily physical activity is recommended by the ADA as a part of a healthy lifestyle. Smoking is widely accepted as a risk factor for cardiovascular disease (ADA, 2010; CDC, 2010). The variables were measured using the Lifestyle Assessment Questionnaire (National Wellness Institute, 1980). The Wellness Inventory section of the Lifestyle Assessment Questionnaire (LAQ) was used to measure lifestyle behaviors and health risks not related to sex or drugs. Participants indicated their participation in each of a list of healthy behaviors on a scale ranging from 1 (“almost never”) to 3 (“almost always”). In the original study, responses were limited to three options to keep consistent with the rest of the tool. Reliability data on the LAQ is limited to pilot testing in prisoners; therefore Cronbach alpha scores are not available.

Healthy eating was operationalized with two items: “How often do you eat breakfast” and “How often do you limit how much fast food you eat” with a response of never, sometimes, or almost always. Physical activity was measured by an item which



asked: “How often do you walk whenever possible” with responses of never, sometimes, or almost always. Smoking behavior was measured by one item which asked: “How often do you smoke or use other tobacco” with responses of never, sometimes, or almost always. The scale has been pilot tested with prisoners. The Medical Outcomes Study (MOS) Social Support Survey is a 20-item Likert scale that was designed to measure the various dimensions of social support, along with an overall social support score (Sherbourne & Stewart, 1991). The Multi-trait scale has four dimensions of social support including: emotional/informational, tangible, affectionate, and positive social interaction; all have been tested previously for reliability with Cronbach alpha scores > .91 (Sherbourne & Stewart, 1991) and were also tested in the original HOPE study with reliability scores between .89-.97 on the total scale and subscales. The MOS Social Support Survey will be used in this secondary data analysis to explore the relationship between social support and healthy behavior change and maintenance in women prisoners.

### **Data Collection Procedure for Original Study**

Data were collected through the administration of the Lifestyle Assessment Questionnaire and the MOS Social Support Survey. Baseline data (Time 1) was obtained at the time that participants agreed to be in the study and provided a signed consent. Interviews lasted approximately one hour. Questions were read to all participants as many of the participants had less than a high school education; to protect confidentiality of participants who were not literate, there was no distinction made. The second data measurement point (Time 2) occurred following the WCRRI or Stay Fit intervention, but prior to release from prison. When participants were released from prison, they were

instructed to contact the researcher using the toll free mobile number. If the call was not received when the study was notified that the participant had been released, the data collector would contact the participant at the phone numbers given at the Time 2 interview session, in order to set up a meeting time for the Time 3 data collection interview. Reminder letters were sent out to women who had not telephoned the study, or were unreachable using the phone numbers provided. Additional data collection points were performed one month following release (Time 3), and at three, six, and nine months post-release (Time 4, Time 5, Time 6). Two data collectors would travel to conduct face to face interviews to increase response rate and ensure participant understanding; further, the length of the one hour interview precluded phone interviewing. The home interviews were always conducted with two data collectors to ensure the safety of researchers. If at any time during the data collection phase, a woman was not able to be contacted, the researchers would visit her residence and/or participant designated places in the community where she commonly spent time, in an attempt to contact her. Incentives were also provided to increase retention. Women would only be able to receive incentives following release from prison. In addition to the items described previously in the release packet, women were given \$25 for each data collection completed from Time 3 through Time 6. Thank you notes and reminder cards were also sent after each interview to remind participants of upcoming appointments for data collection.

### **Secondary Data Analysis**

The Stay Fit and Healthy intervention was a nine session program which incorporated educational and behavioral strategies to increase healthy behaviors and

decrease cardiovascular disease risk. Session topics included nutrition, increased physical activity, and blood pressure reduction through smoking cessation and relaxation techniques. The purpose of this secondary data analysis is to compare the changes in cardiovascular-related healthy behaviors of the women who received Stay Fit intervention with the women who received the primary intervention designed to reduce HIV risk behaviors. The long term goal of the study is to create a tailored approach to lifestyle behavior change related to cardiovascular disease prevention for female prisoners in the southeastern United States. In addition, we will disseminate the results of the research in order to assist other scientists in developing tailored interventions for women prisoners in other regions of the country.

Table 3.1

*Session by Session Outline of the Stay Fit Intervention*

<b>Session</b>	<b>Objective</b>	<b>Content</b>
1: Taking Charge of your Health	Learning major health risks in women	Orientation to classes Assess knowledge of women's health issues Discussion of major health concerns in women
2: Screening and Prevention	Identify personal health risks and need for screening tests	Prevention timeline When to go in to doctor Personal health risks Recommended screening guidelines Immunization schedule
3: Managing Emotions and Stress	Discuss stress and emotions and ways to decrease stress	Positive and negative thoughts Discussion of what is stress and how do I react to it Relaxation strategies
4: Decreasing Health Risks: Physical Activity Part 1	Identify benefits of exercise and develop exercise plan	Benefits of exercise Tips for getting active Developing a personal exercise plan
5: Decreasing Health Risks: Physical Activity Part 2	Learn selected exercises for physical activity	Review personal weight management and exercise plans Program for strength and flexibility Practice exercises

6: Decreasing Health Risks: Nutrition Part 1	Learn the components of healthy eating	Why worry about my diet Tips for healthy eating 5-a-day and Food Guide Pyramid
7: Decreasing Health Risks: Nutrition Part 2	Identify unhealthy eating patterns and how to change them	Eating too much or too little Development of personal weight management plan Cholesterol: what it is and how to manage it
8: Tying it all Together	Identify health risks associated with stress and unhealthy lifestyles and strategies to reduce their impact on personal health	Health problems and stress Smoking risks and smoking cessation Participant Q & A on specific health problems Yoga tape for relaxation Making a plan to become and stay healthy
Graduation Session	Acknowledge efforts and learning of class members evidenced by participation during classes	Review each participant's plan for staying fit and healthy Graduation celebration Discussion of welcome home kit with breast beads

Table 3.2

*Booster Sessions*

<b>Sessions</b>	<b>Focus of Sessions</b>	<b>Delivery</b>
Booster session prior to release (1 month following graduation)	Review of topics in classes; review goals and means to meet them; use of buddy on the outside to help meet goals	1 group session 1 month following graduation
Booster calls following release (2, 6, and 10 weeks after release from prison)	Review progress, receive support for successes and assistance with problems encountered	Phone sessions with research interventionist

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## CHAPTER 4

### A SECONDARY DATA ANALYSIS OF CARDIOVASCULAR DISEASE PREVENTION PROGRAM IN WOMEN PRISONERS

*This paper introduces a health promotion intervention originally designed as a control attention arm for the HOPE Project, an HIV prevention intervention clinical trial. This study will evaluate the efficacy of the Stay Fit and Healthy Intervention on decreasing cardiovascular risk. **Methods:** The Stay Fit and Healthy intervention was a nine session program which incorporated educational and behavioral strategies to increase healthy behaviors and decrease cardiovascular disease risk. Session topics included nutrition, increased physical activity, and blood pressure reduction through smoking cessation and relaxation techniques. **Aims:** The purpose of this secondary data analysis is to compare the changes in cardiovascular-related healthy behaviors of the women who received Stay Fit intervention with the women who received the primary intervention designed to reduce HIV risk behaviors. **Results:** Healthy behaviors in this sample were significantly related to higher social support scores at baseline. Unadjusted analysis revealed improvement in treatment group on limiting fast food at three months post release. Adjusted analysis showed trends toward healthy behaviors at three months. Smoking behaviors improved in both groups following release. The results from this study emphasize the need for future interventions specifically designed to decrease cardiovascular disease within the population of incarcerated women.*

Risk for cardiovascular disease is a problem common to many women in the United States today (DeVol, et al, 2011). Cardiovascular disease is a public health burden given that diagnosis and treatment costs billions of dollars each year, along with lost productivity by those who suffer with cardiovascular illnesses such as hypertension, heart disease, diabetes, and stroke (Finkelstein, 2004). Little is known about the prevalence of cardiovascular illness in women prisoners; however we do know that incarcerated women have high prevalence of risk factors that could lead to cardiovascular disease including inactivity, obesity, poor nutrition, low educational and socioeconomic status, and cigarette smoking (Banks, 2003; Fisher, 2009; Tibbs, Cropsey, Weaver, Villalobos, Stitzer, & Best, 2008). To date, there have been no intervention clinical trials designed to reduce risk of cardiovascular disease in women prisoners. At the same time, incarceration provides an excellent opportunity for providing intervention programs to inmates because women are more likely to attend sessions when they are not having to juggle attendance with the stressors of survival they face on the outside (Banks, 2003).

### **Intervention Studies on Cardiovascular Disease Prevention in Women Prisoners**

Two studies have examined health promotion behaviors of women prisoners; however there are no studies that have tested interventions designed for this population to promote lifestyle behavior change to reduce cardiovascular risk in women prisoners. Khavjou, and associates (2007) examined the benefits of using the WISEWOMAN program, an intervention designed to decrease cardiovascular disease risk in lower socioeconomic women, with a population of incarcerated women in a South Dakota prison (Khavjou, Clarke, Hofeldt, Lihs, Loo, Prabu, et al, 2007). The researchers concluded that there was a significant need for cardiovascular disease screening and education programs in women's prisons, and

that these programs also could improve planning for release and referrals to community health providers for women who need them. It is important to note that this study was exploratory in nature to determine the need for such an intervention in this population and did not test the efficacy of the WISEWOMAN program with women prisoners.

In 1994, Peterson and Johnstone (1995) explored the effectiveness of the Atwood Hall Health Promotion Program, at the Federal Medical Center in Lexington, Kentucky. The program was offered to women prisoners at the Atwood Hall residential substance abuse treatment program. The premise of the study was to provide a holistic program of treatment for these women, not only focusing on their recovery from drugs, but also incorporating other healthy lifestyle behavior changes (Peterson & Johnstone, 1995). According to Peterson and Johnstone, including a health promotion program within a substance addiction treatment program was supported by the literature to increase a feeling of physical and mental wellbeing, which in turn would be supportive of healthy behavior change (Martin, Murphy, Chan, Ramsden, Granger-Brown, Macaulay, et al, 2006; Fisher & Hatton, 2009; Ferszt, Salgado, DeFedele, & Leveillee, 2009). The Atwood Hall Substance Abuse Program utilized a cognitive-behavioral approach, specifically the concepts of self- efficacy and self-monitoring in relapse prevention, and the same constructs were used for the participants in the health promotion program. Participants were encouraged to use self- efficacy and self-monitoring measures to maintain their newly acquired health promotion behaviors. Forty-three incarcerated women enrolled in the Atwood Hall Substance Abuse Program participated in the health promotion intervention and showed significant changes on diastolic blood pressure and several fitness improvement indicators (Peterson & Johnstone, 1995). A series of focus groups from the original sample revealed that the women felt they improved

their health awareness, self-esteem, and additional skills to avoid relapse of drug addiction after completing the health promotion program (Peterson & Johnstone, 1995). While this study tested a health promotion program for women prisoners, participation in the program was limited to inmates enrolled in substance abuse treatment. .

### **Cognitive Behavioral Approach and Social Support**

In the current literature of incarcerated women, three main frameworks guide effective intervention designs that utilize the construct of social support. The Risk Reduction Model (Catania, Kegeles, & Coates, 1990) based on concepts within Social Cognitive Theory and the Health Belief Model (Catania, Kegeles, & Coates, 1990) focuses on changing behavior after the person realizes the reality of his/her risk and perceives that risk as a problem (Catania, Kegeles, & Coates, 1990). Social support is identified as the construct of “help seeking” when persons believe they are at risk and utilize the support of others to adopt and maintain new behaviors which will reduce their risk (Catania, Kegeles, & Coates, 1990). The Enhancement Model (El-Bassel, Ivanoff, Schilling & Gilbert, 1995; Tripodi, Bledsoe, Kim & Bender, 2011) focuses on building coping skills to reduce HIV/AIDS risk (El-Bassel, Ivanoff, Schilling & Gilbert, 1995) through the “enhancement of personal awareness, problem-solving, and coping skills” (pg. 133) using social support (El-Bassel, Ivanoff, Schilling & Gilbert, 1995). Therapeutic Community (DeLeon,1986) was originally developed as an addiction treatment model, based on abstinence and focusing on treatment and prevention of relapse (DeLeon,1986). Therapeutic Community is the concept of addicts and non-addicts living together, as they do in prison, working together in a supportive role to encourage new healthy behaviors, free of substances (DeLeon, 1986). Gender specific interventions using the concept of Therapeutic Community have been shown to be more

efficacious with women when they mirror the lives of other women and experiences (Morrill, Mastroleni & Leibel, 1998; Lichtenstein, 2010; El-Bassel, Ivanoff, Schilling, Borne & Chen, 1995). The concepts of the three main theoretical frameworks used to design effective interventions for women prisoners are all based on improving self-esteem and encouraging support from one's environment to encourage behavior change.

The Stay Fit and Healthy Intervention (Stay Fit) was developed as the attention control arm of an HIV prevention study conducted between 2003 and 2008 at a southeastern Correctional Institution for Women. The secondary data analysis described here is the first to examine the efficacy of a healthy behavior change intervention which can reduce cardiovascular disease risk designed for the general population of women prisoners using a cognitive behavioral framework and social support. The analyses explored the effect of the Stay Fit intervention on participants following release from prison as compared to the group of women who received the HIV risk reduction intervention, to determine whether there was any difference between the two groups on the cardiovascular risk factor variables of nutrition, physical activity, and smoking.

Based on the theoretical frameworks that guide effective interventions with women prisoners in the literature, the original study incorporated the concepts of social support and skill building in the design of the interventions.

## **Methods**

### **Sample and Setting**

The North Carolina Correctional Institution for Women (NCCIW) is the largest women's prison in North Carolina and at the time of the study housed 1,241 women from all over the state (Beck-Warren, 2002). At the time of the initial recruitment of

subjects, 44.5% of the inmates were Caucasian and 48% were African American, with the remaining 7.5% Hispanic, Native American, and other ethnicities (Beck-Warren, 2002).

Each participant provided verbal and written consent to participate in the study. Because this was a HIV prevention study, all participants recruited had a negative HIV status and reported engaging in sex with men. Recruited subjects had to have access to a telephone for booster calls from interventionists and for follow-up data collection at 3, 6, and 9 months following release. At the time of the study, Census data revealed that 96.6% of Caucasian women prisoners and 97.9% of African American women prisoners reported having telephone access (Beck-Warren, 2002). The intervention was designed to change lifestyle behaviors that women had control over once released from prison therefore, they were recruited for the study if they had less than a year left on their sentences and were eligible for release in 2-6 months. The time requirements of the program mandated that each participant be incarcerated for at least 2 months prior to release. Additional inclusion criteria were 18 years of age or older, planning to stay in the state following release, and able to speak English. Women with acute psychosis, cognitive impairment or severe developmental disability were excluded from the study. While in prison, participants completed all intervention sessions and met with data collectors twice, for Time 1 and Time 2 data collections.

### **Hypotheses**

Hypotheses were: (1) Women who received Stay Fit will report a greater increase in the frequency of limiting fast food intake, eating breakfast, and participating in physical activity (walking) than women in the comparison group at 3 and 6 months following release

from prison; (2) Women who received the Stay Fit intervention and reported smoking at baseline, will report a greater decrease in the frequency of smoking cigarettes than women who report smoking in the comparison group, at three and six months following release from prison; and (3) Women with more reported social support will improve in healthy behavior scores than women with less social support at baseline, and following intervention.

### **Variables and Measurement**

Variables of interest included self-reported fast food intake, eating breakfast, smoking behavior, and physical activity. Fast food intake and skipping breakfast have been cited in numerous obesity studies as having negative effects on maintaining a healthy weight (Maddock, 2004; Healthy Eating Recommendations from American Dietetic Association, 2010). Daily physical activity is recommended by the ADA as a part of a healthy lifestyle. Smoking is widely accepted as a risk factor for cardiovascular disease (ADA, 2010). The variables were measured using the Lifestyle Assessment Questionnaire (National Wellness Institute, 1980).

The MOS Social Support Survey (Sherbourne & Stewart) explored the relationship between social support and healthy behavior change and maintenance in women prisoners.

### **Intervention Protocol**

The Stay Fit and Healthy Intervention consisted of eight group sessions, a graduation session, and one booster session prior to their release from prison. The eight intervention sessions focused on healthy behaviors including nutrition, physical activity, stress reduction, and smoking cessation. Following these sessions, participants received a “diploma” of completion and a graduation celebration. At each session, women were



served a snack that consisted of healthy foods to reinforce the healthy food choices introduced in class.

One month later, participants attended the booster session, which was facilitated by the same interventionists who led the eight intervention and graduation sessions. When women were released from prison, participants were contacted by the same interventionist who conducted the three booster phone calls to review the goals set by the participant and assist with questions or barriers that participants were facing on the outside. The central theme of the Stay Fit intervention was developing healthy lifestyle habits in order to attain and maintain healthy behaviors for life. The week that a participant was released, she received a Stay Fit kit containing a heart healthy cookbook, shower breast self-examination card and beads, relaxation tape and a pedometer.

### **Data Collection and Analysis**

Data were collected through the administration of the Lifestyle Assessment Questionnaire and the MOS Social Support Survey. Baseline data (Time 1) were obtained at the time that participants agreed to be in the study and provided a signed consent. The second data measurement point (Time 2) occurred following the WCRRI or Stay Fit intervention, but prior to release from prison. Additional data collection points were performed one month following release (Time 3), and at three, six, and nine months post-release (Time 4, Time 5, Time 6). Incentives were provided to increase retention. Women were only able to receive incentives following release from prison due to prison regulations. In addition to the items described previously in the release packet, women were given \$25 for each data collection completed from Time 3 through Time 6. Chi-square testing was performed to determine if groups were homogeneous.

## **Results**

### **Power Analysis**

In this secondary data analysis, a power analysis for sensitivity to compute required effect size was performed on the sample sizes achieved at each of the three data collection time points under study. The baseline data sample size included 189 women; 102 in the Stay Fit group and 87 in the control group, for an effect size of 0.41, powered at .80, for a two tailed alpha error probability of 0.05. For data collection at 3 months following release, 89 women were included in the analyses for the Stay Fit group, and 75 women were in the control group, for an effect size of 0.44, with the same power and alpha. At the 6 month data time point, the number of women in the Stay Fit sample was 74 and there were 71 women in the control group analyzed for an effect size of 0.47.

### **Participants' Baseline Characteristics**

The characteristics of the 189 participants randomized into control and treatment groups are shown in Table 4.1. The study sample was 56.6% non-Hispanic white, 43.3% African American, American Indian or other. There were no participants who responded as Hispanic. Mean years of education in the sample was 11.2 years, with a range of 6-19 years. Twenty percent of the total sample attended some college following high school completion; almost half (46.1%) of the total sample graduated from high school.

### **Co-Variates**

The co-variates identified prior to performing the regression included: age, race, and educational background. Age was defined as: less than 30/between 30 and 40/over 40. Race was self-defined as non-Hispanic white or non-white (which included African American, Native American, or other). Educational group was defined as less than 12 years of

school/high school graduate/more than 12 years of school. Chi-square tests were performed on all co-variates. There was no significant difference between intervention groups on race, age or educational background (Table 4.2).

### **Dependent Variables at Baseline**

Subjects assigned to both groups were measured for smoking behavior with the question: “How often to you smoke or use other tobacco? “, with possible responses as 1 for never, 2 for sometimes, and 3 for always, The variable of fast food intake was measured with the question, “How often do you limit how much fast food you eat”?, with the same response options. Breakfast intake was measured with the question, “How often do you eat breakfast” with responses of never (1), sometimes (2), and always (3). When asked, “How often do you walk whenever possible”, with the responses above, responses were measured for the variable of walking behavior. Tables 4.3 and 4.4 present the means and standard deviations for the both the intervention and control groups.

### **Change Scores**

In order to conduct a T-test of independent means for the four variables under study, a change score for each variable was computed. A change variable for change in smoking at 3 months was computed by subtracting the baseline smoking scores from the smoking score at 3 months following release (T4). For the smoking change variables, a negative change was favorable, as we hoped for smoking frequency to decrease. The change variable for change in smoking at 6 months was computed by subtracting the smoking score at 3 months from the smoking score at 6 months following release (T5). The change variables of breakfast intake, walking, and fast food intake at 3 and 6 months were computed similarly, however, since we were looking for these behaviors to increase, a positive change score was favorable. As seen

in Table 4.5, the women who participated in the Stay Fit intervention limited their fast food intake significantly more than those who did not attend the intervention, when change was measured at 3 months following release from prison.

### **Analysis of Composite Scores**

A composite score was created on the three variables demonstrating healthy behaviors (limiting fast food, eating breakfast, and walking) by summing up the values at baseline. Composite scores of healthy behaviors were computed at 3 months and at 6 months by adding together the scores on limiting fast food intake, eating breakfast and walking at 3 and six months respectively. Higher scores indicate more healthy behaviors. An increase in smoking was a negative rather than a positive behavior, therefore we analyzed it separately. To reduce the possibility of errors in data entry by reverse-scoring, smoking scores were reported separately. In Table 4.6 we have summarized the composite raw healthy behavior scores at baseline, 3 months and 6 months by treatment group. These include the behaviors of eating breakfast, limiting fast food intake and increasing walking.

In Table 4.7, we have summarized the composite smoking scores at baseline, 3 months and 6 months by treatment group. The desired response would be a decrease in smoking behavior; therefore, the healthy smoking behavior would be for smoking scores to go down following release. There were no significant differences in decrease in smoking behavior between Stay Fit and control groups.

The results from Table 4.8 show that at 3 months, the composite score in the healthy behaviors of walking, eating breakfast and limiting fast food was significantly higher in the treatment group. At six months, there is no longer a significant difference between composite

scores by treatment group; the composite scores in Stay Fit participants did increase between 3 and 6 months, but not enough to see a statistically significant difference between groups.

### **Multiple Regression Model to Explore Healthy Behavior Change Between Treatment Groups**

In order to explore the relationship between healthy behavior changes as a result of the intervention, a univariate analysis of variance was fit using a general linear model. Covariates of race, education and age were fit into the model with the independent variable of treatment group on the dependent variable of each healthy behavior composite score. The multiple regression model for the variables of walking, breakfast and fast food by treatment group is displayed in Table 4.9. Table 4.10 displays the multiple regression model for smoking behavior. In this multiple regression, increased healthy behavior composite scores at baseline were related to non-white race. No significant relationship was found related to healthy behavior change in participants from baseline to three months or six months on treatment group, age, education, or race. No significant relationship was found at baseline for smokers on treatment group, age, education or race. However, white race is suggestive of higher smoking rates at baseline, though not statistically significant  $p=.07$ . No significant relationship was found in smoking behavior at 3 or 6 months on treatment group, age, education or race.

### **Social Support**

The relationship between social support and healthy behavior change was explored using linear regression. The relationship between the composite of healthy behavior score at 3 and 6 months and social support was analyzed after controlling for race, age, and educational background. Parameter estimates for the regression model for healthy behavior scores with social support at baseline, 3 and 6 months are shown in Table 4.11. The multiple

regression parameter estimates for healthy behavior at baseline shows that as social support increases, healthy behavior scores also increase. In this model, increased age and non-white race are also significantly related to higher baseline healthy behavior scores.

No significant relationship was found statistically between healthy behavior scores at 3 months and social support, treatment group, age, education and race. However, treatment group participants had higher healthy behavior scores than the control group at a significance level  $p=.07$ . At 6 months, there is no relationship between healthy behaviors and social support on treatment group, age, education or race.

### **Discussion**

In our unadjusted analyses of the three healthy behavior outcomes, we found that limiting fast food scores improved more in the Stay Fit group than control at three months after release from prison.

In adjusted analyses, we found that race significantly affected both groups in healthy behavior scores. Non-white participants, who included African American, Hispanic and other non-Caucasians, healthy behavior scores were higher at baseline. This finding is may be due to the fact that the white participants were more commonly substance abusers and therefore had less healthy behavior scores. This secondary data analysis did not examine substance use; however Shah (2011) found that black women were less likely to abuse substances prior to incarceration than white women (Shah, et al, 2011). Given that women in this study did not have the ability to smoke or eat fast food while in the study prison, and these were two of the variables studied, when we gathered baseline data, we were asking participants to report their behavior *prior* to incarceration rather than at that point in time while in prison.

Smoking behavior scores improved in both groups from baseline to 3 months, in that smoking frequency decreased, but increased from 3 to 6 months. These findings were not significant between groups. We found that women commonly used smoking as a means to reduce stress during our intervention, which is supported by the literature ((Cropsey, 2008; Cropsey, 2010).

When social support was added to our analyses, we found a significant relationship between social support and high healthy behavior scores, healthy behavior scores increased as age increased, and those participants who were non-white and had high social support also had higher healthy behavior scores. These results are supported by the current literature in that social support has been shown to increase healthy behavior change in women prisoners (Catina, 1990; El-Bassel, 1995; St. Lawrence, 1997).

When social support was added to the regression model, women in the Stay Fit group tended to have higher behavior scores at three months than women in the control group; however results were below significance at  $p < .07$ . This finding is interesting as it suggests that the intervention may have made a difference in behavior and that, if an intervention was designed specifically to decrease cardiovascular disease risk in women prisoners, using a social support framework, it might be effective.

### **Conclusion**

Incarcerated women suffer the same cardiovascular disease risk factors as women in the general population. The Stay Fit and Healthy intervention provided a social support framework utilizing the variables of nutrition, physical activity and smoking cessation to address these risks within this vulnerable population. Previous intervention research utilizing social support has been effective in this population. The Stay Fit and Healthy intervention

has been shown to increase the healthy behaviors of eating breakfast, limiting fast food and increasing walking in women prisoners following release from prison. Given the scarcity of health promotion literature, this study provides support for future study and implementation of programs for women prisoners designed to reduce their cardiovascular disease risks.



Table 4.1

*Descriptive Demographics of the Sample*

	Sample prior to Randomization n=189	Stay Fit n=102 Mean/SD	Control n=87 Mean/SD
Age	32.3 (SD +/- 9.061)	33.1(SD +/- 9.447)	31.3 (SD +/- 8.531)
% Caucasian	56.6(%)	53.9 (%)	59.8 (%)
% African American and other non-Caucasian	43.3(%)	39.2 (%)	29.9 (%)
% Less than HS education	48.1%	41.4%	53.9%
% At least high school education	31.7%	32.2%	31.4%
% More than HS education	20.1%	26.4%	14.7%

Table 4.2

*Pearson Chi-Square Tests on Covariates*

Variable	Chi-square Value	Df	2-sided significance
Age group	2.283	2	.319
Educational group	4.757	2	.093
Race group	.654	1	.419

Table 4.3

*Means for Treatment Group (Stay Fit)*

Variables	Baseline Mean(SD)	3 month Mean(SD)	6 month Mean (SD)
Smoke	2.56 (.752)	2.44 (.797)	2.50(.781)
Fast Food	1.53 (.671)	2.03 (.698)	1.91(.686)
Breakfast	2.16 (.793)	2.35 (.676)	2.28(.693)
Walk	2.37 (.674)	2.29 (.678)	2.26(.703)

Table 4.4

*Means for Control Group*

Variables	Baseline Mean (SD)	3 month Mean (SD)	6 month Mean (SD)
Smoke	2.60 (.723)	2.47 (.827)	2.49 (.791)
Fast Food	1.61 (.688)	1.83 (.742)	1.92 (.692)
Breakfast	2.08 (.750)	2.19 (.730)	2.17 (.697)
Walk	2.21 (.734)	2.23 (.649)	2.18 (.617)

*Note.* Breakfast = How often do you eat breakfast, Fast Food = How often do you limit how much fast food you eat, Walking = How often do you walk whenever possible, Smoke = How often to you smoke or use other tobacco.

Table 4.5

*T-Tests Comparing Scores in Healthy Behaviors Between Stay Fit and Control Groups at 3 and 6 Months*

Variable	T – value	Significance (2 tailed)
Smoking at 3 months	.210	.834
Smoking at 6 months	.140	.889
Eating breakfast at 3 months	.289	.773
Eating breakfast at 6 months	.745	.458
Walking at 3 months	-1.023	.308
Walking at 6 months	.223	.824
<b>Limiting fast food intake at 3 months</b>	<b>2.018*</b>	<b>.045</b>
Limiting fast food intake at 6 months	.098	.922

Table 4.6

*Means and Standard Deviation for Composite Baseline Healthy Behaviors at Baseline, 3 Months, and 6 Months Following Release From Prison*

<u>Variable</u>	<u>Stay Fit Mean/SD</u>	<u>Control Mean/SD</u>
Baseline Composite Scores	6.04/1.43	5.89/1.42
Composite scores at 3 months	6.50/1.54	6.17/1.72
Composite scores at 6 months	6.44/1.41	6.26/1.28

Table 4.7

*Means and Standard Deviation for Smoking Behavior Scores by Treatment Group at Baseline, 3 Months and 6 Months*

<u>Variable</u>	<u>Stay Fit Mean/SD</u>	<u>Control Mean/SD</u>
Baseline Smoking Scores	2.56/.75	2.60/0.72
Smoking scores at 3 months	2.49/0.65	2.42/0.72
Smoking scores at 6 months	2.54/0.64	2.59/0.61

Table 4.8

*T-Test of Independent Means by Treatment Group for Healthy Behavior Composite Scores at Baseline, 3 Months, and 6 Months*

<u>Variable</u>	<u>Stay Fit Mean/SD</u>	<u>Control Mean/SD</u>	<u>t (p)</u>
Composite baseline	6.04/1.43	5.89/1.42	-.73 (.46)
Composite score at 3 months*	6.5/1.54	6.17/1.72	-2.01 (.05)
Composite score at 6 months	6.53/1.53	6.24/1.58	-.80 (.43)

*Note.* \*Significance at  $p \leq .05$

Table 4.9

*Multiple Regression Model for Healthy Behavior Composite Score*

Parameter	Baseline Composite Score	3 month Composite Score	6 month Composite Score
Control group	-.06 (.21)	-.26 (.27)	-.20 (.27)
Age (<30)	-.43 (.27)	-.06 (.33)	.24 (.36)
Age (30-40)	-.08 (.30)	.16 (.36)	.20 (.38)
Education (< 12 yrs)	.27 (.28)	-.39 (.35)	-.29 (.35)
Education (= 12 yrs)	.19 (.30)	-.39 (.37)	-.16 (.37)
White Race	-.48 (.21)*	.28 (.27)	.29 (.27)

Table 4.10

*Multiple Regression Model for Smoking Behavior*

Parameter	Baseline Smoking Score	3 month Smoking Score	6 month Smoking Score
Control group	.03 (.11)	-.04 (.11)	-.03(.11)
Age (<30)	.15 (.14)	-.16 (.14)	.13 (.14)
Age (30-40)	.04 (.15)	.07 (.15)	.17 (.15)
Education (< 12 yrs)	.21 (.15)	-.12 (.15)	.08 (.14)
Education (= 12 yrs)	.18 (.16)	.05 (.15)	.17 (.15)
White Race	.19 (.11) p=.07	.14 (.11)	.16 (.11)

Note. \*p for Type III test < .05

Table 4.11

*Multiple Regression Model for Healthy Behavior Composite Score and Social Support*

Parameter	Baseline Composite Score	3 month Composite Score	6 month Composite Score
MOS score	.47(.10)**	.09(.11)	.02 (.12)
Control group	.001(.20)	-.42 (.23) p=.07	-.12 (.24)
Age (<30)	-.56 (.26)*	-.24(.28)	-.23 (.31)
Age (30-40)	-.083(.28)	.29 (.30)	.17 (.32)
Education (< 12 yrs)	.25 (.27)	-.18 (.29)	-.02 (.29)
Education (= 12 yrs)	.05 (.29)	-.30 (.31)	.22 (.31)
White Race	-.43 (.202)*	-.13 (.22)	-.21 (.23)

Note. \*\*  $p$  for Type III test < .01, \*  $p$  for Type III test < .05.

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## **CHAPTER 5**

### **FINDINGS AND IMPLICATIONS**

Cardiovascular disease remains the number one cause of mortality in adult women in the United States (Furie, et al, 2011). Inactivity, poor nutrition and smoking are behaviors that put women at risk for cardiovascular illness (Finkelstein, 2004). Incarcerated women have high prevalence of these preventable risk factors (Banks, 2003; Fisher, 2009; Cropsey, et al, 2008). Many women who become incarcerated come from impoverished backgrounds and have limited availability of healthy foods or safe areas to exercise in their neighborhoods (Banks, 2003). Smoking is commonly used as a means to relieve the stress that women experience as a marginalized population (Banks, 2003). In the current literature, there have been no intervention clinical trials designed to reduce risk of cardiovascular disease in women prisoners. Incarceration provides an excellent opportunity for providing intervention programs to inmates because women are more likely to attend sessions (Banks, 2003).

#### **Theoretical Framework**

Social support is a common theoretical framework guiding effective interventions within the population of incarcerated women (Catina, 1990; El-Bassel, 1997; Ferszt, 2009; Hall, 2004). The concept of social support is implemented in the Stay Fit and Healthy intervention in a variety of aspects. Sessions are led by trained interventionists, all are nurse practitioners, who provide not only information to participants but also facilitate behavior change through support. Each participant selects a support person on the outside to help

reinforce the new behaviors learned in sessions. A booster session is provided to participants before release to review goals for behavior change outside of prison. Interventionists conduct booster calls to participants three times following release to encourage behavior changes and their maintenance.

### **Results of Secondary Data Analysis**

The Stay Fit and Healthy Intervention (Stay Fit) was developed as the attention control arm of an HIV prevention study conducted between 2003 and 2008 at the North Carolina Correctional Institution for Women (NCCIW) in Raleigh, NC. The study outlined in this document was a secondary data analysis of the changes in behavior of the women who received Stay Fit, as compared to the women who received the primary intervention designed to reduce HIV risk.

This report provides information on the four variables of eating breakfast, avoiding fast food, choosing not to smoke, and incorporating exercise in daily activities by walking; behaviors which have been shown to decrease cardiovascular disease risk. The original study did not explore the relationship between healthy behavior change in women prisoners who received the Stay Fit and Healthy Intervention; however, the knowledge gained from this analysis can guide future research in the area of cardiovascular disease prevention in women prisoners.

Hypothesis 1 stated Women who received Stay Fit will report a greater increase in the frequency of limiting fast food intake, eating breakfast, and participating in physical activity (walking) than women in the comparison group at 3 and 6 months following release from prison. The analysis supported this hypothesis at 3 months. Scores on the three healthy indicators of fast food intake, eating breakfast daily and walking whenever possible

improved following the Stay Fit and Healthy intervention, and limiting fast food was significantly higher in the Stay Fit group at 3 months following release from prison. The Stay Fit intervention incorporates a great deal of time in teaching participants to make healthy food choices including reading food labels, and limiting fast food. Additionally, a composite healthy behavior score was computed by summing the three positive behaviors under study. The composite healthy behavior score at 3 months was also significantly higher in Stay Fit participants.

Cigarette smoking prevalence in incarcerated women is very high. According to Cropsey (2008), who studied the smoking behaviors of women prisoners, the “no smoking” policies in prisons do not keep inmates from smoking. In her 2008 study, only 15.8% of women who smoked before coming to prison cut down on their smoking, and a mere 0.4% quit smoking while incarcerated (Cropsey, Weaver, Villalobos, Stitzer, & Best, 2008). Fourteen percent of women actually started smoking while in prison, while the remaining 50.8% of women studied smoked more (Cropsey, Weaver, Villalobos, Stitzer, & Best, 2008). Cropsey and her colleagues also conducted the only study exploring weight gain following smoking cessation in women prisoners (Cropsey, K, McClure, L, Jackson, D, Villalobos, F, Weaver, M & Stitzer, M. (2010). In the Cropsey study, 250 participants received a smoking cessation intervention with a nicotine replacement patch. When measured at 3 and 6 months, those who did quit smoking gained at least 10 pounds more than those who did not stop smoking. (Cropsey, K, McClure, L, Jackson, D, Villalobos, F, Weaver, M & Stitzer, M. (2010).

Our second hypothesis was Women who received the Stay Fit intervention and reported smoking at baseline would report a greater decrease in the frequency of smoking

cigarettes than women who reported smoking in the comparison group, at three and six months following release from prison. In the Stay Fit group, smoking behavior decreased from baseline to 3 months after release from prison, though not significantly more than control. At 6 months, both groups showed an increase in smoking behavior from 3 months, almost matching baseline results. This result supports reported findings in the literature that incarcerated women will continue smoking following release. With the added cardiovascular risk of weight gain in this population if they do indeed try to quit, it is imperative that healthy eating be part of a cardiovascular disease prevention program which includes smoking cessation. The stressors that women who have been incarcerated face on the outside; which may often include abstaining from substance abuse, smoking becomes a very effective method of stress reduction. Interventions aimed at coping strategies for addressing stress without using tobacco, in addition to illicit drugs and alcohol, may be very effective (Cropsey, Weaver, Villalobos, Stitzer, & Best, A. 2008).

Hypothesis 3 stated Women with more social support will improve in healthy behavior scores than women with less social support at baseline, and following intervention. When social support was added to our analyses, we found a significant relationship between social support and high healthy behavior scores, healthy behavior scores increased as age increased, and those participants who were non-white and had high social support also had higher healthy behavior scores. These results are supported by the current literature in that social support has been shown to increase healthy behavior change in women prisoners (Catina, 1990; El-Bassel, 1995; St. Lawrence, 1997). Women in the Stay Fit group who reported high social support tended to have higher behavior scores at three months than women in the control group; however results were below significance at  $p < 0.07$ . Since both

the control group and the Stay Fit group were receiving support, the lack of statistical significant difference between groups is a logical finding.

### **Strengths and Limitations of This Analysis**

This study had several strengths. Social support was very high at baseline for participants and continued to remain high following release, with higher healthy behavior scores. This finding is supported by previous behavioral change research in substance abuse treatment and HIV prevention programs designed for women prisoners (Catina, 1990; Ferszt, 2009). Attrition in this population is historically high; however, the sample size was large enough to provide adequate (over 80%) power to detect medium effects. Since the existing literature on cardiovascular disease prevention in women prisoners did not measure attrition of subjects following release, a comparison of our results with the literature is not possible. Participants showed improvement over time in healthy indicators, though not significantly between groups, when measured at 6 months. The demographics of both samples were homogeneous on all covariates which strengthen the internal validity of the study and minorities were well represented, as almost half of the sample was African American or Hispanic women.

There were several weaknesses apparent in this study design. The data collected were entirely self-reported. There were no objective measures of physical activity used in this study that are regularly used in intervention studies related to improving risks of cardiovascular disease such as pedometers or Acticals. Objective measures of cardiovascular health such as blood pressure, pulse, oxygen saturation, aerobic capacity, or body weight measurements were not obtained. This original study was not designed to look at these variables but when designing a study for women prisoners that is targeting CVD risk

prevention, these variables must be included, as they are supported in the literature. (Hart, Ainsworth & Tudor-Locke, 2011; Schargal, et al, 2001). Patient weight was part of the data collected, but it was self-reported and not used for this secondary analysis because according to the literature, self-reported weight measurements are highly unreliable (Engstrom, et al. 2003).

An additional weakness of this secondary analysis was that the groups studied both received an intervention. The participants were both motivated for change, even though the targeted change in the groups differed. Both groups received high levels of social support, which has been shown to be very effective at behavior change in this population and that finding is consistent with the results in this study.

### **Implications for Future Study**

The biggest impact from this study is the highlighted need for more research in the area of health promotion and disease prevention programs designed for incarcerated women. Inactivity, poor nutrition and smoking in women prisoners are lifestyle behaviors that place these women at high risk for morbidity and mortality from cardiovascular illness. This study underlined the need for programs that are specifically designed for the purpose of prevention. Future interventions utilizing a social support framework have been shown to be effective in this population. When considering smoking cessation programs, it is vital to keep in mind that incarcerated women commonly use cigarette smoking as a means to relieve stress. Measurement of cardiovascular risk factors, such as body weight, blood pressure, and physical activity history should be determined using objective measures, in addition to self-report. Women will suffer from the sequelae of the lifestyle behaviors discussed in this study while incarcerated, which will result in lost productivity and increased medical expenses

when they are released that will cost taxpayers millions of dollars. The cardiovascular health of these vulnerable women is a public health problem that can no longer be ignored.

**APPENDIX A**

**HEALTH BEHAVIORS LIFESTYLE ASSESSMENT QUESTIONNAIRE**

This section will help us learn what you doing to take care of yourself and stay healthy.

Think about the 30 days before you came to jail/prison and answer using these choices.

A - Almost always this is true (90% or more of the time)

B - Very frequently this is true (approximately 75% of the time)

C - Frequently this is true (approximately 50% of the time)

D - Occasionally this is true (approximately 25% of the time)

E - Almost never this is true (less than 10% of the time)

If there are questions you don't want to answer or that don't apply to you, just tell me.

	Almost always true (90%)	Very fre- quently true (75%)	Frequently true (50%)	Occasionally true (25%)	Almost never true (10%)
Exercise every day					
Walk whenever possible					
Play sport like basket- ball or volleyball					
Sleep when I feel tired					
Eat lean cuts of meat, poultry and fish					
Stay the right weight for my height and size					
Limit the salt I eat					
Eat fresh, uncooked fruits & vegetables					
Eat breakfast					
Eat fiber every day					
Drink enough to keep my pee light yellow					
Eat enough vitamins and minerals					



Take a vitamin pill every day					
Eat only a little store-bought bread, cakes, cookies					
Limit how much fat I eat					
Eat some fruit/vegetables, milk or dairy, breads and cereals, meat or poultry or fish or dried beans/nuts every day					
Drink water every day					
Don't add sugar to my foods					
Limit how much pre-sweetened food (sugar coated cereals, syrups) I eat					
Limit how much fast food I eat					
Examine my breasts every month					
Have my breasts examined every year by a doctor or nurse					
Have a Pap smear every year					
Don't smoke or use other tobacco					
When I am sick or hurt, I see a doctor or nurse					
I brush my teeth after I eat					
I floss my teeth once a day					
When I have sex and don't want to get pregnant I use birth control					
I do what I need to do to make sure I don't get or pass on STDs or HIV					

**APPENDIX B**

**THE MOS SOCIAL SUPPORT SURVEY**

164. About how many close friends and close relatives do you have, people you feel at ease with and can talk to about what is on your mind?

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165. People sometimes look to others for companionship, assistance, or other types of support. How often each of these are available to you if you need it?

	No ne of the tim e	A lit tle of th e ti me	Som e of the time	M ost of the tim e	All of the tim e	Skip ped- N/A	Do n't Kn ow	Ref used
a. Some one to help you if you were confined to bed	1	2	3	4	5	7	8	9
b. Someone you can count on to listen to you when you need to talk	1	2	3	4	5	7	8	9
c. Someone to give you advice about a crisis	1	2	3	4	5	7	8	9
d. Someone to take you to the doctor if you needed it	1	2	3	4	5	7	8	9
e. Someone who shows you love and affection	1	2	3	4	5	7	8	9
f. Someone to have a good time with	1	2	3	4	5	7	8	9
g. Someone to give you information to help you understand a situation	1	2	3	4	5	7	8	9

h. Someone to confide in or talk to about yourself or your problems	1	2	3	4	5	7	8	9
i. Someone who hugs you	1	2	3	4	5	7	8	9
j. Someone to get together with for relaxation	1	2	3	4	5	7	8	9
k. Someone to prepare your meals if you were unable to do it yourself	1	2	3	4	5	7	8	9
l. Someone whose advice you really want	1	2	3	4	5	7	8	9
m. Someone to do things with to help you get your mind off things	1	2	3	4	5	7	8	9
n. Someone to help with daily chores if you were sick	1	2	3	4	5	7	8	9
o. Someone to share your most private worries and fears with	1	2	3	4	5	7	8	9
p. Someone to turn to for suggestions about how to deal with a personal problem	1	2	3	4	5	7	8	9
q. Someone to do something enjoyable with	1	2	3	4	5	7	8	9
r. Someone who understands your problems	1	2	3	4	5	7	8	9
s. Someone to love and make you feel wanted	1	2	3	4	5	7	8	9

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