

The Feasibility of a Spirituality-Based Wellness Program on
Stress Reduction and Health Behavior Change

by

Jenelle R. Walker

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Approved July 2012 by the
Graduate Supervisory Committee:

Pamela Swan, Chair
Barbara Ainsworth
Jack Chisum
Julie Fleury
Steven Hooker

ARIZONA STATE UNIVERSITY

August 2012

ABSTRACT

Introduction: Several faith-based or faith-placed programs have focused on the physical dimension of wellness in efforts to improve health by increasing physical activity and improving diet behaviors. However, these programs were not designed to intervene on the mental dimension of wellness which is critical for stress reduction and health behavior change. Purpose: To evaluate the feasibility of a spirituality-based stress reduction and health behavior change intervention using the Spiritual Framework of Coping (SFC) model. Methods: This study was a quasi-experimental one group pretest posttest design. The study was a total of eight weeks conducted at a non-denominational Christian church. Participants were recruited from the church through announcements and flyers. The Optimal Health program met once a week for 1.5 hours with weekly phone calls during an additional four week follow-up period. Feasibility was assessed by the acceptability, demand, implementation, practicality, integration, and limited efficacy of the program. Analysis: Frequencies for demographics were assessed. Statistical analyses of feasibility objectives were assessed by frequencies and distribution of responses to feasibility evaluations. Limited efficacy of pretest and posttest measures were conducted using paired t-test ($p < .05$). Results: The Optimal Health Program was positively accepted by participants. The demand for the program was shown with average attendance of 78.7%. The program was successfully implemented as shown by meeting session objectives and 88% homework completion. The program was both practical for the intended participants and was successfully integrated within the existing environment.

Limited efficacy changes within the program were mostly non-significant.

Conclusion: This study tested the feasibility of implementing the Optimal Health program that specifically targeted the structural components of the Spiritual Framework of Coping Model identified to create *meaning making* and enhance *well-being*. This program may ultimately be used to help individuals improve and balance the spiritual, mental, and physical dimensions of wellness. However, length of study and limited efficacy measures will need to be reevaluated for program success.

DEDICATION

To all who persevere through pressure come endurance, character, and hope.

ACKNOWLEDGMENTS

To God, my mother, family and friends, you consistently said that it can and will be done. To my chair and each person at ASU who supported me I say thank you. You have taught and challenged. I appreciate it immensely.

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
CHAPTER	
1 INTRODUCTION.....	1
Background.....	1
Significance.....	5
Rationale.....	7
Purpose & Analysis.....	12
Aim.....	13
Limitations.....	13
Delimitations.....	14
Definition of Terms.....	15
2 REVIEW OF LITERATURE.....	17
Spiritual Framework of Coping.....	17
Faith-Based Programs & Behavior Change.....	22
Psychological & Physiological Response to Stressors.....	26
HPA Axis-SNS Interaction.....	28
Allostatic Load.....	29
Potential Pathophysiological Mechanims of Stress & Body Fat.....	29
Mental Health & Physical Activity Behavior.....	33

CHAPTER	Page
3 METHODOLOGY	40
Study Design, Population & Setting	40
Procedures	41
Subject Recruitment & Inclusion Criteria.....	42
Study Program	43
Measures & Questionnaires.....	45
Equipment & Facilities	50
Data, Statistics & Analysis	50
Dosage & Integrity	51
Conceptual Methodology	52
4 RESULTS	53
Participant Characteristics	53
Acceptability	54
Demand	59
Implementation	61
Practicality	69
Integration	69
Limited Efficacy	70
Relationships.....	73

CHAPTER	Page
5 DISCUSSION	74
Acceptability-Overall Views of Program	76
Demand	79
Implementation	80
Practicality	81
Integration	83
Limited Efficacy	84
Relationships Among Limited Efficacy Measures	86
Strengths.....	87
Limitations	88
Conclusions.....	89
REFERENCES	91
APPENDIX	
A GUIDELINES & OBJECTIVES	100
B ACCEPTABILITY	104
C DEMAND.....	107
D FOLLOW-UP PHONE QUESTIONNAIRE	109
E MANUAL OF OPERATIONS	111
BIOGRAPHICAL SKETCH	140

LIST OF TABLES

Table	Page
1. Study Design and Time Line	42
2. Acceptability: Overall Views of Program	55
3. Spiritual Health Connection to Mind and Body.....	56
4. Mind Health Connection to Body and Spirit.....	57
5. Body Health Connection to Spirit and Mind.....	58
6. Additional Comments to Optimal Health Program.....	59
7. Program Attendance.....	61
8. Implementation: Notes for Met Session Objectives	64
9. Limited Efficacy Values for SF-12, BriefRCOPE & PSS-10	71
10. Limited Efficacy Values for IPAQ & Accelerometers	72
11. Limited Efficacy Values for Dietary Intake	72
12. Limited Efficacy Values for BC, BP & RHR	73

LIST OF FIGURES

Figure		Page
1.	Direct and Indirect Effects of Stress on Health.....	3
2.	The Spiritual Framework of Coping.....	8
3.	Causal Model Underlying the Optimal Health Program	11
4.	Transactional Model of Stress and Coping	17
5.	Flow Chart of Participation.....	60

Chapter 1

INTRODUCTION

Background

Wellness is an important aspect of optimal health. Several definitions of wellness exist and thus none are universal. Wellness is typically referred to as a state of well-being. The World Health Organization (WHO) defines health as a complete state of physical, mental and social well-being and not merely the absence of disease or infirmity (WHO, 1948). In 2006 the WHO defined wellness as “the optimal state of health of individuals and groups”. This includes the realization of meeting one’s “fullest potential” physically, psychologically, spiritually and economically (Smith, Tang, & Nutbeam, 2006). Wellness is also defined as a multidimensional state of being in an individual as represented by quality of life and a sense of well-being (Corbin, Welk, Corbin & Welk, 2009). These definitions imply that health and wellness are comprehensive and more than a simple condition of the physical body or disease state.

Wellness is typically conceptualized in three dimensions [i.e. spirit, mind (mental) and body (physical)], but other dimensions have been identified (e.g. social, intellectual, environmental, occupational and emotional) and accepted in the literature. Because wellness is defined as a state it can be quantified and measured. To do this the various dimensions of wellness are identified, described and studied. Previous health promotion research has examined ways to change or enhance selected dimensions of wellness (Dehaven, Hunter, Wilder, Walton & Berry, 2004; Watt, Verma & Flynn, 1998). However, a person’s overall wellness

is a product of all the dimensions, thus a goal of health promotion programs should be to help individual's develop and balance multiple dimensions (Tang, Ehsani & McQueen, 2003). Health promotion programs could include a combination of outcomes focused on spiritual, mental, and physical health.

Reducing or preventing disease, and achieving mental health and wellness requires having coping strategies for stress which in turn may require strategies to balance spirit, mind and body (Cummings & Pargament, 2010). Mental health and wellness is comprised of effectively dealing with stress and emotions. Chronic stress is defined as the day-to-day accumulation of minor stresses (McEwen, 1998). A major contributor to poor health is high levels of continual stress. Perceived or psychological distress triggers physiological responses which can cause damage or disease when chronically experienced. For example, constant stress can result in hormone changes resulting in alterations in metabolism and/or substrate utilization and storage, which results in unhealthy weight gain and metabolic disease. Specific sub-types of obesity, such as central or abdominal fat, have strong relationships to adverse health outcomes that are often related to exposure to chronic stress (Sowers, 2003; Epel, McEwen, Seeman, Matthews, Castellazzo, Brownell et al., 2000; Rosmond, Dallman & Björntorp, 1998; Björntorp, 1997). When an individual is not able to effectively cope with continuous stress the resulting physiological response may have a direct negative effect on health. Additionally, the stress may indirectly induce further poor health outcomes through poor behavioral choices. Thus there are clear interactions between stress, behavior, and health (see Figure 1).

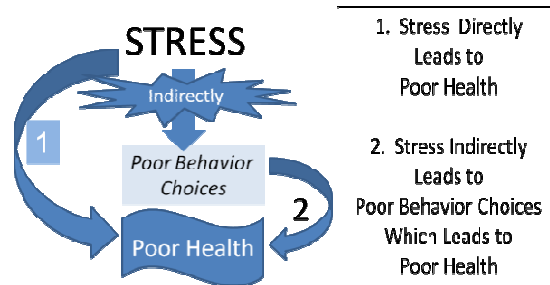


Figure 1. Direct and Indirect Effects of Stress on Health

Stress or distress can negatively affect mental health. According to the American Psychological Association's survey on stress in 2011, the majority of Americans report being overstressed due to financial concerns. This stress may then affect the balance between home and work life and making time to engage in healthy behaviors. Stress is taking a toll not only on physical health but emotional and physical well-being. While many Americans live with moderate or high levels of stress, and recognize that their stress levels far exceed what is a healthy level of stress, many report that they are too busy to manage stress due to lack of motivation, energy and time (APA, 2011). Although these individuals may be aware of the importance of behaviors such as physical activity, eating well, and getting enough sleep for their health and wellbeing, they typically report that they lack the willpower, energy, and confidence to change their behavior. This ultimately can affect the integrity of their physical well-being or wellness (APA, 2011).

The physical component of wellness encompasses all physical aspects of the body. Thus it involves not only the physical health or disease state of the body but also the physical actions and behaviors that people choose. It is well known

that there is an inverse dose-response relationship between physical activity and disease risk (Garber, Blissmer, Deschenes, Franklin, Lamonte, Lee, et al., 2011). Increasing physical activity or exercise leads to better health outcomes and quality of life (Penedo & Dahn, 2005). Mental health outcomes such as anxiety and distress are also inversely associated with regular exercise (DeMoor, Stubbe, Boomsma & Geus, 2006; DeMoor, Boomsma, Stubbe, Willensen & Geus, 2008, Dunn, Trivedi, Kampert, Clark & Chambliss, 2005). Improvements in mood, depression, anxiety, perceived stress and health related quality of life are known to be achievable with increased physical activity behavior (Milani & Lavie, 2009; Kokkinos, 2008; Callaghan, 2004). Despite all of these positive outcomes as many as 65% of Americans do not achieve the recommended levels of physical activity (Haskell, Lee, Russell, Powell, Blair, Franklin et al., 2007).

Choosing to engage in healthy behaviors such as physical activity and proper dietary habits are decisions that may be connected to ones' spiritual and mental wellness. Spirituality is a multifaceted construct that manifests in individuals' behavior, beliefs and experience and operates at several levels of the stress and coping process (Miller & Thorensen, 1999; Park & Folkman, 1997). It is generally defined as a continuing search for meaning and purpose in life and goes beyond specific religious practices. A deeper definition of spirituality includes the innate capacity and tendency to transcend ones' current locus of centrality which is the psychological view from which a person experiences and evaluates life's events (Chandler, Holden & Colander, 1992). Individuals often

rely upon their spiritual beliefs and spirituality as sources for coping with stress when faced with emotional crisis (Chandler et al., 1992).

King and Bushwick (1994) reported that 94% of patients admitted to hospitals believe that their spiritual health is just as important as their physical health. This implies that spiritual health may be a critical aspect for health professionals to understand and target. Understanding and working with ones' spiritual health beliefs may be an avenue for improving the effectiveness of health promotion and disease prevention programs.

Significance

Health professionals have the opportunity to embrace the spiritual aspect of wellness as a means to help individuals choose, adopt or maintain healthy behaviors. Faith-based and faith-placed programs have been implemented in churches to promote physical activity, proper nutrition and knowledge of various diseases (Yanek, Becker, Moy, Gittelsohn & Koffman, 2001; Wilcox, Laken, Bopp, Gethers, Huang, McClorin, Parrott, et al., 2007; Wilcox, Laken, Parrott, Condrasky, Saunders, Addy, Evans et al., 2010).

Faith-based programs are described as those that are a part of the church health ministry. Faith-placed programs are interventions tested in churches by health professionals. The implemented programs can also be collaborative efforts by the church and health professional (faith-based + faith-placed). Programs such as the Health-e-AME faith-based physical activity program evaluated stage of change in participants to ensure that the implemented programs reached all individuals in the target population (Wilcox et al., 2007). In a review of faith-

based programs, faith-placed programs, and a combination of both several programs have been shown to improve various health outcomes (Dehaven et al., 2004).

Despite the potential effectiveness of these programs, few programs specifically targeted the stress aspect of mental health and have focused mainly on the physical dimension of wellness in efforts to improve health behaviors such as physical activity and diet (Yanek et al., 2001; Wilcox et al., 2007; 2010). None were designed to address the mental dimension of wellness which is important for health behavior change. While most programs incorporated some spiritual approaches (e.g. scriptures mentioning health), few have reported matching spiritual beliefs directly to the health intervention program.

Programs that did include spiritual beliefs (i.e. scripture) connected the participant beliefs with weekly session topics (Kim, Linnan, Campbell, Brooks, Koenig & Wiesen, 2006; Yanek et al., 2001). In fact, in programs that did not intentionally include spiritual beliefs, researchers reported that participants routinely mentioned scriptural references related to health during program sessions (Bopp, Lattimore, Wilcox, Laken, McClorin, Swinton, et al., 2006). Ones' spiritual beliefs often govern and direct actions, individual lifestyle choices, and can be strongly motivating (Nagel & Sgoutas-Emch, 2007; Pargament, Koenig, Tarajeshwar & Hahn, 2004). Creating a health promotion program that draws on these beliefs may be able inspire or motivate a larger percentage of individuals to make and sustain healthy behavior choices (Miller & Thorenson, 2003).

Rationale

The combination of spiritual, mental and physical aspects of wellness can have a positive effect on health. The Spiritual Framework of Coping (SFC) is an adaptation of the Transactional Model presented by Lazarus & Folkman (1984), which incorporates spirituality as a foundational coping tool to effectively manage stress and ultimately improve dimensions of wellness or well-being (Gall, Charbonneau, Clarke, Grant, Joseph & Shouldice, 2005; see Figure 2). This model suggests that health behavior and health outcomes can be improved by targeting stress through spiritual beliefs.

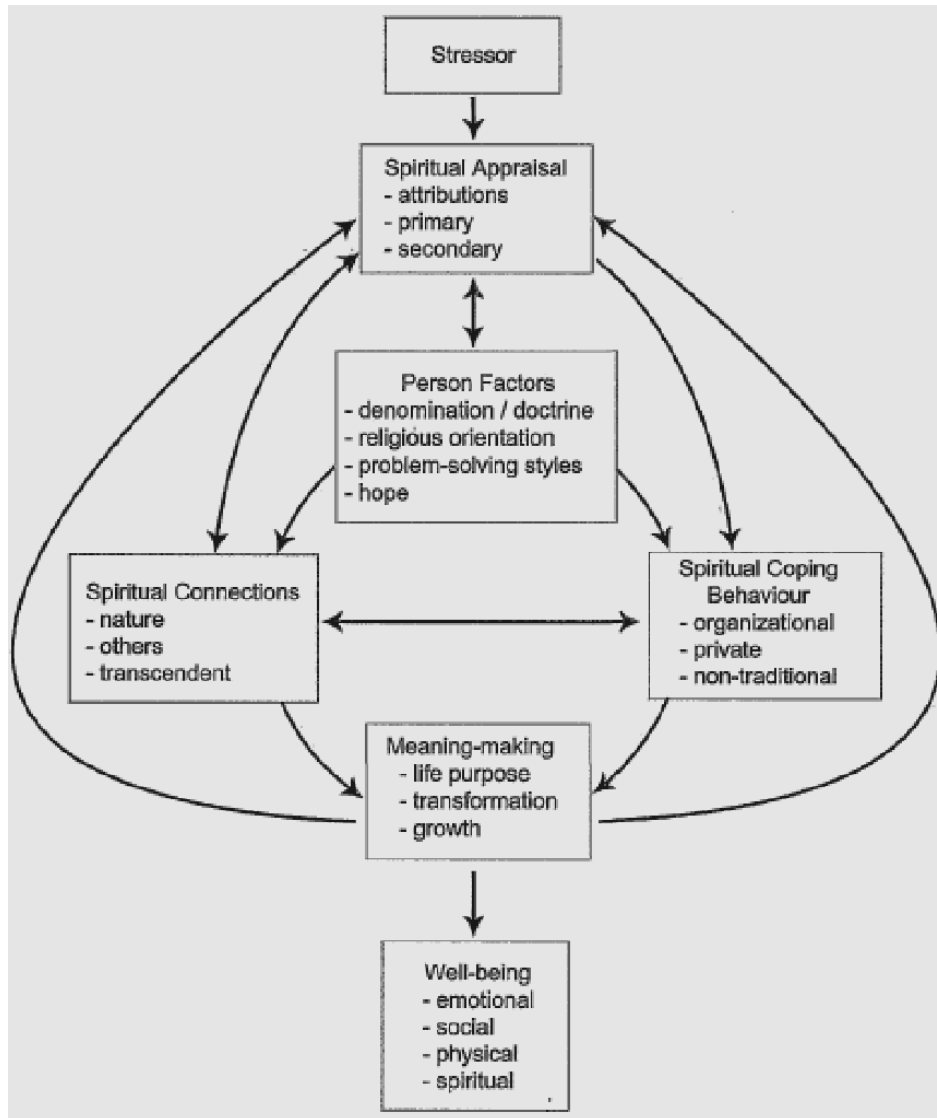


Figure 2. The Spiritual Framework of Coping (Gall et al., 2005).

The SFC model posits that when stressors occur, *spiritual appraisals* are made by individuals regardless of their specific belief system. Depending on the appraisal, specific *person factors* are used to develop *spiritual connections* and *spiritual coping behavior* thus giving meaning to the stressor. The end outcome manifests in feelings associated with each of the dimensions of *well-being*.

Components of SFC have been used in longitudinal studies with the medically ill, elderly, and hospitalized patients (Pargament, Koenig, Tarakeshwar & Hahn, 2001; Pargament, Koenig, Tarakeshwar & Hahn, 2004). These studies specifically assessed the spiritual coping component of the SFC model measured by the Brief Religious Coping (BriefRCOPE) questionnaire for mortality risk, spiritual outcomes, and changes in mental and physical health. The studies found that religious coping was significantly predictive of spiritual outcomes and changes in mental and physical health. Positive methods of religious coping were associated with improvements in health. Negative methods of religious coping were predictive of declines in health.

The SFC model can serve as the foundation for developing a theory-based intervention to improve the mental (mind/emotional) and physical dimensions of wellness. Using SFC to develop a program for a population with similar *person factors* (e.g. religious orientation, problem-solving styles) is the basis for the development of a targeted program for this study.

This study was directed at the *spiritual connection* (i.e. nature, others, transcendent) and *spiritual coping behavior* (i.e. organizational, private, non-traditional) structural components of the SFC model (see Figure 3). The *person factors* (i.e. religious orientation, doctrine, problem-solving styles, hope) were automatically engaged due to the spiritual population similarities. All aspects of the program were created for *meaning making* (i.e. purpose, transformation, growth) which can ultimately promote healthy behavior choices and *well-being*. This study was conducted to help those who have an interest in improving their

health by increasing the interconnections and balance between the spiritual, mental, and physical dimensions of wellness.

**Causal Model:
Elements of the Spiritual Framework of Coping Underlying
the Optimal Health Program**

Problem
Program Feasibility

Increased stress resulting in
poor health behavior and
physiological consequences



CRITICAL INPUTS	MEDIATING PROCESSES	EXPECTED OUTCOMES	EXTRANEOUS FACTORS	CONDITION KEY ISSUES
<u>Optimal Health Program</u> Feasibility <u>Spiritual Coping Behavior</u> Organizational Private Non-traditional <u>Spiritual Connections</u> Nature Others Transcendent	<u>Optimal Health Program</u> <i>Knowledge:</i> Connection between spiritual, mental and physical wellness Decreasing perceived stress Physical activity & dietary recommendations	<u>Increased Knowledge</u> Connection of spiritual, mental and physical well-being How to cope with stress How to meet physical activity & diet recommendations <u>Program Outcomes</u> Well-being Outcomes Possible improvement in stress level, physical activity & diet	Family, friends and social life activities Availability of resources	C: Group settings for program delivery S: Comfortable learning environment KI: Program evaluation for feasibility

Figure 3. Causal Model Underlying the Optimal Health Program

Purpose & Analysis

The purpose of this research was to evaluate the feasibility of a spirituality-based stress reduction and health behavior change intervention using the Spiritual Framework of Coping (SFC) model on changes in well-being (spiritual, mental and physical) and various health parameters.

This study evaluated the feasibility of the Optimal Health program due to the lack of published studies using this specific intervention technique (Bowen, Kreuter, Spring, Cofta-Woepfel, Linnan, Weiner et al., 2009). In addition, the SFC model had not been tested in a church population or setting. Specific feasibility objectives included: 1) Acceptability: To test the extent to which the program is suitable and attractive to program recipients. This was assessed by the feedback questionnaire given to participants asking about the acceptability of the program, 2) Demand: To test the extent to which the program is likely to be used by the intended participants. This was measured by participant attendance monitored at each Optimal Health session, 3) Implementation: To what extent is the program successfully delivered to the intended participants. Fidelity of the program was assessed through session field notes and audiotapes of the Optimal Health sessions and meeting specific session objectives, 4) Practicality: To what extent the program can be carried out with intended participants using existing means without outside intervention. This was assessed by evaluating the ability to deliver the program within the existing means and resources of the culture and environment, 5) Integration: To what extent can the new program be integrated within the existing system. This was assessed by narrative data and field notes

from researchers, and 6) Limited efficacy: To what extent does the new program show promise of being successful with the intended population. This was measured by changes in *well-being* and selected behaviors (Gall et al., 2005). These selected behaviors included perceived stress, physical activity, body composition, and dietary behavior.

Frequencies for demographics for age, race, gender and income were assessed. Statistical analyses of specific feasibility objectives were assessed by frequencies and distribution of responses to feasibility evaluations. Limited efficacy of pretest and posttest measures for well-being, spiritual coping, perceived stress, physical activity, dietary intake, body composition, blood pressure and resting heart rate were compared using paired t-test ($p < .05$). Pearson correlations were conducted to find relationships between limited efficacy measures ($p < .05$).

Aim

The aim of this study was to evaluate the feasibility of the Optimal Health program in a local church setting. The study evaluated feasibility by the acceptability, demand, implementation, practicality, integration, and limited efficacy of the program.

Limitations

Limitations to the study included the study design due to the lack of a comparison group. Participant selection was also a limitation due to the participants volunteering for the study. Evaluation of the program was determined by many self-report questionnaires. It was assumed that participants would

answer honestly for accurate statistical results and that the results may have been generalizable beyond this sample population.

Delimitations

The Optimal Health program was delimited to the spiritual, mental, and physical dimensions of wellness. As mentioned earlier there are multiple dimensions of wellness; however, these selected dimensions were the focus of the program. The study was delimited to members of a chosen non-denominational local church. While several churches and/or denominations have similar beliefs, participants in this church may create a more homogeneous sample due to agreeing to the specific mission and vision of the church. All measures or aspects of feasibility are not included in the study. The chosen measures are assumed to best evaluate the program.

Definition of Terms

Body Composition: total weight and percent body fat measured.

Chronic Stress: the day to day accumulation of minor stresses.

Dietary Intake: fruit and vegetable content, consumption, and servings; caloric and macronutrient composition of foods eaten.

Meaning-Making: how an individual creates life purpose, transformation and growth.

Mental Health (Mind Health): dealing with stress and emotions.

Perceived Stress: perception or view of the stress or stressor.

Person Factors: religious denomination and doctrine used as a means to conduct an individual's life; a personal belief system; religious orientation of an individual that can provide faith, hope and love.

Physical Activity: any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level; physical activity that enhances health.

Physical Health (Body Health): physical health or disease state of the body and the physical actions and behaviors chosen.

Spiritual Connections: relationships to nature, people and the transcendent (God).

Spiritual Coping Behavior: multidimensional state consisting of negative and positive problem- and emotion-focused strategies.

Spiritual Health: The search for meaning and purpose in life; the capacity to, and tendency to, go beyond the mental view of life's experiences; involves knowledge and love.

Spirituality: a continuing search for meaning and purpose in life, going beyond specific religious practices; the innate capacity to, and tendency to, transcend one's psychological view from which a person experiences and evaluates life's events.

Stress: a state of threatened homeostasis that is counteracted by behavioral and physiologic responses.

Well-being: a good or satisfactory condition of existence; a state characterized by emotional, physical and spiritual health.

Wellness: the optimal state of health of individuals and groups concerned with the realization of the fullest potential of an individual physically, psychologically, socially, spiritually and economically, the fulfillment of one's role expectations in the family, community, place of worship, workplace and other settings; a multidimensional state of being describing the existence of positive health in an individual as exemplified by quality of life and a sense of well-being.

Chapter 2

REVIEW OF LITERATURE

Spiritual Framework of Coping

The Spiritual Framework of Coping (SFC) is an adaptation of the Transactional Model of Stress and Coping presented by Lazarus and Folkman (1984). The Transactional Model is a framework for evaluating the coping processes associated with stressful events (see Figure 4). The stressful event is categorized as a person-environment transaction which is mediated by the person's appraisal and the psychological, social and cultural resources that are available. When threatened, an individual evaluates the threat (primary appraisal) and their ability to alter the event and manage emotions (secondary appraisal). The resulting coping efforts for emotional regulation and problem management affect the outcomes of the coping process (Glanz, Rimer & Lewis, 2002).

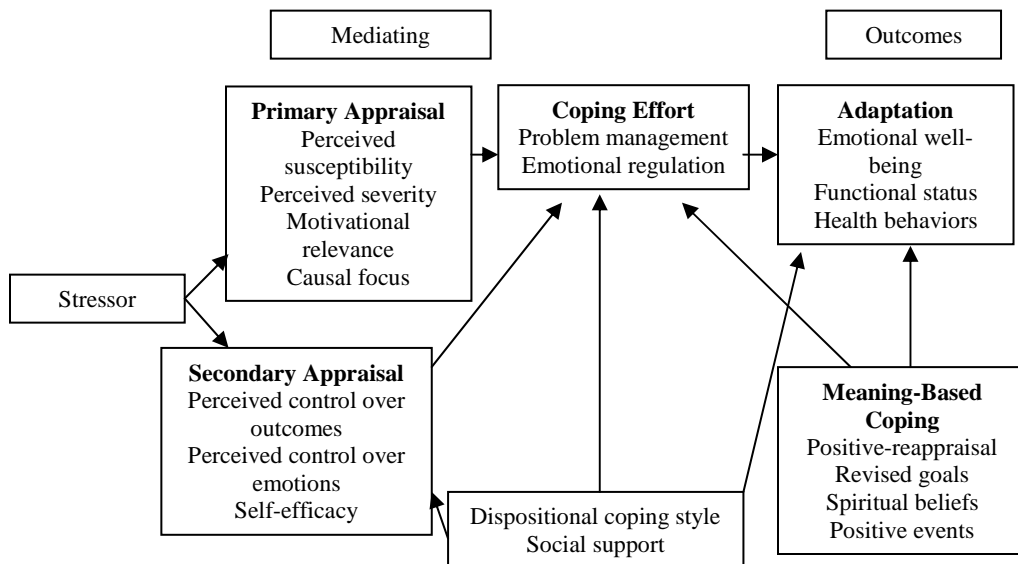


Figure 4. Transactional Model of Stress and Coping (Lazarus & Folkman, 1984; Glanz et al., 2002)

The SFC model incorporates spirituality as a foundational coping tool to effectively manage stress and ultimately improve dimensions of wellness or well-being (Gall et al., 2005; see Figure 2). This model suggests that health behavior and health outcomes can be improved by targeting stress through spiritual beliefs with constructs of the Transactional Model. The SFC model specifically draws on the tenets of the dynamic processes and the structural components such as coping behavior of the Transactional Model.

The Transactional Model and the SFC model differ in that the primary and secondary appraisals are grouped under a total component called *spiritual appraisal*. The SFC model also includes a *person factors* component founded in the individuals' denomination or doctrine. The SFC model then follows the Transactional Model path through *spiritual connections* (dispositional coping style/social support-Transactional Model) and *spiritual coping* (coping effort-Transactional Model) leading to *meaning making* (meaning-based coping-Transactional Model) and lastly *well-being* (adaptation-Transactional Model).

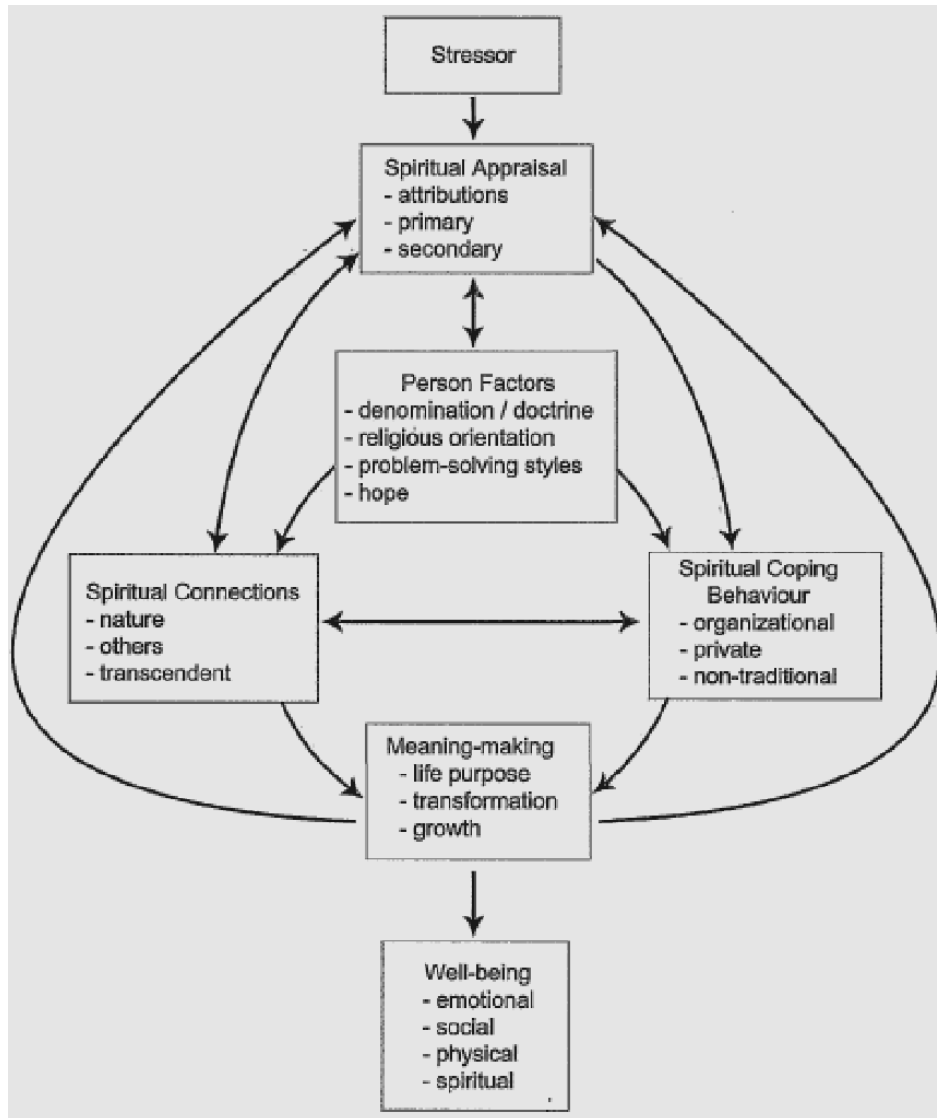


Figure 2. The Spiritual Framework of Coping (an adaptation of the Transactional Model).

The SFC model posits that when stressors occur, *spiritual appraisals* (*primary and secondary*) are made by individuals, regardless of their belief system (Gall et al., 2005). The primary appraisal can be seen as spiritual evaluation of the stressor and the secondary appraisal as the control over outcomes or emotions. Depending on the appraisals, specific *person factors* such

as denomination or religious orientation may be used to develop *spiritual connections* and *spiritual behavior coping*, thus making meaning of the stressor. *Person factors* such as religious denomination and doctrine are utilized as a means to conduct an individual's life. It can define a personal belief system. The religious orientation of an individual can have an effect intrinsically by the internalization of understanding to the transcendent providing faith, hope and love and extrinsically can provide comfort and safety. *Person factors* are also directed by the coping style. A person may have a self-directed style in which the individual functions independent of God; a deferring style by which a passive role is assumed and waits for God to act; or a combination of both. Hope is the final core person factor that can lead to *meaning making* and further benefits (Gall et al., 2005).

The *spiritual coping behavior* construct is multidimensional consisting of negative and positive problem- and emotion-focused strategies. These can include religious, spiritual and nontraditional spiritual practices. The construct of *spiritual connection* can be described by relationships to nature, people and the transcendent (God). All of these constructs affect the construct of *meaning making* by which an individual creates life purpose, transformation, and growth. The final result manifests in actions and feelings associated with *well-being* (i.e. emotional, social, physical and spiritual).

In a two year follow-up, religious coping was significantly predictive of spiritual outcome and changes in mental and physical health in the medically ill, elderly, hospitalized patients (Pargament et al., 2004). The patients (n = 268)

responded to measures of spiritual, psychological and physical functioning and religious coping at baseline and at two-year follow-up. Religious coping was measured by the RCOPE, mental health and spiritual outcomes by questions on depression, quality of life, stress-related growth and three questions on spiritual outcomes. Physical health was evaluated by items on functional status and activities of daily living, cognitive status (mini-mental state exam) and the American Association of Anesthesiologists' Severity of Illness Scale. Positive methods of religious coping (e.g. seeking spiritual support, benevolent religious reappraisals) were associated with improvements in health. These studies specifically assessed the spiritual coping component of the SFC model. Positive religious coping were associated with improvements in health. Negative religious coping (i.e. God punishing me) were predictive of declines in health.

To investigate the relationship between religious struggle with an illness and mortality a cohort (n=596, age >55 years) was evaluated to assess positive religious coping, religious struggle, physical health and mental health (Pargament et al., 2001). Higher religious scores at baseline were predictive of greater risk of mortality (risk ratio [RR], 1.06; 95% confidence interval [CI], 1.01-1.11, p=.02). The elderly ill women and men experiencing a religious struggle with their illness were at an increased risk for death after controlling for baseline health, mental health status, and demographics.

A meta-analysis on religious coping and psychological adjustment to stress synthesized the research on situation-specific religious coping and sought to quantify the efficacy of the studies in people dealing with stressful situations (Ano

& Vasconcelles, 2005). The meta-analysis evaluated positive religious coping with positive psychosocial adjustment, positive religious coping with negative psychological adjustment, negative religious coping with positive psychological adjustment, and negative religious coping with negative psychological adjustment. In a total of 49 studies (n=13,512) positive religious coping was related to positive psychological adjustment (.33; 95% confidence interval [CI], .30-.35, $Q_T = 285.02$, $p < .01$) and negative religious coping was related to negative psychological adjustment (.22; 95% confidence interval [CI], .19-.24, $Q_T = 188.35$, $p < .01$). The study concluded that it may be beneficial to study these relationships to clarify the relationships between religion and mental health.

Faith-Based Programs & Behavior Change

Several faith-based and faith-placed programs reviewed in the literature (n=105) have been implemented in various church settings as a preventative and maintenance measure to promote health (50.9%), general health maintenance (25.5%), cardiovascular health (20.7%) and in cancer prevention (18.9%) (Dehaven et al., 2004). Those studies that conducted statistical analyses report significant reductions in cholesterol, blood pressure levels, weight, and disease symptoms. Most of the programs targeted a single congregation (40%) with a median number of three (range: 1-95). When a specific population was targeted it tended to be African-American (41.5%). Other programs included non-specified (32.5%), targeted low income or underserved (13.2%), Hispanic (7.5%), Caucasian (3.8%), or other (1.9%) populations. Faith-based programs that were an actual part of the churches health ministry accounted for 24.5% of the

implemented programs. Faith-placed programs, those created by health professionals outside of the congregation, accounted for the largest percentage at 43.4% of implemented programs. Faith-placed programs were more likely to report outcome data (75%) than either faith-based (30.4%) or collaborative (faith-based + faith-placed at 37.5%). A large amount of programs (n=386) have been conducted in the area of faith-based research between 1990 and 2000. Less than one-third were eligible for review. However, the programs that were eligible (N=53) in this review increased knowledge of disease, improved screening behavior and readiness for change and reduced the risks associated with disease and disease symptoms. Since the year 2000 new faith-based programs have been implemented and evaluated and will be discussed.

The Faith Activity and Nutrition (FAN) program used a community-based participatory approach and the social ecological model as a basis for increasing self-reported physical activity, fruit and vegetable consumption, and to reduce blood pressure in African-Americans (Wilcox et al., 2010). Secondly, it aimed to objectively measure fiber/whole grain consumption and moderate-intensity physical activity and reduce fat consumption. The study was designed as a group randomized trial with two levels of clustering (N=1279, n=316 accelerometer subgroup) within church (district) and church within church clustering. Eligibility for the study required that participants be 18 years or older, have no serious medical conditions or disabilities that would make physical activity difficult, planning to stay in the area for a two year period and attend worship services at least one time per month. The study was implemented in two waves of

randomization into an immediate or delayed treatment with the first wave of seven clusters (23 churches) and subsequent waves (51 churches). The 15-month intervention consisted of full day trainings on how to implement physical and dietary changes in a church for church committee members, pastors and cooks. Monthly mailings and technical assistance were delivered throughout study duration. Baseline and end of study measures (month 15) were taken. This study specifically targeted the social, cultural and policy influences within the church setting.

The WORD (Wholeness, Oneness, Righteousness, Deliverance) program was a weight loss intervention with a two-group, quasi-experimental, delayed intervention design with church units (treatment n=2, control n=2) and individual units within the church (treatment n=36, control n=37). The study conducted eight weekly sessions targeting health nutrition, physical activity and faith's connection with health (Kim et al., 2006). The researchers first conducted a series of five focus groups with 10-13 participants. WORD leaders were trained to conduct the two and a half hour weekly sessions. Recruitment began one month before start date and a health day was held two weeks prior to encourage participation. The weekly sessions consisted of a learning module (30 min), measurements/mingling (10 min), previous week review (10 min), physical activity/exercise tape (15 min), bible study about health (15 min) and prayer (5 min). The mean weight loss in the treatment group was 3.6 ± 0.64 and 0.59 ± 0.59 in the control group.

Health-e AME was a project implanted within the African American Episcopal churches (Wilcox et al., 2007). A cohort of 20 randomly selected

churches (571 members within) completed telephone surveys at baseline, one year and two years later. Focus groups (n=8) were initially conducted for input and to aid in intervention development. The study used the conceptual frameworks of the Social Ecology and Transtheoretical Models. To target individuals in the contemplation and preparation programs were developed to teach behavior changing skills for healthy eating and physical activity. To reach those in the later stages of change (e.g. action) action-oriented programs were developed such as praise aerobics and chair exercises. Outcomes for this study included physical activity participation, meeting physical activity recommendations, and stage of change for readiness to participate in physical activity. Overtime physical activity did not increase. Among those who were aware of the program, there was a significant relationship to all physical activity outcomes and fruit and vegetable consumption. Pastoral support was also associated with increases in physical activity.

Project Joy was a faith-based cardiovascular health promotion program designed for African American women 40 years and older (n=529, 16 local churches). The women participated in church-based nutrition and physical activity strategies for a 20-week period (Yanek et al., 2001). These included a standard behavioral group, standard intervention group with spiritual strategies or a self-help group. Results of the intervention group showed small improvements in body weight (-1.1 lbs.), waist circumference (-0.66 inches), systolic blood pressure (-1.6 mmHg), dietary energy (-117 kcal/day), dietary total fat (-8 g) and sodium intake (-145 mg). The self-help group showed no improvements.

Psychological & Physiological Response to Stressors

Psychological stress triggers physiological responses in the body which operate to efficiently deal with a particular event. Physiological responses to stress can be acute initially but long-term stress can have chronic effects on the body. Stress or the adaptive stress response is defined as a state of threatened homeostasis that is counteracted by behavioral and physiologic responses with the goal of reestablishing balance. Chronic stress is defined as a state of continual threat to homeostasis due to persistent and frequent stressors (Kyrou, Chrousos & Tsigos, 2006).

Continual activation of the stress response can lead to specific types of weight gain and disease. Central obesity is an independent risk factor for the chronic diseases and high levels of stress can affect body fat distribution. The interactions between the hypothalamic-pituitary-adrenal (HPA) axis and sympathetic nervous system (SNS) stress response can ultimately affect adipose tissue distribution. The stress response is a vital part of human function that can be triggered by various psychological stressors yet the physiological response across individuals is the same. The physiological response can be positive or negative both of which are dependent upon appraisal of the psychological stressor. Allostasis describes the balance of the stress response system which is similar to other homeostatic processes in the body (McEwen, 1998). When the stress process is continual the allostatic load increases and can affect weight.

When the stress response is triggered there is an appraisal of the situation which leads to a series of physiological responses. Acute stress is commonly

described as the “fight of flight” response by which the central nervous system processes the information for the peripheral system to cause tissues to act. The reaction to a stressor begins with the mind perceiving the event as a threat and responding by fleeing or fighting. Secondly, the body responds physiologically through direct and indirect processes via the HPA axis and the SNS. The communication and interaction from the HPA axis and SNS stimulate the release of epinephrine (which ultimately causes vasoconstriction in GI tract and skin, increased heart rate, blood pressure and glucose release) and stimulates the adrenal glands to release cortisol. Cortisol’s release results in breakdown for glycogen, increased utilization of fat and increased immune function in the short term (Chrousos & Gold, 1992). This entire process is the normal response to a stressor which ends when the stressor is no longer present. The stress response becomes problematic when stressors are continually activating the response. This not only wears the system down but it also creates alterations in behavioral choices (i.e. physical activity, diet) to combat the continual response.

Negative changes in behavior affect health. Chronic stress is the day-to-day accumulation of minor stresses (McEwen, 1998). When an individual is not able effectively cope with stress the physiological response is continuous. This results in a direct process of central and visceral fat accumulation. Fat is also accumulated indirectly through poor behavioral choices (i.e. diet, lack of physical activity, addictive behaviors). Normal stress response patterns and actions as well as positive health outcomes are a result of effectively coping with stress.

HPA axis – SNS interaction. The neurological-physiological stress response mechanism consists of the hypothalamic-pituitary-adrenal (HPA) axis which triggers and interacts with the sympathetic nervous systems (Kyrrou, Chruosos & Tsigos, 2006). The HPA axis is ultimately responsible for the release of cortisol that allows glucocorticoids to be released to the tissues. Stress triggers the hypothalamus to send releasing hormones to the pituitary gland. The releasing hormones include: gonadotropin releasing hormone (GnRH), corticotrophin releasing hormone (CRH), growth releasing hormone (GRH) and thyroid releasing hormone (TRH). The pituitary then releases luteinizing hormone/follicle stimulating hormone (LH/FSH), adrenal corticotrophin hormone (ACTH), growth hormone (GH) and thyroid stimulating hormone (TSH). This ends in the release of sex steroids, cortisol, growth hormone and T4 and T3 which have direct effects on tissues such as bone/muscle mass and adipose tissue.

The SNS responds to stress from the locus ceruleus of the autonomic nervous system and through the sympathetic ganglion by the release of epinephrine and norepinephrine. Both are responsible for heart rate response, blood pressure, alertness, gastrointestinal tract function, and arousal. When these are triggered the response is continual until the stressor is no longer present or a threat or the body cannot continue to react. The HPA axis and the SNS are in continual communication in the body. Signals are sent between each to either inhibit or promote responses to stress. Feelings of pain can be controlled through the arcuate nucleus. Proopiomelanotrophic (POMC) acts as a signal between the HPA axis and the SNS. Substances neuropeptide Y (NPY) and substance P (SP) are

also signalers for the release or inhibition of hormones. Together both systems regulate physiologic responses to stress and control the allostatic load on the body.

Allostatic Load. Allostatic load is comprised of unremitting stress, inability to adjust, and the inability to shut off the stress response when stress event is over. Allostasis is a systemic branch of homeostasis with the purpose of providing stability for the body during life events (McEwen, 1998). It is similar to homeostatic processes such as maintaining a steady body temperature. Allostatic load can also be described as the systemic wear and tear on the stress response (ex. repeated stretching of a rubber band). Maintaining allostasis and/or decreasing consistent allostatic load is directly affected by the perception of the stressor and thus the response to a stressor. Stressors can consist of any event or situation; it is the individual's psychological attention/awareness (perception) and the acceptance (response) that determines the degree of allostatic load that is placed on the body. Consistent stress triggers continual activation of both psychological and physiological responses which are contributory to poor health and specifically to increases in abdominal fat (Björntorp, 2001).

Potential Pathophysiological Mechanisms of Stress & Body Fat. Perceived or psychological stress causes the physiological stress response to occur. Although research shows an association between stress and obesity, specific types of obesity may be more strongly related. Adipose tissue operates differently according to its anatomic distribution. Unremitting stress can have effects such as the development of central obesity which can lead insulin resistance and

dyslipidemia. Central obesity (apple shape) is an independent risk factor for health and contributes to the diseases associated with visceral obesity (Sowers, 2003). Continual stress has been linked to weight changes specifically in the abdominal region. Increases in central obesity (subcutaneous fat) may be indicative of increases in visceral fat. Visceral fat when compared to subcutaneous fat is more hyperactive (Björntorp, 1997). Cortisol promotes free-fatty acids (FFA's) to be more readily released and taken up by vital organs (i.e. the liver).

The stress response and ultimately cortisol release can be altered by behavioral adaptations and changes in fat distribution. Adipose tissue is located more centrally for men and in the thighs for most females. Specific distributions of fat can determine cortisol release in the stress response. Studies done to stimulate stress and determine cortisol response were conducted in women with various waist-to-hip ratios (WHR). High WHR is shown to be related to uncontrollable stress amongst other factors. Women with low and high WHR's were measured for cortisol and mood during 60 minute stressful sessions (Moyer, Rodin, Grillo, Cummings, Larson & Rebuffé-Scrive, 1994). In addition, backgrounds on stress and psychological trait variables were also measured and showed that women with high WHR had poorer coping skills and differences in mood reactivity than those with lower WHR.

Central fat distribution was indicated by WHR in which 30 women with high WHR and 29 women with low WHR were exposed to three sessions of psychological stressors and one control session and salivary cortisol reactivity

was measured (Epel, McEwen, Seeman, Matthews, Castellazzo, Brownell et al., 2000). Women with higher levels of central fat distribution evaluated for cortisol reactivity reported more chronic stress than those with lower levels of central fat. Interestingly, lean women with a high WHR continued to secrete significantly more cortisol in response to the same challenges as the sessions continued for days two and three, than lean women with a low WHR. This suggests that fat distribution may be more important to consider versus total body fat.

Cortisol secretion through the HPA axis is triggered by stress in men as well and is associated with changes in regulation of the HPA-axis. In a study of salivary cortisol, measurements were taken and perceived stress was reported during a work-day in 51 year old men (Rosmond et al., 1998). Anthropometric measurements (BMI, sagittal diameter, WHR), blood pressure, hormones and serum lipids were assessed. WHR and BMI showed strong positive associations with stress-related cortisol secretion and strong inverse associations with high density lipoproteins (HDL).

The HPA axis' final hormone effectors are the glucocorticoids which largely affect body metabolism. Their major purpose of the HPA stress response is to promote catabolic actions in order to utilize energy resources against the challenges expressed by various stressors (Kyrou et al., 2006). Glucocorticoids stimulate hepatic gluconeogenesis, elevation of plasma glucose concentrations, lipolysis, and protein degradation for tissues such as muscle, bone and skin. Prolonged action of the glucocorticoids can increase visceral adiposity. The HPA axis and its sensitivity to glucocorticoids have a critical role in fat distribution.

Reward Based Stress Eating is a theoretical model that has been proposed to explain glucocorticoid influence on increases in adipose tissue, specifically visceral fat (Adam & Epel, 2007). The theory states that cortisol may promote intake of more energy dense foods. Glucocorticoids decrease in response to insulin and leptin action but under chronic stress dysregulation of the system can occur and contribute to visceral fat accumulation and increased energy intake by decreased sensitivity of negative feedback signals. Increased visceral fat accumulation may be explained by increased glucocorticoid metabolism due to increased glucocorticoid receptors in the tissue (Lundholm, Rebuffé-Scrive & Björntorp, 1985). High concentrations of cortisol stimulate whole body lipolysis. However, when insulin is present, lipid mobilization is inhibited and lipid accumulation occurs through stimulation of lipoprotein lipase or through lipolytic effects of growth hormones (Djurhuus, Gravholt, Nielsen, Christiansen, Schmitz & Moller, 2002).

An additional mechanism contributing to the link between psychological stress and body fat are cytokine responses. Adipose tissue releases cytokines like TNF alpha and Interleukin-6 which can cause a continual cyclic release of cortisol and SNS action influencing energy balance (Chrousos & Gold, 1992).

The proposed mechanism for cytokine response involves cytokines leptin, interleukin-1 receptor antagonist (IL-1Ra) and interleukin-6 (IL-6) as factors in fat activity and metabolism (Brydon, O'Donnell, Zachary, Wardle & Steptoe, 2008). Obese individuals and who are stressed have shown abnormal circulating levels of these proteins. Cytokine responses to acute mental stress and its

association with adiposity in 67 healthy young college women (ages 18-25) were evaluated (Chrousos & Gold, 1992). Anthropometric and body composition were determined by BMI, waist circumference and body fat percentage by bioelectrical impedance analysis (BIA). Mental stress testing, blood pressure and heart rate values were recorded at baseline, during two challenging tasks (Stroop and speech) and lastly in recovery 40-45 minutes post-stressor. Sample of blood were taken at baseline, immediately post-stress and 45 minutes post-stress to assess circulating cytokines. Salivary cortisol measures were also taken throughout the sessions. Women with higher levels of abdominal fat had increased cytokine responses with stress. A positive correlation between waist circumference and stress-induced increases in plasma levels of leptin ($p < 0.05$) when separated into tertiles and IL-1Ra responses ($p < 0.05$) were found. There was also a significant positive correlation between prolonged diastolic blood pressure responses to stress and measures of total and abdominal obesity ($p < 0.05$).

Mental Health & Physical Activity Behavior

Physical activity (PA) effectively enhances health and is an important factor in disease prevention and longevity. It also has other benefits that go beyond physical manifestations. According to the 2008 Physical Activity Guidelines for Americans scientific report improvements in mental health, such as depression and cognitive function, can be a benefit of regular PA (Physical Activity Guidelines Advisory Committee Report, 2008). Most Americans, however, still do not reach the recommended levels of PA of 150 minutes of moderate intensity PA or 75 minutes per week of vigorous PA (Haskell et al.,

2007). While mental health includes many aspects such as depression and sleeping disorders other mental health issues such as anxiety and distress are common among many Americans. High amounts of stress are related to quality of an individuals' mental health and stress is rising among Americans (APA, 2011). Many people report that stress is present in their everyday lives psychologically and physically. Effectively managing stress may be a factor in decreasing the severity of these issues and PA is a practical means that can be used to lessen the symptoms by improving health.

The amount of PA recommended by the 2008 Physical Activity Guidelines shows a beneficial relationship regarding exercise and mental health issues such as depression and improvements in sleep duration and quality (Physical Activity Guidelines Advisory Committee Report, 2008). Increased PA of the recommended levels is a healthy behavior shown to provide better fitness levels and health such as diabetes indices, blood pressure, and HDL's (Kokkinos, 2008). Recommended amounts of activity can be achieved in many different settings, with various types of activities, and do not have to be structured or planned exercise. Several moderate intensity activities provide MET levels that can meet the physical activity recommendations (Ainsworth, Haskell, Whitt, Irwin, Swartz, Strath et al., 2000). The overall population and the clinically diagnosed population can have improvements in mental health with recommended amounts of physical activity.

The relationships between mental and physical health however may not be linear relationships but rather circular in nature where one affects the other. Using

healthy behaviors such as PA as one of many mechanisms for treatment of mental health may be beneficial. Stress, anxiety and depression affect behavior negatively and this could be an antagonist to weight management. Physical activity has been neglected over the decades as a viable tool for mental health (Callaghan, 2004). According to Callaghan, clinically diagnosed mental health issues such as depression and anxiety are rarely treated with PA. The first course of action is usually drug therapy and counseling. For some individuals drug therapy may be avoided if physical activity was recommended initially.

Studies evaluating mental health, physical activity, and exercise show the benefits. However they can be criticized for methodological flaws and lack of objective measures. The studies are not typically Level 1 Grade A randomized controlled trials therefore the outcomes of the studies are scrutinized. This may explain why exercise is not heavily promoted for treatment of mental health for the clinical population. In a review evaluating quasi-experimental studies (Level B & C) of mental health and physical activity greater amounts of leisure time and occupational physical activity were associated with reductions in depression (Dunn, Trivedi & O'Neal, 2001). The dose-response relationship is shown regardless of intensity level and both resistance and aerobic training have shown benefits in reduction of symptoms. In studies of depression, anxiety, and PA there are few if any randomized controlled trials that have controlled for frequency and duration of exercise or total energy expenditure.

Depression and PA have been examined in various studies (Rethorst, Wipfli & Landers, 2009). Most of these studies show the positive effects of PA on

depression. In this meta-analysis the greatest change in depression scores due to PA was seen more heavily in the clinical versus non-clinical populations. The average change in the Beck Depression Inventory (BDI) was 10.60 in the clinical population and 2.64 in the non-clinical population. Change in depression scores also varied by the intervention duration between the clinical and general population. In the general population interventions as short as four to nine weeks were effective while 10-16 weeks resulted in significantly larger effects in the clinical population.

In studies evaluating mental health the type of PA (aerobic versus resistance) there were no significant differences in the clinical population versus the general public (Rethorst et al., 2009). In the general population however, a combination of aerobic and resistance training had significantly larger effects than either alone. For exercise duration changes in depression were seen for bouts as short as 20-29 minutes in the general population while longer bouts of 45-59 minutes were needed for significant change in the clinical population. Treatment of depression with exercise had larger anti-depressive effects than psychotherapy but this outcome was non-significant.

Serotonin levels can be measured to assess levels of depression. Serotonin action is improved by exercise (Wipfli, Landers, Nagoshi & Ringenbach, 2011). In this seven week intervention undergraduates (n= 72) were randomly assigned to an exercise group or stretching only group. The exercise group consisted of 30 minute bouts of cycling at 70% of age predicted heart rate maximum and the stretching group completed three 30 minute sessions per week of yoga and

stretches. Exercise improved serotonin re-uptake which may indicate a positive mental health status and ultimately provide improvements in depression.

Positive mental health is associated with sleep duration and sleep quality (Ford, Douglas & Kamerow, 1989). Sleep allows the body rest, recover and repair from daily actions. Without sleep several bodily functions are negatively affected. Over 7,000 respondents in the National Institute of Mental Health Epidemiologic Catchment Area were questioned about sleep and psychiatric symptoms. In those who reported insomnia or hypersomnia greater than 40% had a psychiatric disorder. Physical activity is shown to improve sleep duration and quality of sleep (Kubitz, Landers, Petruzzello & Han, 1996; Driver 2000). Regardless of the type of PA that individuals engaged in REM sleep was longer in duration. Additionally, improvements in quality of sleep occurred and more hours of sleep were attained. Greater benefits were seen for those who were clinically diagnosed such as those with sleep apnea. Ease of falling asleep, longer duration and deeper sleep are achieved after exercise (North, McCullagh & Tran, 1990).

The 2008 Physical Activity Guidelines state that it is unclear whether physical activity has benefits for distress or anxiety. There are studies however that do show some benefits of PA on distress or anxiety. Distress can manifest as a result of psychological or physiological stressors and or from the combination of both. Anxiety and distress are associated with regular exercise (DeMoor et al., 2006; 2008). In the Netherlands Twin Registry 51.4 % of participants reported completing a minimum of 60 minutes of exercise at four METS. Adolescent and adult twins and their families (N = 19,288) participated in the study on lifestyle

and health from 1991–2002. Every two years exercise participation, anxiety, depression and personality were assessed with self-report questionnaires. These exercisers reported being less anxious, depressed and neurotic than non-exercisers.

Physical activity has also been utilized in populations with high stress and disease. These studies evaluated the physiological response and the psychological responses to stress. Psychosocial stress, survival rates and exercise training in those with coronary artery disease were studied (Milani & Lavie, 2009). Patients participated in approximately 12 weeks of 36 educational and exercise sessions based on ability and other risk factors. Exercise session consisted of warm up and 30-to-40 minutes of aerobic and dynamic exercises at 70-85% of the maximum heart rate. Stress levels were evaluated by the Kellner Symptom Questionnaire. Three groups were compared (high stress & PA; low stress & PA and usual care). Exercise training had significant positive effects for decreases in stress (10% to 4%, $p < .001$). Mortality rates were four-fold higher in patients with high stress. Exercise improved peak oxygen uptake in high and low stress groups (-1.6 ml/kg/min, $p < .0005$). Those with the high stress decreased the most after the intervention (35.5 ± 8.7 to 15.3 ± 12.2 , $p < .0001$). The usual care group did not show the same benefits.

Stress management training and exercise training in ischemic heart disease (IHD) and exercise-induced myocardial ischemia patients improved cardiovascular risk (Blumenthal, Sherwood, Babyak, Watkins, Waugh, Georgiades et al., 2005). Aerobic exercise (35 minutes 3 times per week) and

stress management training (1.5 hour sessions) and usual care were completed over a period of 16 weeks. Both stress management and exercise training showed the most improvements in BDI scores (8.2 ± 0.6) more than usual care (10.1 ± 0.6 , $p=.02$) alone.

Chapter 3

METHODOLOGY

The purpose of this research was to evaluate the feasibility of a spirituality-based stress reduction and health behavior change intervention using the Spiritual Framework of Coping (SFC) model on changes in well-being (spiritual, mental and physical) and various health parameters. Feasibility was assessed by measuring the acceptability, demand, implementation, practicality, and integration of the program. Limited efficacy of the program was evaluated for changes in wellness, spiritual, mental, and physical health.

Study Design, Population & Setting

This study was a quasi-experimental one group pretest posttest design. The study was conducted for a total of ten weeks (one week pretest, four week knowledge and skill building sessions + four week follow-up, one week posttest). The study was completed at a non-denominational Christian church in the local metropolitan Phoenix area. The church has a multi-cultural and diverse population that is representative of the greater Phoenix area. The leaders of the church described the population as majority Hispanic (approx. 35%), African American (approx. 30%), Caucasian (approx. 30%) and other (approx. 5%). According to the pastoral staff, several member families report that they are in the low SES category. Approval for the study was provided verbally and discussed in meetings with the church leadership.

Procedures

The study lasted ten weeks with pretests and posttests (Table 1). Participants were recruited and upon consent completed the pretests for the study. Participants were given an accelerometer to wear for a seven day period. After tests were completed, participants began the four-week Optimal Health program. The lead investigator led all sessions of the Optimal Health program. The lead investigator followed up weekly with the participants by phone calls with participants using scripted questions about their spiritual, mental and physical health (Appendix D). The content of the program presented in the initial four week session was reinforced through the follow-up phone calls for a period of four weeks. The standard dosage of the follow-up phone calls was a minimum of 10 minutes and a maximum of 30 minutes. Follow-up phone calls began on the first day of the week (e.g. Monday). If the participant was not reached on this day subsequent phone calls were done each day until the end of the week (e.g. Saturday).

At the end of the one month follow-up, participants met again to complete the posttests and wear the accelerometer again for a seven day period. Staff members for the study were trained for the pretest and posttest measures. Study staff members were also tested for inter-rater reliability before the study begins (Appendix E). The lead investigator conducting the Optimal Health sessions did not collect the pretest and posttest measures to decrease any sources of measurement bias. At least one additional staff member attended each session to

audiotape and evaluate the session for meeting session objectives. Table 1 outlines the intervention design and time line.

Table 1

Study Design and Time Line

Pretest	*Pretest Assessments	1 hour
Week 1	Optimal Health Program: Introduction	1.5 hr.
Week 2	Optimal Health Program: Spiritual Health	1.5 hr.
Week 3	Optimal Health Program: Mind Health	1.5 hr.
Week 4	Optimal Health Program: Body Health	1.5 hr.
Week 5	Follow-up Phone Call	10-30 min
Week 6	Follow-up Phone Call	10-30min
Week 7	Follow-up Phone Call	10-30 min
Week 8	Follow-up Phone Call	10-30 min
Posttest	*Posttest Assessments	1 hour

****Pretest Assessments (T1)*: Informed Consent, Demographics, PAR-Q, SF-12 (well-being), Brief RCOPE, PSS-10 (perceived stress), IPAQ & Seven day accelerometer wear (physical activity), NCI Fruit & Vegetable Screener (dietary intake), body composition and blood pressure.

****Posttest Assessments (T2)*: SF-12 (well-being), Brief RCOPE, PSS-10 (perceived stress), IPAQ & Seven day accelerometer wear (physical activity), NCI Fruit & Vegetable Screener (dietary intake), body composition, blood pressure and Feedback Form.

Subject Recruitment & Inclusion Criteria

All men and women who are 18 years of age and older and are members of the River of Life Church were invited to participate in the study. Upon approval by the Arizona State University Institutional Review Board, participants were recruited. Participants for the study were recruited from the local church setting via verbal and announcements, flyers and informational tables two to three weeks before beginning of

study. Individuals interested in participating were asked for their name, phone and email. They were also be given times and dates for the first informational session. This session consisted of informed consent and pretest for the study.

For inclusion in the study participants needed to be adults (18 and over) and members of the church. All gender, races and ethnicities were included in the study. The only exclusion criteria for this study were potential participants being non-members of the local church for a homogeneous population. Participants with health risks were identified at beginning of study through the completion of the Physical Activity Readiness-Questionnaire (PAR-Q). Participants answering yes to any of the PAR-Q questions were advised to consult physician before making any changes based off of the knowledge from the Optimal Health program. The amount of participants screened was 32. A total of 20 participants were enrolled. Participants were considered a dropout if they missed greater than two sessions (three or more sessions). A minimum of 20 participants was the goal for the study based on faith-based studies that have enrolled 20-40 participants per church group (Wilcox et al., 2007; Kim et al., 2006; Yanek et al., 2001).

Study Program

The Optimal Health program consisted of 90 minute weekly sessions targeting knowledge on spiritual, mental and physical health. Program aids for delivery of the program included PowerPoint presentations, binders, and

handouts. The handouts consisted of study modules and questions for the week that could put in the binder. The sessions were designed to target the SFC model constructs of *person factors* (PF), *spiritual connections* (SC), *spiritual coping behavior* (SCB) and *meaning making* (MM) to have an ultimate effect on *well-being* (emotional, physical, social, spiritual). Each session began with prayer, then an overview of the previous week homework, current session presentation and brief mention of the next week topic.

Optimal Health Program. The Optimal Health Program consisted of four topic modules following a standard session format. Participants received a pedometer and study program booklet for participation. The pedometer and booklet are items that participants used to track exercise and complete the weekly sessions of the Optimal Health program. See Appendix A for an outline of the participant and instructor objectives of each Module.

Standard Session Format (approx. minutes):

- Opening Prayer: 5 minutes
- Review: 10-15 minutes
- Current Week Presentation & Discussion: 35-40 minutes
- Introduction for next session: 5 minutes
- Closing Prayer: 5 minutes

Module 1: Introduction to Optimal Health Program

Module 2: Spirit Health

Module 3: Mind Health

Module 4: Body Health

Measures & Questionnaires

Participant demographics were assessed by questions from Behavioral Risk Factor Surveillance System Survey (CDC, 2011). Participants were asked how often they attend church in a one month period. Specific feasibility measures included: 1) Acceptability: To test the extent to which the program is suitable and attractive to program recipients. The feasibility objective of acceptability was obtained by a standard questionnaire asking participants whether they liked or disliked the program and included areas for specific comments on aspects of the program (Appendix B), 2) Demand: To test the extent to which the program is likely to be used by the intended participants. This was measured by participant attendance (participant sign-in sheet) (Appendix C) taken at each Optimal Health session. Participants were considered a dropout if they miss three or more sessions (greater than two sessions) and were contacted at the end of the study to obtain reason(s) for not completing the program, 3) Implementation: To what extent is the program successfully delivered to the intended participants. Fidelity of the program was assessed through session field notes and audiotapes of the Optimal Health sessions to determine if specific session objectives were met and program homework. During sessions participants will be asked if they completed homework. The amount of homework completed will be documented for each session. The taped four week group sessions were transcribed using Dragon Naturally Speaking Recognition Software, 4) Practicality: To what extent can the program be carried out with intended participants using existing means without outside intervention. This was assessed by evaluating the ability to deliver the

program within the existing means and resources of the culture and environment. This data was obtained from field notes evaluating the study environment, setting, sessions and participants, 5) Integration: To what extent can the new program be integrated within the existing system. This was assessed by field notes, 6) Limited efficacy: To what extent does the new program show promise of being successful with the intended population. This was evaluated by overall changes, pretest and posttest, in well-being as proposed by the SFC model and aspects of well-being related to behavior change (Gall et al., 2005). These measures included stress, physical activity, body composition, and dietary behavior.

Limited efficacy. Well-being: The SF-12 (Medical Outcomes Trust, Boston, MA) is a multipurpose, short-form health survey with only 12 questions (Appendix E). It yields an eight-scale profile of scores as well as physical and mental health summary measures. It has multiple *R* squares of 0.911 and 0.918 in predictions of the SF-36 Physical Component and SF-36 Mental Component Summaries, respectively (Ware, Kosinski, & Keller, 1996). Scores were computed for SF-12 Physical Composite Scores and SF-12 Mental Composite Scores (MCS). Higher scores indicate increased well-being. The norm value for tested populations is a score of 50 (Office of Public Health Assessment, 2004).

Spiritual coping: The Brief RCOPE is a 14-item instrument, generated from the larger RCOPE, designed to assess religious coping methods more efficiently (Appendix E). It consists of two factor-analytically derived subscales: positive religious coping and negative religious coping (Pargament et al., 2000; Pargament et al., 1998). It has been tested in hospital, church and college samples

and has high reliability and internal consistency at of .80. It is a complementary measure for health and science research seeking to incorporate a meaningful way to integrate religious dimensions into models of stress, coping and health (Pargament et al., 1998). Scores were computed for questions Brief RCOPE Positive Coping (PC) and Brief RCOPE Negative Coping (NC). The sum of the PC and NC responses was calculated. The scores for both PCS and NCS range from seven to twenty-eight. For PC a higher value is favorable and a lower value for NC is desired.

Perceived Stress Scale 10 item (PSS): The PSS is a psychological instrument used to measure perceptions of stress or how an individual appraises a stressful situation (Appendix E). The PSS asks thoughts and feelings over the past month and assesses the degree to which an individuals' life is uncontrollable, unpredictable and overloaded (Cohen, 1988; Cohen, Kamarck & Mermelstein, 1983). The PSS was created for use for people with at least a junior high level in community samples and is relatively free of content specific to a group or subpopulation. The PSS shows high symptomalogical correlations to the number of life events and the impact of life events ranging from an r of .52-.76. A lower PSS-10 score indicates less perceived stress. PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items.

Physical Activity: A one-week measure of physical activity was assessed subjectively and objectively, at the beginning and end of the study (Appendix E).

Participants will be required to wear the accelerometer at wake until sleep for a seven day period.

The ActiGraph (AG) model GT1M provides information on frequency, intensity, and duration of PA by utilizing a built-in single axis accelerometer which measures vertical accelerations at the hip (Appendix E). It also measures steps taken. The manufacturers indicate that these parameters have been carefully chosen to detect normal human motion and to reject motion from other sources (e.g., vibrations while driving in a car). These accelerations are summed and stored over a pre-set, user-determined epoch interval ranging typically from 5 seconds to several minutes. The resulting output from the AG is activity counts and steps per epoch (i.e., time sampling interval). Activity intensity is then derived from the activity counts (ranging from 0 to >10,000) based on previously validated cut points. Higher counts reflect more intense activity. Using a one minute epoch, the AG can collect data for 178 consecutive days (if set to detect steps as well as body movement). Data analyzed for this study included participants with at least four days of ≥ 10 hours/day of wear time.

Self-report physical activity was assessed by the short form International Physical Activity Questionnaire (IPAQ) (Appendix E). The IPAQ short form is used to obtain health related physical activity. Reliability and validity testing show that the measure is acceptable for use regionally, nationally and internationally for research projects and public health programming and evaluation (Craig, Marshal, Sjöström, Bauman, Booth, Ainsworth et al., 2003). The IPAQ shows significant Spearman correlation coefficient (0.8), reliability

between the short and long form ($r_s = 0.67$) and criterion validity ($r_s = .30$) when compared with accelerometers. The IPAQ also has significant correlations with pedometer step count ($r_s = .33$) (DeCocker, Bourdeauhuij & Cardon, 2009). Scoring for the IPAQ was summed for vigorous min/wk., moderate min/wk., walk min/wk., and sit min/wk. A total met-min/wk. score was also calculated.

Body Composition (BC): Weight and percent body fat was measured by bioelectrical impedance BIA (Bioelectrical Impedance Analysis) (Tanita, Arlington Heights, IL) and waist circumference will also be measured (Appendix E). Height (Accu-Hite Measure Device with level bubble) will be taken for all participants. Subjects will be asked to remove their shoes, socks, and any jewelry and step on to the scale. After each subject, alcohol wipes were used to clean the surface. Waist circumference was measured with a standard II 150 cm anthropometric Gulick tape at the level of the umbilicus with the subject standing.

Dietary Intake: Self-report fruit and vegetable dietary intake was assessed by the National Cancer Institute (NCI) Fruit & Vegetable Screener (Appendix E). This is a 17-item survey is designed to estimate intake of fruit and vegetables, percentage energy from fat and fiber by participant response to intake questions (Thompson, Midthune, Subar, Kahle, Schatzkin & Kipnis, 2004).

Other Health Measures: Resting blood pressure (BP) & resting heart rate (RHR) was measured using the OMRON® Automatic Blood Pressure Monitor-HEM-711DLX (Appendix E).

Equipment & Facilities

Equipment for the study came from the Exercise and Wellness research facilities on ASU's campuses. Assessments were conducted at local church and ASU campus.

1. Tanita Body Composition Analyzer TBF-300A (Weight & body fat percentage)
2. OMRON® Automatic Blood Pressure Monitor-HEM-711DLX
3. Gulick II 150 cm anthropometric tape (Waist Circumference)
4. Stadiometer (Accu-Hite Measure Device with level bubble) (Height)
5. Actigraph GTM1 Accelerometers
6. Dragon Naturally Speaking Recognition Software
7. Cardiff TeleForm

Data, Statistics & Analyses

Questionnaires were converted to Cardiff TeleForm documents. The program creates forms that can be scanned, corrected for errors and generate excel data sheets. Data collected for limited efficacy measures were entered into TeleForm documents. All staff were trained on entering data into TeleForms to assure data quality. Staff was also trained to disseminate and conduct surveys and limited efficacy measures. The inter-rater reliability for the staff was $r = .985$.

Frequencies for demographics for age, race, gender and income were assessed. Statistical analyses of specific feasibility objectives were assessed by frequencies of responses to feasibility evaluations. Acceptability was assessed by frequency of responses to the acceptability questionnaires given to participants

(Appendix B). Demand was assessed by the amount of participants in attendance at each session (Appendix C). Implementation fidelity was assessed by the frequency of objectives mentioned in each session and program homework. In addition to recorded sessions Optimal Health staff also took detailed field notes. The audiotapes in addition to the field notes were used to identify met objectives for all of the sessions. Practicality and integration were assessed by evaluation of narrative field notes. During meetings with pastoral staff narrative field notes were taken for practicality and integration of the study. The session speaker took narrative field notes throughout the study. These notes were used to establish the practicality and integration outcomes.

Limited efficacy of pretest and posttest measures for well-being, spiritual coping, perceived stress, physical activity, dietary intake, body composition, blood pressure, and resting heart rate were compared using paired t-test ($p < .05$). Pearson correlations were conducted to find relationships between limited efficacy measures ($p < .05$). Test for normality were conducted.

Dosage & Integrity

The local church setting typically conducts specific knowledge sessions on a particular topic for 60-90 minutes each week over a one month period (four weeks). It is beneficial to see if the program can be effectively delivered within this time period since church members have made this time a part of their lives. This time period may help prevent dropouts and members simply not attending due to time constraints. The one month follow-up period will provide participants with weekly support. Privacy of shared information during the sessions from

participants will be a priority during the intervention.

Conceptual Methodology

Testing the theoretical model of the Spirituality Framework of Coping may reveal the linkage between spirituality, stress, behaviour, and wellness. The theory directly addresses the concepts within SFC that can alter *spiritual connections* and *spiritual coping behavior*.

There must be a clear understanding of the possible mechanism(s) that is being evaluated. The general concept of the connection between spirituality, stress and wellness is not only linearly linked. Stress may improve or inhibit dimensions of wellness. In addition wellness can increase or decrease stress. Poor wellness dimensions can be a result of increased stress and/or lack of spiritual coping and connections as well as an initiator of increased stress and decreased wellness. Therefore, SFC provides the basis of understanding that explains the mechanism and any generated outcomes. Targeting constructs of spiritual connections and spiritual coping provide the foundational mechanism to promote decreases in stress which may improve wellness indices.

Chapter 4

RESULTS

Participant Characteristics

Participants in this study were mostly female (n=20, 17 female, 3 males) aged 52.5 ± 14.8 . Twenty-five percent were of Hispanic or Latino decent (16 non-Hispanic). Race of participants was White (55%), African American (35%), Asian (5%), and American Indian (5%). Thirty-five percent were married, divorced (40%), widowed (5%), separated (5%), and never married (15%). Seventy-five percent had no children in the household, one child (10%), two children (10%), and six children (5%). Fifteen percent were high school graduates/GED, some college (55%), and college graduates (30%). For household income 10% earned less than \$10,000, < \$15,000 (20%), < \$20,000 (5%), < \$25,000 (5%), < \$35,000 (5%), < \$50,000 (25%), < \$75,000 (5%), and more than \$75,000 (25%). No participants reported being currently counseled for anxiety, stress or depression. At baseline, participants reported weekly church attendance of one time (5%), two times (5%), three times (5%), four times (40%), eight times (35%), and nine times (10%). Attendance at church included all church events such as bible studies and other church sponsored events. Fifty-five percent of participants reported current use of medications for various issues. Two reported lifelong issues with diseases such as one with fibromyalgia and another with Crohn's disease. Others reported a tumor removal from brain, one was a cancer survivor, and another had previous treatment of stress/anxiety.

Acceptability

Eighteen participants completed the feedback questionnaire (Appendix B). All responders reported they liked or approved of the program. Table 2 indicates aspects of the program that “helped” or “detracted”. Each of the comments is from a separate individual. The major reoccurring theme was that knowledge involving the connection between spirit, mind, and body were helpful and informative (see Table 2).

Table 2

Acceptability: Overall Views of Program

Helped Comments	
Connecting all three: spirit, mind and body.	Strength of inner spirit. Relationship of body discipline.
Exercising. Careful watching of my eating.	Pedometer, handouts, and instruction/classes.
Focus less on your weight and more on a healthy lifestyle.	Pedometer, scripture that applied to body.
Instruction, knowledge, helpful suggestions.	The balanced teaching on body, mind and spirit. Pedometer.
Showing god's information as well as science.	Pedometer, realized that I do most days 10,000 steps.
More aware of how active I really am.	Resources.
Measuring the waist.	Helped me to focus on healthy foods, to meditate, to control stress levels.
Bottled water, fruit, healthy snacks, participants input (interesting).	Speakers knowledge and he positive attitude. Handouts and PowerPoint.
Gave me tools to use for all three areas: spirit, mind, body. Especially the website for healthy eating.	It helped me appreciate that god has helped me understand the spiritual health to provide a positive outlook on life. Took away to long for strength, positive attitude and took away anger I used to have.
Detracted Comments	
Participant's input (sometimes too long and took away from lesson).	The aerobic exercise triggered an old health issue and I was not able to continue to exercise last 2 weeks. Very painful and disappointed.

Spiritual Health session. For the spiritual health session feedback three participants reported that it could have been clearer. These individuals reported that there could be more emphasis on spiritual health, a food journal during the program would be helpful, and that some of the questionnaires could have been clearer. When asked whether they would add to this section one person replied that wanted more biblical input on dietary needs. Others liked the emphasis of

spiritual health with physical health. They indicated that the program provided a different view on how to take care of him/her. All participants reported that they would not delete anything from this section. When asked if the information received from this section could be applied to the mind and body all reported yes. Table 3 provides individual feedback on the connection of spiritual health to the mind and body.

Table 3

Spiritual Health Connection to Mind and Body

Comments
Foundation is the word of God.
A clear, healthy, good and active mind helps me to have a healthy mind and body. In turn, this showed/helped me with my spiritual health.
Absolutely.
Yes because God created the mind and body to work together.
Yes, once I get an understanding how to do both and apply.
Yes, shows me to control my stress in my life.
Yes, all 2 must work together and be on the same page.
Yes, it gave me more ideas on how to deal with spiritual issues.
Yes. The mind and body are very strongly connected in the sense that if you condition the mind to be spiritually and naturally strong, the body will be healthy.
Yes, I personally need to go back and finish my work book.
Yes, I can apply the teaching to my daily life. It is practical.
Very much.
Because I have never seen it as anything that could help me before.

Mind Health session. When asked if the mind health session could have been clearer all reported no. Participants who commented on this question said that the mind has a great impact on spirit & body and that you would almost need a Psych 101 course for people to understand. They also enjoyed the information from this section. When asked whether they would add to the mind section two

replied yes. They specifically replied that the mind dominates the emotional feeling of the body, that they would like more information in this section, and that meditation tapes and exercise in class would be helpful. All participants reported that they would not delete anything from this section. When asked if the information received from this section could be applied to the body and spirit all reported yes. Table 4 provides individual feedback on the connection of mental health to the spirit and body.

Table 4

Mind Health Connection to Body and Spirit

Comments
A healthy body means less stress-on your mind, and a healthy (or sound mind) helps to give a sound body and good spirit.
Yes, whatever the mind does the body follows.
I need to work on my stinkin' thinking' after reading this section I have loads to help defeat the devil with my thoughts.

Body Health session. When asked if the body health session could have been clearer four reported yes. Participants commented that more fruits and vegetables need to be emphasized, that light workouts would help, wanted more of an individualized plan for each participant. When asked whether they would add to the body section three replied yes. Participants who commented on this question replied that they just need an exercise coach, wanted goals with various suggested exercise and time length, and a specific diet to follow to get motivated. All participants reported that they would not delete anything from this section. When asked if the information received from this section could be applied to the spirit and mind all reported yes. Table 5 provides individual feedback on the

connection of physical health to the mind and spirit. Additional individual comments to the Optimal Health program are reported in Table 6.

Table 5

Body Health Connection to Spirit and Mind

Comments
Physical health contributes to a better mind set (less or no worry).
Our teacher made it fun and easy to understand.
The program was informative.
Yes because the body reacts to everything else going on inside and around it.
Definitely all three go together.
Yes because it was said that our body is the temple of the holy ghost. I forgot that scripture, so now I have a clearer understanding on how to put all three into one.
Yes, the scriptures were applicable to my life and I appreciate the reinforcement from the teachers.
Yes because it helped me control my anger and strengthen my mind from stress.

Table 6

Additional Comments to Optimal Health Program

Thank you for your help in contributing towards my having a healthy (healthier) life.
Presentation was very informative and interesting. Speaker is a very engaging speaker and enthusiasm shows.
Really enjoyed everything about the class, handouts and booklet.
It was a wonderful experience. Everyone was so nice, helpful and friendly. – Maybe very short films on people who experienced mental/spiritual/body issues, how they overcame them, the positive impacts, etc. - Would like to know outcome –How my physical/mental/body health is and how it should be. It was interesting to do the meditation exercise; it felt much longer than a minute! – Maybe more suggestions/ideas to help us in all 3 areas. But I'm glad I was able to participate. Thank you!!!
The class inspired me to continue to be spiritually led, having a sound mind and to control emotional feelings.
Overall class was good.
Questionnaire in 1st session made me aware of what I eat and how I feel about my life, activities, more willing to exercise more.

Demand

Flow of participation in the study is detailed in Figure 6. The average percent attendance during the four sessions was 78.7% (see Table 7). One person was considered a dropout due to missing two or more sessions. Participation for the follow-up phone calls declined as over the second four week period (see figure 4).

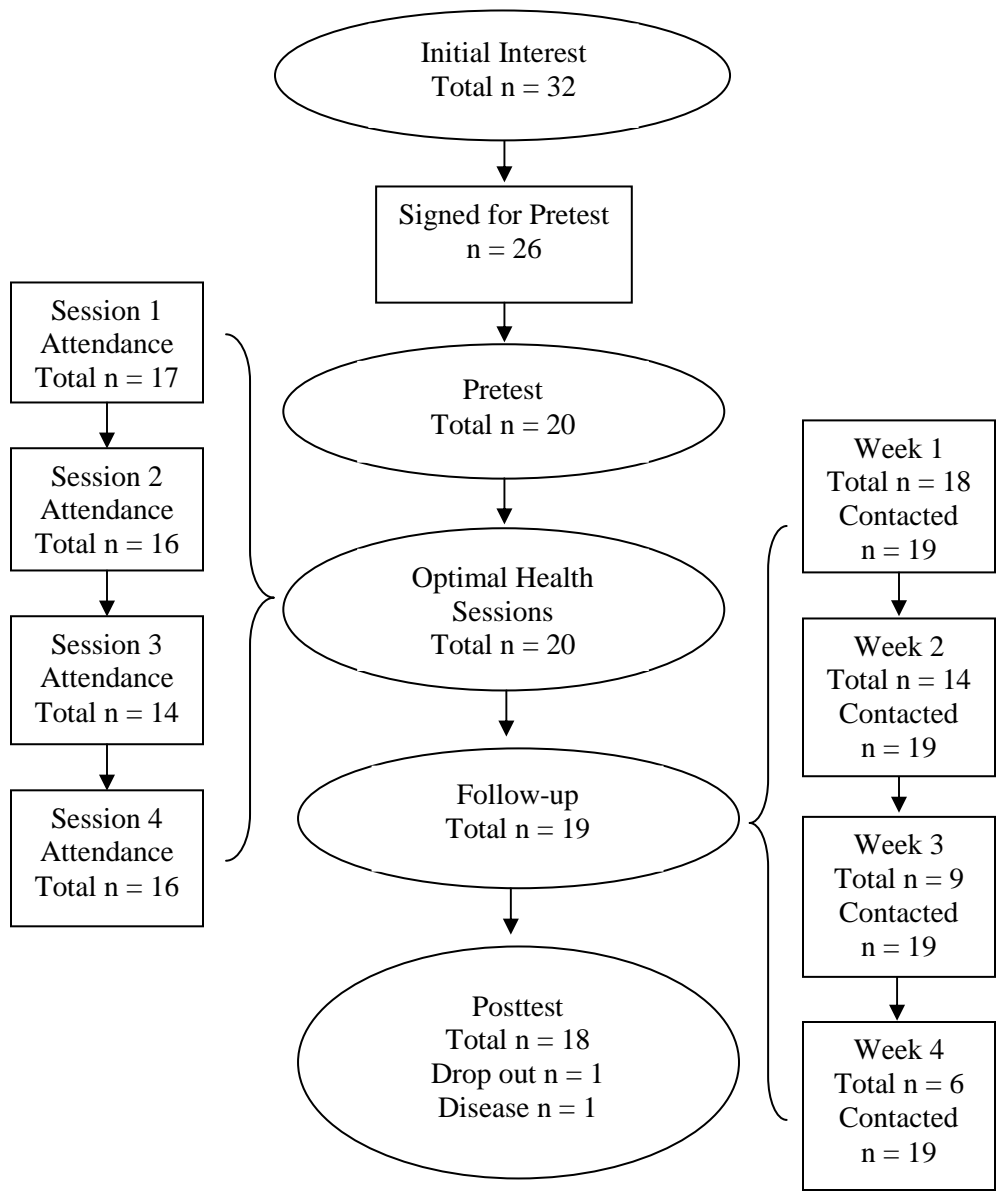


Figure 5. Flow Chart of Participation

Table 7

Program Attendance

Session	Attendance	Attendance (%)	Reason	Avg. Attendance
1	17	85	2-out of town, 1-RNK	78.7%
2	16	80	4 - RNK	
3	14	70	4 – sick/family, 2 - RNK	
4	16	80	2 – sick/family, 2 - RNK	

**Reason Not Known*

Implementation

The average percent homework completion during the four sessions was 88% (avg. 3.5 sessions). The constructs of *person factors* and *meaning making* were met for the introduction session one. The overall goal for the instructor was to discuss the goals of the program, participant individual goals, and discuss homework for the introduction section. The instructor specific goals to reach the afore mentioned constructs of session one were 1) To introduce the connection of spirit, mind and body by establishing doctrinal person factors and 2) To introduce the following session topic: Spiritual Health. The participant objectives for session one was to 1) To discuss the connection of spirit, mind and body and 2) To briefly discuss the following session topic: Spiritual Health.

The constructs of *spiritual connections* and *meaning making* were met for the spiritual health session two. The overall goal for the instructor was to review the introduction homework, specify the concepts of identity, direction & guidance, discuss spirituality’s influence on mind & body, and encourage participants to complete the spiritual health homework. The instructor specific

goals to reach the afore mentioned constructs of session one were 1) To review introduction homework, 2) To introduce the spiritual and biblical connections to health, and 3) To introduce the following session topic: Mind Health. The participant objectives for the spiritual health session were to 1) To discuss introduction homework, 2) To discuss the spiritual and biblical connections to health, and 3) To briefly discuss the following session topic: Mind Health.

The constructs of spiritual *coping behavior* and *meaning making* were met for session three. The overall goal for the instructor was too review the spiritual health homework, specify the concepts of peace and meditation, discuss the minds influence on spirit & body, emphasize the importance of reducing stress, and encourage participants to complete the mind health homework. The instructor specific goals to reach the afore mentioned constructs of session one were 1) To review spiritual health homework, 2) To introduce/identify doctrinal scriptures and tools to cope and to reduce stress, 3) To introduce/describe the effects of stress on spiritual and physical health, and 4) To introduce the following session topic: Body Health. The participant objectives for the spiritual health session were to 1) To discuss spiritual health homework, 2) To discuss doctrinal scriptures and tools to cope and to reduce stress, 3) To discuss the effects of stress on spiritual and physical health, and 4) To briefly discuss the following session topic: Body Health.

The constructs of *spiritual connections* and *meaning making* were met for session four. The overall goal for the instructor was to review the mind health homework, specify the concepts of honoring your temple, weight and its

relationship to health, physical activity & exercise, nutrition, and encourage participants to complete the body health homework. The instructor specific goals to reach the afore mentioned constructs of session one were 1) To review mind health homework, 2) To introduce/describe doctrinal scriptures on the body, 3) To introduce/describe the effects of stress on the body, 4) To provide guidelines for physical activity and nutrition, 5) To introduce/describe options for attaining physical activity and nutritional guidelines, and 6) To provide participants with information for four week follow-up and final measurements. The participant objectives for the spiritual health session were to 1) To discuss mind health homework, 2) To discuss doctrinal scriptures on the body, 3) To discuss the effects of stress on the body, 4) To discuss guidelines for physical activity and nutrition, and 5) To discuss options for attaining physical activity and nutritional guidelines.

See Table 8 for specific comments from field notes identifying met objectives for implementation of the study. At each session notes were taken Optimal Health. Trained staff of the Optimal Health program followed PowerPoint's and took notes for each slide ("S" indicates the slide number) throughout the sessions.

Table 8

Implementation: Notes for Met Session Objectives

<p><u>Introduction (Session 1)</u></p> <p>S1: Talked about balance between physical body and emotional well-being, connecting with God as our foundation</p> <p>S3: Emphasized the study as being a process not a quick fix</p> <p>S5: Answers of participants: strength, peace, eating right, no stress</p> <p>S6: Optimal health = spirit, mind, body</p> <p>S7: Emphasized the individual responsibilities of the participants to look into their lives to define Optimal Health of spirit, mind, and body</p> <p>S13: Drew on board the relationships between weight loss and increased exercise and explained how the health benefits were consistent with the participants regardless of weight loss</p> <p>S14: The Spirit of God leads our spirits to our needs. God is the provider of all.</p> <p>S15: "There is a crazy calming comfort in consistent chaos." Stress is a killer. Our bodies were not made to handle sustained stress. Encouraged participants to recognize their own stress in their daily live. Response to stress protects the body spiritually, emotionally, and physically. Participants shared how they became used to stressful situations and how un-stressful events felt abnormal.</p> <p>S16: God is providing protection</p> <p>S18: Three parts of us on earth</p> <p>S19: We were created to thrive in all areas</p> <p>S21: Physically: eat, cry, get mad, sleep (ignore it), don't exercise. Spiritually: music and things that help start our day in the Lord get interrupted and cause stress</p> <p>S22: Direct effect: stress affects health. Indirect effect: stress affects behavior which affects health. Ask God what stresses are in your life that you have not identified.</p> <p>S23: Bringing God glory is really helping us. God created our body to move. Get physically active. It's not okay to not move. God guides us through the spiritual man, physical man, and mental man.</p> <p>S25: Find out what God wants you to do that will work in your life.</p>
<p><u>Spirit Health (Session 2)</u></p> <p>S3: Everyone is different. Let God reveal what you need to do. Piece by piece, step by step. Participants very engaged. Responding silently.</p> <p>S5: God was in the beginning.</p> <p>S6: Participants nodding in agreement. Goodness and mercy. Optimal health, optimal living.</p> <p>S7: Q: What is the balance of spirit, mind, and body in you? A: Very good group discussion. Most of the group was engaged in the scripture reading and elaboration. Participants gave positive feedback to each other that allowed the discussion to continue.</p> <p>Q: Was the body neglected in the church and the mind and spirit getting all the attention? Focus on behavior and the lifestyles and not the specific goal (i.e. specific weight on scale) and the things will happen.</p> <p>Q: Psalm 23 and what it means to them. A: incredibly spiritual Q: What other scriptures? A: Proverbs 15:14, what you feed your mind tends to reflect what you do. A: 3 John 2. Our soul, mind, will and emotions. A: Psalms 139:14. I don't need to be a single digit</p>

size, he knew what was going to make me, so it was okay and I should be okay. A:
Romans 12:2
*Tons of feedback and positive feeling
A: God expects us to work with Him. I need to keep my mind on those things that are positive.
*Laughter and joking, enjoyment by participants
A: Proverbs 16:2 I know the Lord and sometimes we compare ourselves to others but the Lord knows our heart so we can only fool people and not God.
PI Comments: “You may pull on other modes of support and wellness (aspects. i.e. social support etc...). Many parts of spirit, mind, and body (broad including several aspects of overall wellness). “
“single mother with stress running around, not on good diet.”
“our bodies are significant, body temple of the Lord.”
Q: Did you write own personal goals? Just think about them and be willing to change them to what God says is okay. Stop focusing on a number.
Response: “Fearfully and wonderfully made.” “Devil tempting me with food, constant turmoil.”
S8: God gives us purpose to get to our destinies.
S9: Openness and honesty with God is the key to the beginning of the spiritual healing process. All are related. We have to let God teach us the things we want to learn, He’s given us spirit so we can have out healthy mind and body.
Let God disrobe you. Those things that you do that are unhealthy. Don’t condemn yourself. Have a purpose of doing these things as God wants you to react to those unhealthy things. Be honest about it, don’t be condemned about it. It is a process not a quick fix.
*Participants responded with enthusiasm
***PI Notes: Saw tears in some participants eyes during this session. Especially when talking about identity in Christ. Their purpose.
S10: Recognizing and laying out your flaws to self and God is how you discover who you are. We don’t always understand at first but when you trust in God you can take those first steps.
S11: Keeping all aspects (spirit, mind body) strong and focused on the Lord allows for equal growth. In order to know purpose the mind, spirit and body need to be sound, however they might not all be working together (same level, one weaker than the other).
S12: *Participants continuing to take notes and are engaged.
S13: What you put in your body is what you get out of it. [*Participants nodding very much and agreeing with this statement]
Apply your body with what you have learned (spiritually). Pay attention to every aspect of what God made you. There is purpose and meaning.
S14: Having the right thoughts. Walking in the right spirit and caring for the body brings long life and prosperity.
S15: *participants responding out loud, encouraging
S21: *participants responding, nodding, seeming to be learning new things.
S22: Start from within and adapt accordingly to the environment. Let God reveal the root to the unhealthy behaviors.
S24: It’s not about being perfect. It’s about taking the proper steps toward your goal for health.
*Participants taking notes
*participants telling funny stories all laughing and having good time.

Mind Health (Session 3)

S3: God does not do weight loss with health gimmicks. Go through research. It does not work for everyone!

*Speaker is lively and interactive! Attention is 100% on speaker.

S7: Hands rose when asked "how many know who you are and what your purpose is?" 3-4 hands. *Ask God – who am I? Deep focus on speaker – educative few note takers.

Humor – Joan's in the spotlight! Focus on student speaker. Knowing love versus feeling love, male participating as well. No intimidation/tension here. Some are fidgeting during speaker – phones, purses, etc. phone vibrating. "Because your present you know at least a piece of who you are and how something to give." "How has purpose/lack of purpose affecting your body?" Women – mom, daughter, friend, etc. student speaker. Respectful audience – listening. "You have to adjust the balance" participating by looking up Bible verses and going along spiritual health equals foundation.

S11: discussion of chronic/severe illness on depressing spirit brought up by student speaker to illustrate relationship of spirit mind and body. Discussion of Scripture Matthew 6. Fulfilling and interactive. "Presence of God leaves me when I worry."

*Nodding heads – agreement on topic.

*Instructed to turn to page 15 of booklet to have a major front of them. Lots of note taking among peers nearly every member of the peer group has shared personally during group discussion three people have not 14 people did.

God told us not to be anxious because he knows we can't handle it. Psalms 4:8 to help sleep.

S12: Deal with stress in a healthy way to submit to God. What's the source of the stress?

S16: treatment to stress. Meditation is not a confession – meditation the stillness

S17: God can't and won't compete with hundreds of thoughts – you can only focus on one at a time – focus on him – be receptive

S18: rest/meditation equals good success

S19: repetition model's behavior. Takes bad thoughts – uses Lord's word

S20: stillness equals rest. Wait; patience.

1 member leaving another member stepped out to speak to someone who entered building.

S21: how do you use meditation as a tool for success?

S22: recognize stress. Meditate on good things to heal.

S23: do your homework!

Body Health (Session 4)

S1: going to talk about physical health. Moment of silence just 1 min.

*participants were surprised it was only 1 min.

Mental health is connected to physical health. Encourage people to take 1 min. in the day to reset.

S2: how we/God can take care of physical bodies. Discuss homework from last week. Identify stressors.

S5: identify stressors with individual answers.

Open format answering (people raise their hands to discuss)

"how we walk through with God's help" stress impacted physical body – how?

Comfort foods, lowered immune, Crohn's disease

talked about staying in the moment and perception, let it go. Very engage participants, discussion across table. Intimate sharing of experiences and emotions. "No condemnation

come as you are"

S6: begin to do our walk in taking care of the things we can. Etc. what our body is and ask God to help

S7: what you do determines your health. Not body fat percentage. Not everyone has the same response, but everyone needs healthy behavior such as diet and exercise.

S8: quick fixes don't work and you can't maintain them. Rapid weight loss fluctuations up and down. Your baseline gets higher – body sees this as "starvation mode" unhealthy for body. The "want" to look a certain way due to societal pressures. Ask God or say to God "I choose to let you be in my physical body."

S9: make small changes, one – 2 pounds per month is efficient for weight loss. Lots of rapid change can create wrapper weight loss and certain people with really unhealthy habits. Weight loss then weight gain causes physical changes (love pressure, glucose).

S10: "obesity epidemic", societal pressures. Health consequences increases in things like diabetes blood pressure and CVD.

*True grass X axis weight y-axis diabetes or blood pressure or CVD. Linear positive increase.

S11: how obesity is classified, don't focus on weight

S13: she can do a lot, stigma of obesity, doesn't look like we think.

S16: BMI = weight/height

*Drew on board: BMI normal 18 – 24.9, overweight 25 – 29.9, obese >30 new sentence "weight charts" or ideal weight charts. Use elbow width – they were using weight only to establish health for insurance purposes. Setpoint (Drew line for setpoint) 5 to 10 pounds. Weight is – fat, bone, muscle, water

*people talk about their BMI experiences

S17: food intake – abundance of food in America – we started eating the wrong things. What we eat – fried, sugary, process. Lack of PA due to jobs, technology. Genetic predisposition also, all different. Stress and age too. Have to do the best we can with food, exercise, stress

S18: prevention of disease, other than genetics

S19: (asked participants...) "How do you feel about PA?" Freely answered, talked about the challenges likes/dislikes. People seem comfortable sharing openly. Physiological response. Add variety to prevent boredom. Be active

S20: we were created to walk and move

S22: plan/structured capital PA, HR increase, get stronger

S23: increased workload on body, get stronger. Be specific with exercise to train different things. Build up. To prevent boredom, change it up. Don't use it you lose it, body adapts to inactivity, body slows down think this time to store with fat.

S25: 150 min. per week of moderate activity, 75 min. per week of vigorous. Don't have to live with tons of weight, can do big muscle groups – emphasis on back and abdominal muscles

S27: being CV Fit tells us so much about how long we will live, train your heart and systems. Can't be diet only. More fit regardless of weight, lives longer.

<5007 sedentary, 5000 – 7499 low, 7500 – 9999 moderate, 10,000 active, 12,500 very active

S28: decreased metabolism – weight fluctuation changes metabolic rate. Not enough calories, metabolism slows down, can't maintain, weight goes back up but metabolic rate doesn't change... Increases in weight.

S30: balance is important as we age. You will look good with positive behavioral changes – feel better on the inside, look better on outside – focus on the success of this, not the weight

S31: our summers are winter. The good things you can do in your environment

S32: evening cleaning is activity

S34: men linear path. Woman variable, individual differences. Different responses due to genetics and what you have done in the past. Look at yourself, not comparing to others.

S39: want to be in this zone when exercising: "moderate"

S40: need general flexibility, the earlier the better. Very important

S41: $220 - \text{age} = \text{max heart rate}$

*gave max heart rate example

S43: showed people how to take pulse on wrist for 30 seconds and 10 seconds

S46: the fuel you put in is what you're going to get out. Carbohydrates the first thing broken down. Carbohydrate content has changed = processed foods body uses whole grains. You don't lose fat cells; they "deflate" so the body can fill them back up – good not to do drastic things the body. Different types of fats.

*Drew deflated fat cells on board. "Our bodies haven't change but we change what we put in them"

S47: there is a reason for all of us. Let God direct what you eat; do what's best for you. Game has different stomach than paid. Cows eat grass and grains, pig feed everything. Seafood – fish with scales have a lot of nutrients, others are "filter feeders". Fruits and vegetables have a ton of nutrients. Natural sugars in fruit. "Red's" – tannins and are heart healthy. "Eat a lot of color"

all of these are heart healthfully biblically and scientifically

S48: "go to myplate.gov" gives you a baseline to go from. WATER! The body needs it! Very important.

S49: it is not so much the calories but the type of calories you and take. Water, water, water. Fiber, fiber, fiber. What comes out tells you a lot about your health your digestion tells you a lot about your health – urination and bowel movements. Find alternatives to lose with increase high fructose corn syrup, increase sodium. Cook on your own, have control. Sodium already in the foods we buy. Take responsibility to read labels. "The less processing the better"

S51: don't wait to start changes such as diet, exercise, mental health. Small steps! Step – by – step. You can change your portion sizes to get the things we need and are healthy.

S52: review of what's next instructor will call to check in, make some changes, shall call to set up times

*Handed back sheets and outcomes. Participants were told to use this as their baseline waist circumference was given because fat act differently and upper body and organs. Flat/weight will take longer to change. Accelerometer – different levels and minutes of sedentary time can vary from week to week. Compared to self-report. Food intake, again baseline, no value, can't compare to guidelines surveys SF-12. Physical and mental health score processes breakdown of averages). PSS – 10 scores and averages, brief RCOPE, positive coping/negative coping. Divided positive score by seven and negative score too. After next four weeks the June 5th redo for comparisons.

Practicality

In the initial stages of this study the study investigator met with the head pastor of the local church for approval of the content of the Optimal Health study. After review of the content the program was approved by the head pastor. Once the content was approved, the investigator had additional meetings with the head pastor for program delivery and structure. Based on the structure of previous scientific studies and the current bible studies being conducted at the church (knowledge/education sessions), a four week program was accepted with approval for a four week follow-up. The study took place in a room used for bible studies and took place on a night that would not conflict with other events. The intended participants for the Optimal Health program were adult members of the church. Participants in the program were adult members of the River of Life Church. These adults created a homogeneous sample with similar foundational principles and belief system. Conducting all Optimal Health program events at the church site was beneficial for a familiar setting for participants. The study design allowed these participants the ability to carry out intervention activities, specifically to attend pretests, study sessions, and posttests. Costs for this study were minimal as the church did not require payment for facility usage. The only costs were for materials (booklet, binders, and pens), pedometers, and healthy snacks bought for each session.

Integration

The new program was able to be integrated into the existing system. The church facilities were available for use. The investigator was allowed to verbally

recruit participants during a Sunday service with a PowerPoint slide. The slide announcement ran for three weeks during all events and services for the recruitment period. Optimal Health staff was also allowed to stand at a table in the lobby for recruitment. Various organizations of the church post materials and stand at tables after service for member interest. During initial meetings with pastoral staff the use of the room was approved. The Optimal Health sessions took place in a room that was approximately 20'x30' with comfortable temperature. The tables with chairs were arranged in a horseshoe pattern facing the podium, projector screen, and white board. The facility was equipped with audio-visual equipment that was used during the sessions. Pretests and posttests were conducted in the same room as the sessions. Study equipment was transported to the site, set up and torn down by Optimal Health staff. The study did fit within the infrastructure of the existing organization and setting. No conflicts or issues arose with the integration of the study. The only cost to the organization was through electric energy costs during the pretest, sessions, and posttest and possibly for church staff who closed the facility down after the sessions.

Limited Efficacy

Well-being. The SF-12 showed no significant differences by time for both the Physical Health scores and Mental Health scores ($p > .05$). See Table 9.

Spiritual Coping. The BriefRCOPE showed no significant differences by time for either positive coping or negative coping ($p > .05$). See Table 9.

Perceived Stress. The PSS-10 showed no significant time differences between pretest and posttest time periods ($p > .05$). See Table 9.

Table 9

Limited Efficacy Values for SF-12, BriefRCOPE & PSS-10

n = 18	Pretest (T1) Mean ± SD	Posttest (T2) Mean ± SD	t Value	p Value
SF-12 Physical Health	46.09 ± 11.26	42.72 ± 13.33	-1.50	0.153
SF-12 Mental Health	52.16 ± 8.55	54.05 ± 6.99	0.72	0.483
BriefRCOPE Positive Coping	22.30 ± 5.04	21.50 ± 4.94	-0.39	0.700
BriefRCOPE Negative Coping	9.60 ± 3.55	9.06 ± 2.62	-0.82	0.426
PSS-10	14.50 ± 7.13	13.78 ± 6.99	-0.09	0.932

Physical Activity.

Subjective. There were no significant time differences for self-reported total vigorous minutes per week, moderate minutes per week, and walk minutes per week ($p > .05$) from the IPAQ. There were no significant differences in physical activity categories by met-min/wk. for the population ($t = 1.32$, $p = 0.203$).

Objective. There were no significant differences in activity intensities through accelerometer wear (see Table 10.).

Table 10

Limited Efficacy Values for IPAQ & Accelerometers

IPAQ (met-min/wk.) (n=18)				
	Pretest (T1) Mean ± SD	Posttest (T2) Mean ± SD	t Value	p Value
Vigorous	433.3 ± 557.0	264.44 ± 478.3	1.442	0.167
Moderate	353.3 ± 290.8	276.7 ± 282.0	.668	0.513
Walk	281.4 ± 190.0	338.3 ± 214.0	-.871	0.396
Total	1089.1 ± 783.1	791.4 ± 651.9	1.32	0.203
Sitting (min/wk.)	502.11 ± 540.17	393.75 ± 219.88	-0.80	0.434
Accelerometer (min/day) (n=7)				
Sedentary	518.4 ± 57.5	568.4 ± 107.1	-1.094	0.316
Light	241.7 ± 57.3	222.6 ± 41.8	1.693	0.141
Lifestyle	54.5 ± 17.2	49.4 ± 20.5	.945	0.381
Moderate	6.23 ± 4.2	5.83 ± 7.7	.205	0.844
Vigorous	.71 ± 1.9	.09 ± 1.23	1.00	0.356
Steps per day	4984.9 ± 1440.3	4372.0 ± 1662.9	2.218	0.068

Dietary Intake – NCI Food Screener. There was a significant difference in tomato sauce intake from T1 to T2 ($p = 0.0035$). No other significant differences were found for dietary intake (see Table 11).

Table 11

Limited Efficacy Values for Dietary Intake

Times/wk. n = 18	Pretest (T1) Mean ± SD	Posttest (T2) Mean ± SD	t Value	p Value
Juice	1.90 ± 1.65	1.83 ± 1.34	0.52	0.611
Fruit	3.55 ± 1.40	3.94 ± 1.47	1.06	0.302
French Fries	1.35 ± .988	1.11 ± .758	-0.83	0.417
White Potatoes	1.45 ± .945	1.44 ± .984	0.12	0.903
Lettuce	2.60 ± 1.47	3.00 ± 1.85	1.36	0.192
Other Vegetables	3.30 ± 1.90	3.61 ± 1.79	0.49	0.627
Beans	1.60 ± 1.93	2.00 ± 2.00	1.40	0.179
Mixture Vegetables	2.58 ± 1.54	2.78 ± .943	0.57	0.575
Veg. Soup	1.16 ± 1.17	.83	-0.91	0.376
Tomato Sauce	1.53 ± .841	2.28 ± .826	3.42	0.0035*

***Significant $p < .05$**

Body Composition. There were no significant differences for weight, percent body fat or waist circumference ($p > .05$). See Table 12.

Blood Pressure & Resting Heart Rate. No significant differences were shown for changes in blood pressure ($p > .05$). There was a significant increase in resting heart rate ($p = .0034$). See Table 12.

Table 12

Limited Efficacy Values for BC, BP & RHR

BC				
n = 18	Pretest (T1) Mean \pm SD	Posttest (T2) Mean \pm SD	t Value	p Value
Weight (kg)	83.70 \pm 17.00	82.85 \pm 16.71	0.12	0.905
BF (%)	37.99 \pm 9.23	38.57 \pm 9.39	0.58	0.571
WC (cm)	93.84 \pm 21.70	88.85 \pm 11.79	-0.96	0.351
SBP	123.88 \pm 15.02	119.23 \pm 13.58	-1.52	0.146
DBP	77.31 \pm 13.24	76.05 \pm 10.01	-0.50	0.623
RHR	69.78 \pm 8.68	74.76 \pm 10.77	3.41	0.0034*

*Significant $p < .05$

Relationships

Significant inverse relationships were shown between PSS-10 and SF-12 PCS for pretest ($r = -.54$, $p = .01$) and posttest ($r = -.59$, $p = .01$). Inverse relationships were also shown for PSS-10 and SF-12 MCS pretest ($r = -.61$, $p = .01$) and posttest ($r = -.81$, $p = .000$). A significant inverse relationship was shown for SF-12 MCS and Brief RCOPE negative coping scores ($r = -.49$, $p = 0.04$) for posttest.

Chapter 5

DISCUSSION

The purpose of this study was to evaluate the feasibility of the Optimal Health program. The Optimal Health program was a spirituality-based stress reduction and health behavior change intervention designed to enhance well-being and affect behavior change. Little attention is paid to the role of spirituality and health. Spirituality is conceptually related to physical and mental health but can contribute to overall health and well-being (Hill & Pargament, 2003). Religion is widespread in American life and targeting it as a factor in health has the potential influence to affect well-being in a preventative manner (Maton & Wells, 1995).

The underlying model of this program was the spiritual framework coping (SFC) which was an adaptation of Lazarus & Folkman's Transactional Model for stress and coping. The SFC model also targets stress but also incorporates the role of spirituality in health. A goal within this study was to use the SFC model beyond the populations which Pargament and colleagues have used in earlier studies. These studies were particularly done in disease states or in the elderly (Pargament et al., 2001; 2004). The SFC model however has the potential to be used in a wide variety of populations as a preventative measure for changes in well-being which can influence health as suggested by the authors. Well-being is often related to health related quality of life. Healthy People 2020 have made the focus on quality of life an overarching goal (USDDHHS, 2009). The measures of progress in this area are well-being, physical, mental, and social health-related quality of life. The SFC model is directed at these areas.

Another goal of this pilot program was to provide a multifaceted approach to health. The Optimal Health program sought to intervene on the spiritual, mental, and physical components of health by providing a comprehensive knowledge, tools, and education program for health promotion. Large-scale trials have been implemented that take a multi-faceted approach to health. The Lifestyle Heart Trial focused on the mental and physical dimensions of health in the treatment group through stress management, diet, and exercise (Ornish, Scherwitz, Billings, Gould, Merritt, Sparier et al., 1998). The preventative focus of this trial dealt with chronic stress as it related to others, self and a higher power through tools such as meditation, stretching, and forgiveness. It also focused on lifestyle through a low-fat diet, regular activity, and smoking cessation. While the Optimal Health program was not a large-scale trial conducted in a diseased group, the foundation of the program did incorporate several factors that influence well-being and health as preventative measures in a generally healthy group.

This study evaluated feasibility of the Optimal Health program in a local church by assessing the acceptability, demand, implementation, practicality, integration, and limited efficacy of the program. Faith-based or faith-placed programs which are also referenced as church-based programs share key elements for promoting health (Peterson, Atwood & Yates, 2002). Some of these elements include positive health values, access to church facilities, and health behavior change. The Optimal Health program did succeed in attaining some of these elements and are thus discussed.

Acceptability-Overall Views of Program

The acceptability of the program was designed to evaluate how the intended individual recipients and those involved implementation of the program reacted to the Optimal Health program. For acceptability the feasibility asks if the program is judged as suitable, satisfying, or attractive to program deliverers and recipients. Outcomes are usually assessed by satisfaction, intent to continue to use the program, the perceived appropriateness, the fit within the organizational culture, and the perceived positive or negative effects on the organization (Bowen et al., 2009).

Acceptability was assessed by frequency of responses to the feedback questionnaires given to participants. The majority of the participants in this program were female. Participants overwhelmingly reported that they approved of the program. The main reason for positive reports of acceptability was the knowledge and education of spiritual, mental and physical connections to health. These connections were culturally tailored to health through foundational biblical principles. Several faith-based studies have used the church setting or simply incorporated some biblical text after the program was already created. Other programs such as the WORD program and Faith on the Move directly connected scripture to their health sessions (Kim et al, 2006; Fitzgibbon, Stolley, Ganschow, Schiffer, Wells, Simon et al., 2005). Each session within the Optimal Health program used scripture as a foundation coupled scientific fact in all the materials.

Participants also enjoyed the materials given during the program. They reported that the handouts were helpful and most were enthusiastic about

receiving and keeping the pedometer. The pedometer allowed participants to have a realistic view of how much they moved throughout the day. The goal of 10,000 steps per day which describes an active person was a lofty goal for some (Tudor-Locke & Bassett, 2004). The participants were encouraged to increase their daily steps within range of their abilities. Success was furthermore emphasized as moving more than they had before this study. This could be as little as 50-100 more steps per day.

For the spiritual health session participants reported that they wanted more foundation of biblical principles to their health, specifically on dietary needs. When asked how their spiritual health connected to the mind and body they reported it was foundational, that all were created to work together, and that having a healthy mind and body can affect their spiritual health. In the mind health session participants reported that they began to understand how perceptions of mental stressors affect the body and the spirit. Many emphasized the emotional turmoil of the mind on spirit and body. Participants also suggested that meditation tapes and exercise in class would be helpful. For the body health session some participants wanted more than knowledge and education. Participants wanted more emphasis on fruit and vegetable consumption, actual exercises with individual plans, and a specific diet to follow to get motivated. They also reported that education from the body health session could be applied to the spirit and mind.

The follow-up phone calls for the four-week period after the initial four sessions did not seem to have the same favorable acceptability. Participants did

not report any dislikes for the follow-up phone calls. However, actual conversations with each of the participants for each week during the follow-up period declined over time. Every participant was contacted each week and subsequent phone calls were made thereafter if the participant was not reached. The participants who did have continual contact with the investigator during this period seemed to enjoy the interaction, asked questions and gave comments on their current changes, or their thoughts for making future changes. Those participants who did not have a conversation with the investigator each week may have still received some form of intervention. When the participants were not reached voicemail messages were left detailing the desire of the investigator to encourage them and provide support for their health behavior changes. The contact alone may influence behavior change on some level.

A Lay Health Counselor (LHA) as described in other studies is trained for program implementation (Castro et al., 1995, Davis et al. 1994, Kumanyika & Charelston, 1992). In a church-based telephone mammography counseling study investigators trained peer counselors to conduct phone calls (Derose, Fox, Reigadas & Hawes-Dawson, 2000). The effective training of the LHA's provided was successful. In this two year study, participants were called so that investigators could complete one interview per year. While the percentage of phone interview completion was favorable, approximately 5-18% (depending on the participant race group) did not complete phone interviews. Of those who did complete the interviews it took between two to three calls to complete a case and at least five to eight calls for the "hard-to-reach" cases. In the Optimal health

study there was only one caller (the session leader) which proved challenging for the follow-up phone calls.

Demand

The demand for the Optimal Health program was evaluated by the documented use of the Optimal Health program in this population and setting. Demand for feasibility studies tests the program for its likelihood to be used. This is assessed by the actual use of the program, the expressed interests or attention to use the program, and the perceived demand (Bowen et al., 2009). Actual interest in the study was verbally expressed by many adults at the church but only 32 signed up for initial participation. This may be due to not having a longer recruitment period and adults not fully understanding the content and purpose of the program. It is important to note however that while the church is large (approximately 500-1000 per Sunday service) the number recruited for this study is representative of participation in other bible study classes conducted at the River of Life.

Demand was assessed by the amount of participants in attendance at each session. Attendance at the sessions was favorable. When participants were absent most called and gave investigators a reason as to why they could not attend. Several of these reasons had to do with sickness, family, or that they could not be in town for the specific session. These participants were not considered dropouts unless they missed three or more sessions. The reason a participant was not considered a drop out until three sessions were missed was because they still had access to the PowerPoint's and homework materials. They were still receiving

some form of the intervention and could catch up on missed materials. The investigator told participants to complete homework from the previous session before the next session occurred. There was only one dropout in the study. This participant cited time constraints and lack of monetary resources as barriers for attendance.

Implementation

The implementation of the program evaluated the likelihood that the Optimal Health program could be fully implemented as planned and proposed. For implementation, a feasibility study asks how the program can be successfully delivered to the intended participants in a somewhat defined context.

Implementation is usually assessed by the degree of execution, the success or failure of execution, the amount and type of resources needed to implement, factors affecting implementation ease or difficulty, the efficiency, speed, or quality of the implementation (Bowen et al., 2009).

Implementation fidelity was assessed by the frequency of objectives mentioned in each session and program homework. All objectives were met for the Optimal Health program. The Optimal Health program was specifically designed to utilize the SFC model construct of *person factor* as a foundation. The *person factor* construct was determined by the chosen population. Therefore, when having these *person factors* established the constructs of *spiritual connections* and *spiritual coping* were able to be intervened on to create *meaning making* that ultimately was to affect *well-being* outcomes. It is important to note however that while these participants were chosen for their similar *person factor*

(e.g. doctrinal beliefs) there was likely variation within the individuals. While the participants believe in the overall ideals (e.g. Jesus died for them) they may have differences in how they utilize their foundational beliefs. *Spiritual connections* and *spiritual coping behavior* were targeted through biblical principles and connected with scientific facts for health to create purpose and meaning.

The majority of participants did do the homework for each session. Participants were asked by show of hands if they did the homework for the current session. Homework or instructions for the week are sometimes given in other bible studies in the church. Investigators did not look to see if participants answered each question in written form so some participants may have not have answered every question for each session. The reason for this was so that participants did not feel like they were in school. Some of the participants did express that needing to complete homework was not desirable. Therefore the show of hands for doing the homework was seen as sufficient.

Practicality

The practicality of the program evaluated the state to which the Optimal Health program could be delivered in the confinement of the current resources and time constraints. Practicality in a feasibility study asks how the program can be carried out using the existing means, resources, and circumstances without outside intervention. This is measured by the positive or negative effects on the target population, the ability of participants to carry out the intervention activities, and cost analysis (Bowen et al., 2009).

Practicality was assessed by evaluation of narrative field notes. The existing means and resources provided by the facility allowed the Optimal Health program to be conducted with minimal costs. Using the same facility from which the participants were recruited as the facility for program implementation created a familiar and comfortable setting for the population. This may have influenced the participant decision to attend the sessions for the program. The sessions (one per week) for an hour and a half are consistent with the structure of current Bible studies that occur within the church. Participants thus knew what to expect when attending the sessions.

The pastor and pastoral staff at the church setting were available and willing to meet with the study investigator for the content and implementation of the program. Positive health values can be endorsed through programs that are supported by clergy and other church leaders (Cook, 1997; Campbell, Motsinger, Ingram, Jewell, Makarushka, Beatty et al., 2000). The initial meetings were beneficial since they allowed the leadership to fully understand the content of what was delivered and the importance of the material that we would be delivered. The initial meetings allied potential issues that may have come about as the recruitment process, pretests, program sessions, and posttests occurred. Pastoral staff was aware of each step in the process and all steps were approved in advance.

The church leadership did not require payment for facility usage which may be due to the leadership seeing the benefit to church members. As previously stated, the costs for the study investigators were minimal. The booklet of the

Optimal Health program was used as workbook by the participant's for education and homework completion. Pedometers were provided to reinforce the need for increasing physical activity. Healthy snacks were purchased for each session to reinforce and provide a practical example of proper dietary snack habits.

The one month follow-up showed limited practicality due to only the speaker conducting follow-up phone calls. While it is beneficial for the participant to be in contact with a person who has direct knowledge of all aspects of the program, having additional trained staff to conduct phone calls may have lessened the decline in actual person-to-person contact for the follow-up. The trained staff would need more than general training but in-depth understanding of the Optimal Health program.

During the sessions participants were also able to be open and honest about their health with the assurance that they would have the same respect and privacy that occurs in other general bible studies.

Integration

The integration of the program was evaluated by how the Optimal Health program could be integrated at a system level in the existing infrastructure. During Optimal Health program the documentation of change that occurred within the organizational setting was evaluated as a result of integrating the Optimal Health program to see if the program was feasible. Integration in a feasibility study asked how the program can be integrated within the existing system. This is usually measured by the perceived fit within the infrastructure, the perceived sustainability, and cost to the organization (Bowen et al., 2009).

Integration was assessed by evaluation of narrative field notes. The existing system of how church leadership recruits and implements programs for adult members, was able to be utilized for the process of integration. In this setting, members are typically targeted for participation in programs through PowerPoint slides, by verbal announcements during Sunday services, flyer postings, and tables set up after Sunday services.

The Optimal Health program was able to recruit through the existing infrastructure. Access to facilities at the church was essential for program integration. Churches tend to have facilities appropriate for conducting group meetings and discussions (Kong, 1997; Lasater, Wells, Carleton & Elder, 1986). The sessions were also conducted in a room used for other sessions are Bible studies. The room was equipped with the study needs to conduct Optimal Health sessions. The setting did not provide any of the materials needed to conduct pretests or posttests and thus all materials for these tests were transported to the site. Cost to the facility may have come through energy usage during Optimal Health program events however no issues or concerns arose on this matter from church leadership.

Limited Efficacy

The limited efficacy of the Optimal Health program allowed the program to test the intervention to some degree. Limited efficacy testing is usually done with a convenience sample, with shorter follow-up, and limited statistical power. Limited efficacy of a feasibility study asked how the program shows promise of being successful with the intended population. It is usually evaluated by the

intended effects of the program on the key intermediate variables. These variables were outlined in the causal model (see Figure 3). It can also give an effect-size estimation and maintenance of changes from the initial change (Bowen et al., 2009).

Limited efficacy of pretest and posttest measures for well-being, spiritual coping, perceived stress, physical activity, dietary intake, body composition and blood pressure were measured. Changes in well-being were not significant. The means of the physical health scores declined slightly. With the small sample size this could likely be due to one individual who had a flare of fibromyalgia which may have affected the physical health scores for well-being.

Mental health scores for well-being did increase slightly but were not significant. Spiritual coping scores were not significant. Positive coping scores reflected little to no change in the mean. This population may already use positive coping techniques for spiritual health. Negative spiritual coping did slightly decrease but was also non-significant. Perceived stress scores showed no significant changes but did slightly decrease in the mean. A lower perceived stress score is considered favorable.

The outcomes for these measures in this population were the norm means for these surveys. This could account for the lack of change due to these specific measures no being an issue in this population. Lack of change could also have been due to a ceiling effect in the participants where they could have favorably reported initial outcomes.

For subjective physical activity there were no significant differences in intensity, walking minutes or overall physical activity category changes. For objective physical activity there were no significant differences for sedentary, light, lifestyle, or moderate minutes per week of activity. Vigorous activity was rarely done and none engaged in very vigorous activity. Dietary intake overall showed no significant changes. However, the means for reported healthy food intake did slightly increase. There were no significant changes for weight, percent body fat, or waist circumference. This outcome is not surprising since major body composition changes are rarely seen in a short period of time. Changes in body composition can be seen in trials that are long term but even those changes can be minimal and begin to diminish over time (DPP, 2009). Values for changes in blood pressure were non-significant. The means of these values did slightly decrease.

Relationships among Limited Efficacy Measures

Although little to no significant time changes was shown in the Optimal Health program, some significant correlated relationships were found. Inverse relationships were found between perceived stress and well-being. The mental composite score for well-being had a strong inverse relationship to the perception of stress. This is important to note since perception of the stressor can have an effect on aspects of mental health. A significant inverse relationship was also found between well-being mental composite scores and negative spiritual coping scores. This suggests that how people spiritually cope may be related to mental well-being. Similar results have been found between mental well-being and

perceived stress and mental well-being and negative religious coping in different populations (Bovier, Chamot & Perneger, 2004; Sherman, Simonton, Latif, Spohn & Tricot, 2005). Thus well-being is likely reflective of an individuals' perception of stress and negative coping practices.

Strengths

The Optimal Health program took a multifaceted approach to well-being and health behavior change. Several faith-based studies and non-faith-based studies have are implementing programs with a wide approach to health and behavior change (Yanek, et al., 2001; Wilcox et al., 2007; Ornish et al., 1998). With this multifaceted approach the Optimal Health program specifically utilized foundational tools in the intended population. This is important to point out since the foundational tools (i.e. *person factors*: doctrinal) that were targeted are used in some form it in the intended population. It is used as a means of change in their lives or for other behavior changes. Many health behavior change programs implement knowledge and education into a population without anchoring to the culture of the population. The culture of the population can extend beyond race and gender. Spirituality has an underlying focus that goes beyond specific cultures, races, and gender. This study was demonstrated in a multicultural population.

An additional strength of the Optimal Health program was having a speaker who was connected to the cultural environment to lead the sessions. Having an individual who is involved with the culture and environment and the actual program being implemented gives the ability to understand both sides. This

lay counselor as it is described in other studies, which is connected to the cultural environment, is able to interact with the people more readily (Toh & Tan, 1997). Having the session leader also be connected with the program in a direct form enhances program dissemination to the intended participants.

Limitations

The Optimal Health program was evaluated and tested in a small sample population. The small sample size may have limited the ability to detect significant changes pretest and posttest. Virtually no limited efficacy changes were shown. This may be largely due to the short time to enact changes in behavior. Other programs have showed significant or favorable results with eight week programs (Hooker, Harmon, Burroughs, Rheaume & Wilcox, 2011; Kim et al., 2006). In the study by Kim et al. (2006), there were structured bouts of physical activity within the study for participants. Hooker et al. (2011) met for two weekly sessions.

A possible confounder to the study may have been having the lead investigator leading the actual sessions. This could have created bias with the participants and in study analyses and outcomes.

While the entire program was eight weeks participants did not receive all of the information from the program until the first four weeks ended. In reality, this only left one month to utilize all of the tools, knowledge, and education provided through the Optimal Health program. Furthermore, the participants as the population in the study were generally healthy and as individuals may have been at different points for behavior change. The study was also limited by the

lack of a comparison or control group. There may have been significant between group differences that cannot be analyzed or evaluated.

Conclusions

The Optimal Health program was shown to be a feasible and can be conducted in a local church setting. The program was shown to be attractive for participants with these similar foundational or doctrinal beliefs. The SFC model was a successful framework by which conduct the program.

In the future, further measures of limited efficacy will need to be evaluated to determine the efficacy of this program. The Optimal Health program should also be lengthened to allow for changes in behavior. Participants did report that they were more aware of their spiritual, mental, and physical health. However, applying the knowledge and education received can require an increased amount of time for behavior change.

Participants should also be evaluated for their current levels of stress and/or physical activity level. This would enable investigators to create structured programs or activities that target the person where they currently reside.

A multifaceted approach to health may be essential for health behavior change. The Optimal Health program may be feasible in similar settings but could easily be modified and tailored to lengthen the intervention, increase efficacy and add staff to work with participants. Targeting the physical dimension of health alone may not be enough for long term behavior change (Tang et al., 2003). The results of this study indicate that the multifaceted spirituality-based Optimal Health program, designed to enhance well-being and health behavior, is feasible

and acceptable in men and women who attend a non-denominational Christian church.

REFERENCES

- Adams, T. B., Bezner, J. R., Drabbs, M. E., Zambarano, R. J., & Steinhardt, M. A. (2000). Conceptualization and measurement of the spiritual and psychological dimensions of wellness in a college population. *Journal of American College Health, 48*(4), 165–173.
- Ainsworth, B. E., Haskell, W. L., Whitt, M. C., Irwin, M. L., Swartz, A. M., Strath, S. J., O'Brien, W. L., et al. (2000). Compendium of physical activities: an update of activity codes and MET intensities. *Medicine & Science in Sports & Exercise, 32*(Supplement), S498–S516.
- Ano, G. G., & Vasconcelles, E. B. (2005). Religious coping and psychological adjustment to stress: A meta-analysis. *Journal of Clinical Psychology, 61*(4), 461–480.
- APA Stress Report (2011). Stress in America findings. www.apa.org.
Psychology. Newbury Park, CA: Sage. Harris Interactive. (2010). American Psychological Association Survey, *APA Stress and Mind/Body Health*.
- Bjorntorp, P. (1997). Hormonal control of regional fat distribution. *Human Reproduction, 12*(suppl 1), 21–25.
- Bjorntorp, P. (2001). Do stress reactions cause abdominal obesity and comorbidities? *Obesity Reviews, 2*(2), 73–86.
- Blumenthal, J. A. (2005). Effects of exercise and stress management training on markers of cardiovascular risk in patients with ischemic heart disease: A randomized controlled trial. *JAMA: The Journal of the American Medical Association, 293*(13), 1626–1634.
- Bopp, M., Lattimore, D., Wilcox, S., Laken, M., McClorin, L., Swinton, R., Gethers, O., et al. (2006). Understanding physical activity participation in members of an African American church: a qualitative study. *Health Education Research, 22*(6), 815–826.
- Bovier, P. A., Chamot, E., & Perneger, T. V. (2004). Perceived stress, internal resources, and social support as determinants of mental health among young adults. *Quality of Life Research, 13*(1), 161–170.
- Bowen, D. J., Kreuter, M., Spring, B., Cofta-Woerpel, L., Linnan, L., Weiner, D., Bakken, S., et al. (2009). How we design feasibility studies. *American Journal of Preventive Medicine, 36*(5), 452–457.

- Brydon, L., Wright, C. E., O'Donnell, K., Zachary, I., Wardle, J., & Steptoe, A. (2007). Stress-induced cytokine responses and central adiposity in young women. *International Journal of Obesity*, 32(3), 443–450.
- Callaghan, P. (2004). Exercise: a neglected intervention in mental health care? *Journal of Psychiatric and Mental Health Nursing*, 11(4), 476–483.
- Campbell, M. K., Motsinger, B. M., Ingram, A., Jewell, D., Makarushka, C., Beatty, B., Dodds, J., et al. (2000). The North Carolina black churches united for better health project: Intervention and process evaluation. *Health Education & Behavior*, 27(2), 241–253.
- Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Questionnaire*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, (2011).
- Chandler, C. K., Holden, J. M., & Kolander, C. A. (1992). Counseling for spiritual wellness: Theory and practice. *Journal of Counseling & Development*, 71(2), 168–175.
- Chrousos, G. P., & Gold, P. W. (1992). The concepts of stress and stress system disorders: Overview of physical and behavioral homeostasis. *JAMA: The Journal of the American Medical Association*, 267(9), 1244–1252.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of health and social behavior*, 385–396.
- Cohen, Sheldon. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan S. Oskamp (Ed.), *The social psychology of health*, The Claremont Symposium on Applied Social Psychology. (pp. 31–67). Thousand Oaks, CA, US: Sage Publications, Inc.
- Cook, T. R. C. (1997). Faith-based health needs assessment: Implications for empowerment of the faith community. *Journal of Health Care for the Poor and Underserved*, 8(3), 300–301.
- Corbin, C.B., Welk, G., Corbin, W. R., & Welk, K. A. (2009). Concepts of physical fitness: Active lifestyles for wellness, (15thed). New York: McGraw Hill.
- Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., Pratt, M., et al. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise*, 35(8), 1381.

- Cummings, J. P., & Pargament, K. I. (2010). Medicine for the spirit: Religious coping in individuals with medical conditions. *Religions, 1*(1), 28–53.
- De Cocker, K. A., De Bourdeaudhuij, I. M., Cardon, G. M., & others. (2010). What do pedometer counts represent? A comparison between pedometer data and data from four different questionnaires. *Public health nutrition, 12*(1), 74.
- De Moor, M. H. M., Beem, A. L., Stubbe, J. H., Boomsma, D. I., & De Geus, E. J. C. (2006). Regular exercise, anxiety, depression and personality: a population-based study. *Preventive Medicine, 42*(4), 273–279.
- De Moor, Marleen H. M. (2008). Testing causality in the association between regular exercise and symptoms of anxiety and depression. *Archives of General Psychiatry, 65*(8), 897.
- DeHaven, M. J., Hunter, I. B., Wilder, L., Walton, J. W., & Berry, J. (2004). Health programs in faith-based organizations: Are they effective? *American Journal of Public Health, 94*(6), 1030–1036.
- Derose, K. P., & Fox, S. A. (2000). Church-based telephone mammography counseling with peer counselors. *Journal of Health Communication, 5*(2), 175–188.
- Diabetes Prevention Program Resea. (2009). 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program outcomes Study. *The Lancet, 374*(9702), 1677–1686.
- Djurhuus, C. B., Gravholt, C. H., Nielsen, S., Mengel, A., Christiansen, J. S., Schmitz, O. E., & Møller, N. (2002). Effects of cortisol on lipolysis and regional interstitial glycerol levels in humans. *American Journal of Physiology-Endocrinology And Metabolism, 283*(1), E172–E177.
- Driver, H. S., & Taylor, S. R. (2000). Exercise and sleep. *Sleep Medicine Reviews, 4*(4), 387–402.
- Dunn, A. L., Trivedi, M. H., Kampert, J. B., Clark, C. G., & Chambliss, H. O. (2005). Exercise treatment for depression: efficacy and dose response. *American Journal of Preventive Medicine, 28*(1), 1–8.
- Dunn, A. L., Trivedi, M. H., & O’Neal, H. A. (2001). Physical activity dose-response effects on outcomes of depression and anxiety. *Medicine & Science in Sports & Exercise, 33*(6), S587.

- Epel, E. S., McEwen, B., Seeman, T., Matthews, K., Castellazzo, G., Brownell, K. D., Bell, J., et al. (2000). Stress and body shape: stress-induced cortisol secretion is consistently greater among women with central fat. *Psychosomatic Medicine*, 62(5), 623–632.
- Fitzgibbon, M. L., Stolley, M. R., Ganschow, P., Schiffer, L., Wells, A., Simon, N., & Dyer, A. (2005). Results of a faith-based weight loss intervention for black women. *Journal of the National Medical Association*, 97(10), 1393.
- Flegal, K. M., Carroll, M. D., Ogden, C. L., & Curtin, L. R. (2010). Prevalence and trends in obesity among US adults, 1999-2008. *JAMA: The Journal of the American Medical Association*, 303(3), 235–241.
- Ford, D. E., & Kamerow, D. B. (1989). Epidemiologic study of sleep disturbances and psychiatric disorders. *JAMA: the journal of the American Medical Association*, 262(11), 1479–1484.
- Gall, T. L., Charbonneau, C., Clarke, N. H., Grant, K., Joseph, A., & Shouldice, L. (2005). Understanding the nature and role of spirituality in relation to coping and health: A conceptual framework. *Canadian Psychology/Psychologie Canadienne*, 46(2), 88–104.
- Garber, C. E., Blissmer, B., Deschenes, M. R., Franklin, B. A., Lamonte, M. J., Lee, I.-M., Nieman, D. C., et al. (2011). Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults. *Medicine & Science in Sports & Exercise*, 43(7), 1334–1359.
- Glanz, K., Rimer, B. K., & Viswanath, K. (2008). *Health behavior and health education: theory, research, and practice*. Jossey-Bass Inc Pub. Retrieved from <http://books.google.com.ezproxy1.lib.asu.edu/books>
- Haskell, W. L., Lee, I. M., Pate, R. R., Powell, K. E., Blair, S. N., Franklin, B. A., Macera, C. A., et al. (2007). Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Medicine & Science in Sports & Exercise*, 39(8), 1423.
- Hawks, S. R., Hull, M. L., Thalman, R. L., & Richins, P. M. (1995). Review of spiritual health: Definition, role, and intervention strategies in health promotion. *American Journal of Health Promotion*, 9(5), 371–378.

- Hill, P. C., & Pargament, K. I. (2008). Advances in the conceptualization and measurement of religion and spirituality: Implications for physical and mental health research. *Psychology of Religion and Spirituality*, *S*(1), 3–17.
- Hooker, S. P., Harmon, B., Burroughs, E. L., Rheaume, C. E., & Wilcox, S. (2011). Exploring the feasibility of a physical activity intervention for midlife African American men. *Health Education Research*, *26*(4), 732–738.
- Kim, K. H. -c., Linnan, L., Kramish Campbell, M., Brooks, C., Koenig, H. G., & Wiesen, C. (2006). The WORD (Wholeness, Oneness, Righteousness, Deliverance): A faith-based weight-loss program utilizing a Community-Based Participatory Research approach. *Health Education & Behavior*, *35*(5), 634–650.
- King, D. E., & Bushwick, B. (2001). 6.1 Beliefs and attitudes of hospital inpatients about faith healing and prayer. *Psychological Perspectives on Prayer: A Reader*, 179.
- Kokkinos, P. (2008). Physical activity and cardiovascular disease prevention: Current recommendations. *Angiology*, *59*(2 suppl), 26S–29S.
- Kong, B. W. (1997). Community-based hypertension control programs that work. *Journal of health care for the poor and underserved*, *8*(4), 409–415.
- Kubitz, K. A., Landers, D. M., Petruzzello, S. J., & Han, M. (1996). The effects of acute and chronic exercise on sleep. A meta-analytic review. *Sports medicine (Auckland, N.Z.)*, *21*(4), 277–291.
- Kyrou, I., Chrousos, G. P., & Tsigos, C. (2006). Stress, visceral obesity, and metabolic complications. *Annals of the New York Academy of Sciences*, *1083*(1), 77–110.
- Lasater, T. M., Wells, B. L., Carleton, R. A., & Elder, J. P. (1986). The role of churches in disease prevention research studies. *Public Health Reports*, *101*(2), 125.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer Publishing Company. Retrieved from <http://books.google.com.ezproxy1.lib.asu.edu/books>
- Lundholm, K., Rebuffe-Scrive, M., & Bjorntorp, P. (1985). Glucocorticoid hormone binding to human adipose tissue. *European Journal of Clinical Investigation*, *15*(5), 267–271.

- Maton, K. I., & Wells, E. A. (1995). Religion as a community resource for well-being: Prevention, healing, and empowerment pathways. *Journal of Social Issues, 51*(2), 177–193.
- Mattis, J. S., & Jagers, R. J. (2001). A relational framework for the study of religiosity and spirituality in the lives of African Americans. *Journal of Community Psychology, 29*(5), 519–539.
- McEwen, B. S. (1998). Stress, adaptation, and disease: Allostasis and allostatic Load. *Annals of the New York Academy of Sciences, 840*(1), 33-44.
- Milani, R. V., & Lavie, C. J. (2009). Reducing psychosocial stress: a novel mechanism of improving survival from exercise training. *The American journal of medicine, 122*(10), 931–938.
- Miller, W. R., & Thoresen, C. E. (2003). Spirituality, religion, and health: An emerging research field. *American Psychologist, 58*(1), 24–35.
- Moyer, A. E., Rodin, J., Grilo, C. M., Cummings, N., Larson, L. M., Rebuffe-Scrive, M., & others. (1994). Stress-induced cortisol response and fat distribution in women. *Obesity research, 2*(3), 255.
- Nagel, E., & Sgoutas-Emch, S. (2006). The relationship between spirituality, health beliefs, and health behaviors in college students. *Journal of Religion and Health, 46*(1), 141–154.
- North, T. C., McCullagh, P., & Tran, Z. V. (1990). Effect of exercise on depression. *Exercise and sport sciences reviews, 18*(1), 379.
- Office of Disease Prevention and Health Promotion. Developing Healthy People 2020: The road ahead. Washington, DC. US Department of Health and Human Services. 2009.
- Office of Public Health Assessment. (2004). *Health Status in Utah: The Medical Outcomes Study SF-12* (2001 Utah Health Status Survey Report). Salt Lake City.
- Ornish, D. (1998). Intensive lifestyle changes for reversal of coronary heart disease. *JAMA: The Journal of the American Medical Association, 280*(23), 2001–2007.
- Pargament, K. I. (2001). Religious struggle as a predictor of mortality among medically ill elderly patients: A 2-year longitudinal study. *Archives of Internal Medicine, 161*(15), 1881–1885.

- Pargament, K. I. (2004). Religious coping methods as predictors of psychological, physical and spiritual outcomes among medically ill elderly patients: A two-year longitudinal study. *Journal of Health Psychology, 9*(6), 713–730.
- Pargament, K. I., Smith, B. W., Koenig, H. G., & Perez, L. (1998). Patterns of positive and negative religious coping with major life stressors. *Journal for the Scientific Study of Religion, 7*10–724.
- Pargament, Kenneth I., Koenig, H. G., & Perez, L. M. (2000). The many methods of religious coping: Development and initial validation of the RCOPE. *Journal of Clinical Psychology, 56*(4), 519–543.
- Park, C. L., & Folkman, S. (1997). Meaning in the context of stress and coping. *Review of General Psychology, 1*(2), 115–144.
- Peterson, J., Atwood, J. R., & Yates, B. (2002). Key elements for church-based health promotion programs: Outcome-based literature review. *Public Health Nursing, 19*(6), 401–411.
- Powell, L. H., Shahabi, L., & Thoresen, C. E. (2003). Religion and spirituality: Linkages to physical health. *American Psychologist, 58*(1), 36–52.
- Rebuffe-Scrive, M., Lundholm, K., & Bjorntorp, P. (1985). Glucocorticoid hormone binding to human adipose tissue. *European journal of clinical investigation, 15*(5), 267–271.
- Rethorst, C. D., Wipfli, B. M., & Landers, D. M. (2009). The antidepressive effects of exercise: a meta-analysis of randomized trials. *Sports Medicine, 39*(6), 491–511.
- Rosmond, R. R. (1998). Stress-related cortisol secretion in men: Relationships with abdominal obesity and endocrine, metabolic and hemodynamic abnormalities. *The Journal of clinical endocrinology and metabolism, 83*(6), 1853–1859.
- Sherman, A. C., Simonton, S., Latif, U., Spohn, R., & Tricot, G. (2005). Religious struggle and religious comfort in response to illness: Health outcomes among stem cell transplant patients. *Journal of Behavioral Medicine, 28*(4), 359–367.
- Smith, B. J., Tang, K. C., & Nutbeam, D. (2006). WHO health promotion glossary: new terms. *Health Promotion International, 21*(4), 340–345.

- Sowers, J. R. (2003). Obesity as a cardiovascular risk factor. *The American journal of medicine*, 115(8), 37–41.
- Tang, K. C. (2003). Evidence based health promotion: recollections, reflections, and reconsiderations. *Journal of Epidemiology & Community Health*, 57(11), 841–843.
- Thompson, F. E., Midthune, D., Subar, A. F., Kahle, L. L., Schatzkin, A., & Kipnis, V. (2004). Performance of a short tool to assess dietary intakes of fruits and vegetables, percentage energy from fat and fibre. *Public health nutrition*, 7(08), 1097–1106.
- Toh, Y. M., & Tan, S. Y. (1997). The effectiveness of church-based lay counselors: A controlled outcome study. *Journal of Psychology and Christianity; Journal of Psychology and Christianity*. Retrieved from <http://psycnet.apa.org.ezproxy1.lib.asu.edu/psycinfo/1997-43698-006>
- Tudor-Locke, C., & Bassett, J. D. R. (2004). How many steps/day are enough?: Preliminary pedometer indices for public health. *Sports Medicine*, 34(1), 1–8.
- Ware Jr, J. E., Kosinski, M., & Keller, S. D. (1996). A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Medical care*, 34(3), 220.
- Watt, D., Verma, S., & Flynn, L. (1998). Wellness programs: a review of the evidence. *Canadian medical association journal*, 158(2), 224–230.
- Wells, B. L., DePue, J. D., Buehler, C. J., Lasater, T. M., & Carleton, R. A. (1990). Characteristics of volunteers who deliver health education and promotion: A comparison with organization members and program participants. *Health Education & Behavior*, 17(1), 23–35.
- Wilcox, S., Laken, M., Bopp, M., Gethers, O., Huang, P., McClorin, L., Parrott, A. W., et al. (2007). Increasing physical activity among church members: community-based participatory research. *American journal of preventive medicine*, 32(2), 131–138.
- Wilcox, S., Laken, M., Parrott, A. W., Condrasky, M., Saunders, R., Addy, C. L., Evans, R., et al. (2010). The Faith, Activity, and Nutrition (FAN) Program: Design of a participatory research intervention to increase physical activity and improve dietary habits in African American churches. *Contemporary clinical trials*, 31(4), 323–335.

- Wipfli, B., Landers, D., Nagoshi, C., & Ringenbach, S. (2011). An examination of serotonin and psychological variables in the relationship between exercise and mental health. *Scandinavian Journal of Medicine & Science in Sports*, 21(3), 474–481.
- Yanek, L. R., Becker, D. M., Moy, T. F., Gittelsohn, J., & Koffman, D. M. (2001). Project Joy: faith based cardiovascular health promotion for African American women. *Public Health Reports*, 116(Suppl 1), 68.

APPENDIX A
GUIDELINES & OBJECTIVES

Instructor Guidelines:

Each session will be lead with use of PowerPoint presentations.

Session Time Breakdown (approx. minutes):

Opening Prayer: 5 minutes

Review: 10-15 minutes

Current Week Presentation & Discussion: 35-40 minutes

Introduction for next session: 5 minutes

Closing Prayer: 5 minutes

Objectives for each Program Module

Module 1: Introduction to Optimal Health Program (PF, MM)

Program Goals/Individual Goals/Introduction Homework

Module 1 Instructor Objective(s):

- To introduce the connection of spirit, mind and body by establishing doctrinal person factors.
- To introduce the following session topic: Spiritual Health

Module 1 Participant Objective(s):

- To discuss the connection of spirit, mind and body.
- To briefly discuss the following session topic: Spiritual Health

Module 2: Spirit Health (SC, MM)

Introduction Homework Review/Identity, Direction & Guidance/Spirituality's

Influence on Mind & Body/Spiritual Health Homework

Module 2 Instructor Objective(s):

- To review introduction homework
- To introduce the spiritual and biblical connections to health
- To introduce the following session topic: Mind Health

Module 1 Participant Objective(s):

- To discuss introduction homework
- To discuss the spiritual and biblical connections to health
- To briefly discuss the following session topic: Mind Health

Module 3: Mind Health (SCB, MM)

Spiritual Health Homework Review/Peace/Meditation/Mind's Influence on Spirit
& Body/Importance of Reducing Stress/Mind Health Homework

Module 3 Instructor Objective(s):

- To review spiritual health homework
- To introduce/identify doctrinal scriptures and tools to cope and to reduce stress
- To introduce/describe the effects of stress on spiritual and physical health
- To introduce the following session topic: Body Health

Module 1 Participant Objective(s):

- To discuss spiritual health homework
- To discuss doctrinal scriptures and tools to cope and to reduce stress
- To discuss the effects of stress on spiritual and physical health
- To briefly discuss the following session topic: Body Health

Module 4: Body Health (SC, MM)

Mind health homework review/Honoring your temple/Weight & Health/Physical
Activity & Exercise/Nutrition/Body Health Homework

Module 4 Instructor Objective(s):

- To review mind health homework
- To introduce/describe doctrinal scriptures on the body
- To introduce/describe the effects of stress on the body
- To provide guidelines for physical activity and nutrition
- To introduce/describe options for attaining physical activity and nutritional guidelines
- To provide participants with information for four week follow-up and final measurements

Module 4 Participant Objective(s):

- To discuss mind health homework
- To discuss doctrinal scriptures on the body
- To discuss the effects of stress on the body
- To discuss guidelines for physical activity and nutrition
- To discuss options for attaining physical activity and nutritional guidelines

APPENDIX B
ACCEPTABILITY

Overall Views of Program

What was your view of the program overall? (Circle one)

- a) Liked it/Approved it
- b) Disliked it/Disapproved of it

Please list the items/elements of the program that helped or detracted from the overall program.

Helped

Detracted (took away)

Spirit Health:

- 1) Are there any parts of this program that could have been clearer?
Please explain.

- 2) Would you add anything to this section? Please comment below.

- 3) Would you delete anything from this section? Please comment below

- 4) Do you feel that the information you received from this section is able to be applied to the mind and body? Please comment below.

Mind Health:

- 1) Are there any parts of this program that could have been clearer?
Please explain.

- 2) Would you add anything to this section? Please comment below.

- 3) Would you delete anything from this section? Please comment below.

- 4) Do you feel that the information you received from this section is able to be applied to the body and spirit? Please comment below.

Body Health:

- 1) **Are there any parts of this program that could have been clearer?
Please explain.**

- 2) **Would you add anything to this section? Please comment below.**

- 3) **Would you delete anything from this section? Please comment below.**

- 4) **Do you feel that the information you received from this section is able
to be applied to the spirit and mind? Please comment below.**

APPENDIX C

DEMAND

APPENDIX D
FOLLOW-UP PHONE QUESTIONNAIRE

APPENDIX E
MANUAL OF OPERATIONS

OPTIMAL HEALTH

SPIRIT-MIND-BODY

Manual of Operations

An Individual Lifestyle Change

****Wholeness and wellness in all areas is Optimal Health. ****

SECTION 1: OVERVIEW

I. PURPOSE

The purpose of this research is to evaluate the feasibility of spirituality based stress reduction and health behavior change intervention using the Spiritual Framework of Coping (SFC) model on changes in well-being and secondarily assess changes in participants as a result of the program implementation. This manual will describe the methods of obtaining data on willing subjects of the Optimal Health study.

II. MATERIALS & EQUIPMENT

- Stadiometer (Seca Road Rod Portable Stadiometer)
- Gulick II 150 cm anthropometric tape
- Tanita Body Composition Analyzer TBF-300A
- OMRON® Automatic Blood Pressure Monitor-HEM-711DLX
- Hand Calculator
- Alcohol Wipes
- String
- Manual Blood Pressure Cuffs (S, M, L)
- Stethoscope
- Pedometers
- Digital Recorder
- Batteries (AA/AAA)
- Optimal Health Lecturer Manual
- Optimal Health Participant Booklets
- Questionnaires
- Laptop
- Projector
- Binders
- Pens
- Files & Blank Files

** These items will be transported to the location for testing*

III. FITNESS TESTING LOCATION

All measures will be taken on location of the study site.

IV. FITNESS ASSESSMENTS

1. General Instructions for Physical Assessments

- 1.1 For all measurements, subjects should wear light clothing but no shoes (thin socks or “pillow slippers” OK). Keep a supply of clothing for subjects who forget to wear or bring the appropriate clothes. Have subjects completely empty their pockets and remove all jewelry. Provide bowl for change and jewelry.

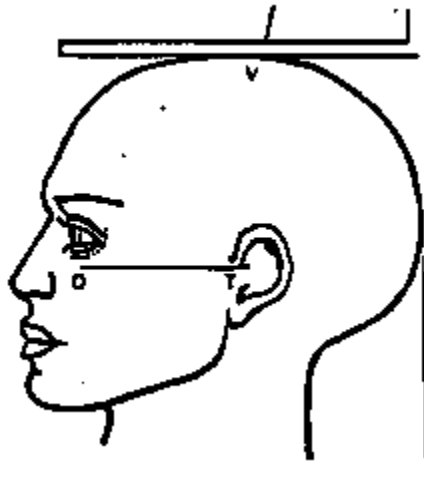
- 1.2 The subject should be ascertained for pregnancy status. Pregnant women should not be measured, regardless of gestational stage (check exclusion criteria for pregnancy).
- 1.3 Record any modifications in measurement techniques (e.g., height decreased from a hunched posture or weight that exceeds the capacity of the scale) on the data sheet.
- 1.4 Check in Participants with data sheet and code #
If participants need to change direct them to the changing area.

2.Standing Body Height

I. Materials & Equipment

- Seca (RoadRod) Portable Stadiometer

- 2.2 Before measuring height, make sure the floor is level. Measurement must never be taken on an uneven surface.
- 2.3 For accurate measurement of height, the subject must be standing in a vertical plane. To achieve this position, have the subject stand erect on the platform, with back against the vertical Stadiometer, heels against the back of platform, and feet *or* knees together—whichever come together first. Have the subject look straight ahead, with head in the Frankfort horizontal plane (Figure 1, below).



- 2.4 Place the headpiece over the crown of the head, with the headpiece forming a right angle to the scale. The headpiece should touch the scalp lightly.
- 2.5 Ask the subject to step out from under the headpiece. *Record the subject's height to the nearest 0.1 centimeter on the data sheet.*
- 2.6 If you are unable to measure the actual height of the subject because the headboard does not rest directly over the scalp, *estimate height to the nearest 0.1 cm, record on the data sheet and answer "yes" to the question, "Was there a modification in protocol?"*
- 2.7 Repeat procedure for second measurement. If values are within 0.2cm take the mean of the 2 trials. If values are not within 0.2cm take a third trial.

3. Bioelectrical Impedance (BIA) & Body Weight

I. Purpose

Tanita utilizes a patented "foot to foot" pressure contact electrode Bioelectrical Impedance Analysis technique. The BIA is based on the fact that lean tissues have high water content, and thus provide a good electrical pathway. Fat mass contains a lower percentage of body water, and thus is a poor conductor of the electrical signal. By inducing a low energy, high frequency, electrical signal (50 kHz 500

microamp). A measurement of the baseline resistance to the flow of electrical current can be made. This current is passed through the anterior electrode platform, and the voltage drop is then measured on the posterior electrode. The resistance measurement relates directly to the volume of the conductor which is used to determine total body water, lean body mass and fat mass. Percent body fat, as calculated by the Tanita, is a highly researched proprietary formula combining impedance and weight measurements with height, gender and age information[1, 2].

II. Materials & Equipment

- Tanita Body Composition Analyzer. Model TBF-300A; Tanita Corporation: Arlington Heights, IL,
- Alcohol Bottle & Gauze
- Table

III. Definitions

Weight: Total body weight includes bones, muscle, fat, water etc...

BMI: Correlates physical stature and body weight with mortality ratios (i.e. diabetes, cardio-pulmonary disease, cancer, etc). BMI is recognized as a valid assessment tool in identifying obese individuals. Body Composition Analysis may provide more information regarding actual changes in composition over an extended period of time.

Impedance: Measured in Ohms (Ω), the impedance value reflects how hard a mild electrical signal had to work to travel through the body. Lean mass (containing water and electrolytes) conducts the current, while fat mass acts as a resistor to the current. A standard range for impedance is 200-650 Ω . Do not compare impedance values among different people.

Fat Mass: Actual fat mass (in pounds, kilograms or pounds) in the body.

FFM: Fat Free Mass (in pounds, kilograms or pounds) is comprised of muscle, bone, tissue, water and all other fat free mass in the body. A healthy ratio for FFM to FM is approximately 5:1 for females, and 7:1 for males. Generally speaking, males carry more muscle than females, therefore they will report a higher FFM.

TBW: Total Body Water (in pounds, kilograms or pounds) reflects

the amount of water in the body.

3.1 Initial Scale Set Up (Only for first time use):

- 3.1.1 The scale should be on a firm, level surface (not on a carpet). Place the control box table with screen facing away from the subject.
- 3.1.2 Plug connection cable from weight platform into weighing platform connection port on back of control box.
- 3.1.3 Plug AC Adapter into the DC Jack on back of the control box. Then plug power cable into AC adapter. Plug power cable into outlet.
- 3.1.4 Turn machine on by pressing [ON/OFF] key. If printer paper is not loaded remove the paper dispenser cover by lifting it up from the back. Cut approximately 1 inch (3cm) off the paper roll. Feed paper into the automatic feeder. Replace dispenser cover.
- 3.1.5 To select print out press and hold the [0] key. Release after “Prt-1” is displayed on the screen. Select [1] for the number of printouts.
- 3.1.6 To select language press and hold [0] key. Select [1] for English.
- 3.1.7 Set the scale to Original mode. Turn power on while pressing the [CLOTHES] key. Press [0] to deactivate goal setter and wrestling mode. Once this is set the unit will start up with this setting the next time it is used.
- 3.1.8 Set the scale to Original mode. Turn power on while pressing the [CLOTHES] key. Press [0] to deactivate goal setter and wrestling mode. Once this is set the unit will start up with this setting the next time it is used.

3.2 Measurement:

- 3.2.1 Press [ON/OFF] key to turn on power. Measurement

units should be in kg/cm. Press [kg] to select.
Throughput data entry mistakes can be corrected by pressing the [CE] key.

- 3.2.2 Enter clothes weight. Enter 0.3kg for light exercise clothing. *If subject is wearing jeans or heavy clothing enter 0.5 kg.*
- 3.2.3 Enter gender and body type. All subjects will use the Standard setting for body type.
- 3.2.4 Enter age. Enter height in centimeters to the nearest whole number. If ≥ 5 round up. If ≤ 4 round down (i.e. 172.5 to 176; 172.4 to 171).
- 3.2.5 When the flashing arrow appears next to STEP ON instruct subject to step onto metal foot placements with bare feet.
- 3.2.6 After results are printed out have subject step off the scale. Record % body fat and weight on data sheet.
- 3.2.7 Clean scale with alcohol solution and gauze/cloth. Scale should be cleaned after each measurement.

4. Abdominal Girth Measurement

I. Purpose

Abdominal girth is the measurement of the distance around the abdomen at a specific point, usually at the smallest point between the lowest rib and the top of the hip bone. Abdominal girth can be an objective measurement of obesity or health risk.[3, 4]

II. Materials & Equipment

- Gulick II 150 cm anthropometric tape
- String

4.1 Technique

4.1.1 Do *not* take abdominal girth measurements over clothing.

If a subject is very large, you may have him/her hold one end of the tape while walking the tape around to obtain the measurement. If any

circumference exceeds 150 cm, use the string provided. (Take care not to offend the person being measured).

- 4.1.2 Have subject lift shirt. Apply a Gulick II anthropometric tape horizontally at the smallest point between the lowest rib and the top of the hip bone and instruct the subject to breathe normally. Move to the subject's right side to take the measurement; do not take this measurement from the front. Once position is established on the right side have subject hold tape at this point and instruct subject to slowly turn 360 degrees. **Be sure to keep the tape horizontal while making the measurement.** Instruct subject to breathe in and breathe out. **Measure at end-exhalation.** *Round abdominal girth measurement to the nearest cm and record on data sheet. If the circumference exceeds 150 cm, record "yes" for the question, "Was there a modification in protocol?"*
- 4.1.3 Repeat procedure for second measurement. If values are within 0.1cm take the mean of the 2 trials. If values are not within 0.1cm take a third trial. Record on data sheet.
- 4.1.4 If the third trial was necessary, calculate the mean of the two data points that are closest to each other.

5. Blood Pressure

I. Purpose

Blood pressure measurements in the clinical and research settings are extremely variable. Techniques must be implemented to reduce the variability between technicians. Clinical decisions such as diagnosing hypertension, determination of types of medication and effectiveness of medication are dependent on accurate blood pressure values. Procedures to reduce the variation in blood pressure measurements must include standardization of measurement techniques and utilization of multiple blood pressure readings (record average). No other fitness assessment testing event should be performed until participants have had their blood pressure measured.

The main advantages of the OMRON® automated device are accuracy comparable to manual mercury sphygmomanometry, with reduced potential for observer biases and less demand on research assistants in terms of training and effort in data collection[7].

II. Materials & Equipment

- OMRON® Automatic Blood Pressure Cuff Model HEM-711 DLX[8, 9]
- Table & Chair

III. Definitions

Blood Pressure: The force of circulating blood on the walls of the arteries. Blood pressure is taken using two measurements: systolic (measured when the heart beats, when blood pressure is at its highest) and diastolic (measured between heart beats, when blood pressure is at its lowest).

IV. Classification of the Subject's Blood Pressure within the JNC VI Categories and criteria for alerts and referrals

The 1993 Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI) defines categories of blood pressure and recommends follow-up according to the following criteria:

Classification of Blood Pressure for Adults Age 18 Years and Older According to JNC 7*			
Category	Systolic Blood Pressure (mmHg)		Diastolic Blood Pressure (mmHg)
Normal ^b	<120	and	<80
Prehypertension	120–139	and	81–89
Hypertension ^c			
Stage 1	140–159	or	90–99
Stage 2	160	or	100

* The seventh report of the Joint National Committee (JNC 7)

1. Alert levels requiring immediate referral (send subject directly to a physician or hospital) for subjects are:
 - Diastolic BP >120 mm Hg
 - Systolic BP >210 mm Hg
2. Alert levels requiring urgent referral (within one week) are:
 - Diastolic BP 110–119 mm Hg
 - Systolic BP 180–209 mm Hg
3. BP >140/90 mm Hg requires follow-up within two months' time, and, therefore, we recommend physician notification for systolic or diastolic BP above these levels.
4. JNC VI states that blood pressure classifications and referral recommendations are based on the average of two or more readings on two or more occasions.

5.1 Set Up

- 5.1.1 Place chair by table where the subject is able to place left arm comfortably on the table at heart level.
- 5.1.2 Connect the AC adapter to the back of the unit. Plug cord into the outlet. Plug air tube of the cuff into the unit

5.2 Technique

- 5.2.1 Inform patient to avoid smoking, eating, drinking (except H₂O), exercise and medications for at least an hour before the appointed time for her/his BP measurement
- 5.2.2 Seat patient comfortably. Legs and ankles uncrossed and feet flat on the floor for 3-5 minutes before taking BP
- 5.2.3 Seat patient comfortably. Legs and ankles uncrossed and feet flat on the floor for 3-5 minutes before taking BP
- 5.2.4 Seat patient comfortably. Legs and ankles uncrossed and feet flat on the floor for 3-5 minutes before taking BP

- 5.2.5 Use unclothed left arm for consistency. Make sure the air plug is securely inserted into the unit.
- 5.2.6 Place left arm on the table so that the cuff is level with the subject's heart.
- 5.2.7 Apply the cuff to the left upper arm so the blue strip is on the inside of the arm and aligned with the middle finger. The air tube runs down the inside of the arm. The bottom of the cuff should be approximately 1.5 cm (½") above the antecubital fossa (bend in elbow).

5.3 Measurement

- 5.3.1 Press START/STOP button. The cuff will inflate automatically. It will then deflate and display reading.
- 5.3.2 Record systolic/diastolic and heart rate on data sheet
- 5.3.3 Wait 1 minute before taking the second reading. Repeat above procedure

- 5.3.4 Record both blood pressure measurements

**If subject's BP measure is abnormal refer subject to healthcare provider.*

6. PHYSICAL ACTIVITY ASSESSMENT – ACCELEROMETERS

Instrument

The ActiGraph (AG) provides information on frequency, intensity, and duration of PA by utilizing a built-in single axis accelerometer which measures vertical accelerations at the hip. It is designed to detect accelerations ranging in magnitude from approximately 0.05 to 2.00g with a band limited frequency response from 0.25 to 2.5 hertz. The manufacturers indicate that these parameters have been carefully chosen to detect normal human motion and to reject motion from other sources (e.g., vibrations while driving in a car). These accelerations are summed and stored over a pre-set, user-determined epoch interval ranging typically from 5 seconds to several minutes. The resulting output from the AG is activity counts and steps per epoch (i.e., time sampling interval). Activity intensity is then derived from the activity counts (ranging from 0 to >10,000) based on previously validated cut points. Higher counts reflect more intense activity. Using a 1 minute epoch, the AG can collect data for 178 consecutive days (if set to detect steps as well as body movement).

Physical activity assessment protocol-GT1M

Epoch

The traditionally used epoch length is one minute in adults. Therefore, for this study a 1 minute epoch will be used.

Number of days

The literature is inconsistent on the number of days to monitor, for adults normally 3-5 days is recommended. In this study a seven day physical activity monitoring protocol will be used. In addition there is no consensus regarding how many hours of registered time per day that constitutes a valid day of recording. We will standardize daily wear time requirements to ≥ 10 hours/day. Data analyzed for this study included participants with at least four days of ≥ 10 hours/day.

Wear Time Validation Details for Analysis

Data Screening criteria

- days begin non-wear bout after 60 minutes
- use vector magnitude
- spike tolerance 2 minutes

Bouts

- Minute length: 10 minutes
- Minute Counts: 1953 per minute
- Max Counts: 500000 per minute
- Drop Time: 2 minutes

Intensity cutpoints

For this study, participants will wear the AG for seven consecutive days to characterize the frequency and intensity of daily activity. The cutpoints for intensity counts will be as follows: 0-99 counts/minute is sedentary, 100-759 is light activity, 760-1951 is moderate lifestyle activity, 1952-5724 is moderate intensity physical activity (walking), and 5725-9498 is vigorous intensity physical activity, and > 9499 is very vigorous activity (Freedson et al., 1998).

Physical activity is measured using the ActiGraph (accelerometer GTM1) model. The software should be installed using the instructions provided. Each participant should be monitored for 7 consecutive days, using the monitor exactly as detailed in the manufacturer's instructions. We are using the right midaxillary line as the location for attachment of the monitor. The pedometer will be placed on the same belt on the right front hip.

Freedson, P. S., Melanson, E., & Sirard, J. (1998). Calibration of the computer science and applications, inc. accelerometer. *Medicine and Science in Sports and Exercise*, 30(5), 777-781.



The ActiGraph is worn on the right midaxillary line (under arm) and the pedometer is worn over the right knee (to the right of the umbilicus)

Actigraph wear & Data Collection

To process and clean the data and also to derive physical activity variables, software has been developed by the manufacturer called ActiLife v6.1.4. A master database with the data from every participant at every measurement will be used for analysis.

The following notes are important for secure handling and may aid in creating safe routines, as they have been compiled after several years of experience of using this instrument:

1. Install the software according to manufacturer's instruction (see below)
2. The ActiGraph model GT1M needs no calibration. The GT1M is rechargeable and it should be done between each measurement. Use a USB hub that is self-powered through the power outlet.
3. It is important that one person in the research team is responsible for the accelerometers and that a routine is established for their delivery and collection from the subjects, downloading data, backing up data, and re-initializing the instruments.
4. Use a record sheet for keeping track of data collection.
5. The participant must record on a sheet (provided) the times at which they put on and take off the accelerometer. It is also a cue for the participant to remember and wear the accelerometer and can be used when analyzing the data.

5. It is absolutely crucial that the file that you download is named according to the **unique id number** of that subject (001). This filename is used when analyzing the data to identify each individual.

Optimal Health Accelerometer Instructions

Here are the instructions to wear the red motion sensor (ActiGraph accelerometer):

- Wear the instrument all waking hours except for showering and swimming (e.g. water activities)
- Record the time you put the motion sensor in the morning as well as what time you take it off at night, the red instrument will not supply any output data, this is for the researchers
- Record any times you take the motion sensor off (e.g., showering, swimming, etc.) or to give any comments about wearing it that day.



The ActiGraph accelerometer is worn on the belt on right side of your hip (under right arm, in line with seam of the pants). The belt should be worn so ID number on the instrument (or the pouch) is right side up. Write the information in the log below and return this with your ActiGraph accelerometer in the provided envelope.

Day 1 _____ **Date:** _____

Time On (in the morning) _____ Time Off (in the evening) _____ Periods of removal _____ Comments _____

Day 2 _____ **Date:** _____

Time On (in the morning) _____ Time Off (in the evening) _____ Periods of removal _____ Comments _____

Day 3 _____ **Date:** _____

Time On (in the morning) _____ Time Off (in the evening) _____ Periods of removal _____ Comments _____

Day 4 _____ **Date:** _____

Time On (in the morning) _____ Time Off (in the evening) _____ Periods of removal _____ Comments _____

Day 5 _____ **Date:** _____

Time On (in the morning) _____ Time Off (in the evening) _____ Periods of removal _____ Comments _____

Day 6 _____ **Date:** _____

Time On (in the morning) _____ Time Off (in the evening) _____ Periods of removal _____ Comments _____

Day 7 _____ **Date:** _____

Time On (in the morning) _____ Time Off (in the evening) _____ Periods of removal _____ Comments _____

SECTION 2: QUALITY ASSURANCE & QUALITY CONTROL

I. INTRODUCTION

To ensure reliability and validity; sites, instruments and assessors for the test were chosen to maintain a high level of quality. Collecting data of high quality is critical to the success of the study.

Quality Assurance (QA) activities are those undertaken before the data are collected and include developing and documenting a standard way of performing each study procedure and training technicians to perform procedures in a consistent way.

Quality Control (QC) involves monitoring data quality at specified time points during and after data collection. It includes performing statistical analyses to evaluate measurement quality, reporting the results of these analyses to appropriate study personnel, and implementing strategies to remedy deficiencies in measurement quality identified by these analyses.

II. INSTRUMENTS/CALIBRATION

In this multi-site study, technicians, clinicians, and readers from different sites will sometimes using different equipment to provide measurements on subjects. The difference is mainly from model type versus an instrument from a completely different company/manufacturer. Despite attempts to standardize examination protocol across sites, these differences inevitably increase the potential for variability and lack of reliability.

1. Calibration Check of Scales and Equipment Check

All equipment and materials will be checked monthly prior and after measures are taken. Physical Assessments will be taken at baseline, month 3, month 6 and month 9 (post-competition).

Equipment:

- Stadiometer (Accu-Hite Measure Device with level bubble)
- Gulick II 150 cm anthropometric tape
- Tanita Body Composition Analyzer TBF-300A
- OMRON® Automatic Blood Pressure Monitor-HEM-711DLX

Testing Supervisor will check calibration and working condition weekly. Checks will include the following:

- Examination of anthropometry tape measures, stadiometer, Polar transmitter/strap, and BP cuff for signs of wear.

III. DATA MANAGEMENT

1. QA Activities
 - a. Staff Training
 - i. Staff will be trained by qualified technicians on all stations of the physical assessments. Before testing begins staff will be required to pass a quality control test all stations. For assurance the technician must complete all stations according to the set criteria.

2. QC Activities
 - a. Monitoring of Technician Quality
 - i. Throughout the study technicians will be assessed prior to each testingtime period to maintain quality of data collection.
 - ii. Testing supervisor or lead investigator will be on site to monitor all data collection.

ASSESSMENT	PASS/FAIL	QUALIFIED TECHNICIAN INTIALS
Height		
BIA & Weight		
Waist Circumference		
Blood Pressure		

IV. TECHNICIAN QUALIFICATION CHART

**If technicians fail they will be retested in one week. Those who do not pass will not be allowed to perform assessments.*

QUESTIONNAIRES

SF-12® Health Survey

This survey asks for your views about your health. This information will help you keep track of how you feel and how well you are able to do your usual activities.

Answer every question by selecting the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is:

- Excellent Very good Good Fair Poor
-

2. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

- | | Yes limited a lot | Yes limited a little | No not limited at all |
|---|--------------------------|--------------------------|--------------------------|
| a Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b Climbing several flights of stairs | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

- | | Yes | No |
|--|--------------------------|--------------------------|
| a Accomplished less than you would like | <input type="checkbox"/> | <input type="checkbox"/> |
| b Were limited in the kind of work or other activities | <input type="checkbox"/> | <input type="checkbox"/> |

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

- | | Yes | No |
|--|--------------------------|--------------------------|
| a Accomplished less than you would like | <input type="checkbox"/> | <input type="checkbox"/> |
| b Did work or other activities less carefully than usual | <input type="checkbox"/> | <input type="checkbox"/> |

5. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

- Not at all A little bit Moderately Quite a bit Extremely
-

6. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks...

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
a Have you felt calm and peaceful?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b Did you have a lot of energy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c Have you felt downhearted and blue?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for completing these questions!

Brief RCOPE

The following items deal with ways you coped with the negative event in your life. There are many ways to try to deal with problems. These items ask what you did to cope with this negative event. Obviously different people deal with things in different ways, but we are interested in how you tried to deal with it. Each item says something about a particular way of coping. We want to know to what extent you did what the item says. *How much or how frequently.* Don't answer on the basis of what worked or not – just whether or not you did it. Use these response choices. Try to rate each item separately in your mind from the others. Make your answers as true FOR YOU as you can. Circle the answer that best applies to you.

- 1 – not at all
- 2 – somewhat
- 3 – quite a bit
- 4 – a great deal

(+) 1. Looked for a stronger connection with God.	1	2	3	4
(+) 2. Sought God's love and care.	1	2	3	4
(+) 3. Sought help from God in letting go of my anger.	1	2	3	4
(+) 4. Tried to put my plans into action together with God.	1	2	3	4
(+) 5. Tried to see how God might be trying to strengthen me in this situation.	1	2	3	4
(+) 6. Asked forgiveness for my sins.	1	2	3	4
(+) 7. Focused on religion to stop worrying about my problems.	1	2	3	4
(-) 8. Wondered whether God had abandoned me.	1	2	3	4
(-) 9. Felt punished by God for my lack of devotion.	1	2	3	4
(-) 10. Wondered what I did for God to punish me.	1	2	3	4
(-) 11. Questioned God's love for me.	1	2	3	4
(-) 12. Wondered whether my church had abandoned me.	1	2	3	4
(-) 13. Decided the devil made this happen.	1	2	3	4
(-) 14. Questioned the power of God.	1	2	3	4

-
- (+) Positive religious coping item
 - (-) Negative religious coping item

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

Name _____ Date _____

Age _____ Gender (Circle): **M** **F** Other _____

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?..... 0 1 2 3 4
2. In the last month, how often have you felt that you were unable to control the important things in your life?..... 0 1 2 3 4
3. In the last month, how often have you felt nervous and "stressed"? 0 1 2 3 4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?..... 0 1 2 3 4
5. In the last month, how often have you felt that things were going your way?..... 0 1 2 3 4
6. In the last month, how often have you found that you could not cope with all the things that you had to do? 0 1 2 3 4
7. In the last month, how often have you been able to control irritations in your life?..... 0 1 2 3 4
8. In the last month, how often have you felt that you were on top of things?..... 0 1 2 3 4
9. In the last month, how often have you been angered because of things that were outside of your control? 0 1 2 3 4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?..... 0 1 2 3 4

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. This is part of a large study being conducted in many countries around the world. Your answers will help us to understand how active we are compared with people in other countries.

The questions are about the time you spent being physically active in the last 7 days. They include questions about activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Your answers are important.

Please answer each question even if you do not consider yourself to be an active person.

THANK YOU FOR PARTICIPATING.

In answering the following questions,

- ◆ **vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal.
- ◆ **moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

- 1a. During the last 7 days, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling,?

Think about *only* those physical activities that you did for at least 10 minutes at a time.

_____ days per week ⇨

- 1b. How much time in total did you usually spend on one of those days doing vigorous physical activities?

or

_____ hours _____ minutes

none

- 2a. Again, think *only* about those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ days per week ⇨

- 2b. How much time in total did you usually spend on one of those days doing moderate physical activities?

or

_____ hours _____ minutes

none

- 3a. During the last 7 days, on how many days did you **walk** for at least 10 minutes at a time? This includes walking at work and at home, walking to travel from place to place, and any other walking that you did solely for recreation, sport, exercise or leisure.

_____ days per week ⇨

- 3b. How much time in total did you usually spend walking on one of those days?

or

_____ hours _____ minutes

none

The last question is about the time you spent **sitting** on weekdays while at work, at home, while doing course work and during leisure time. This includes time spent sitting at a desk, visiting friends, reading traveling on a bus or sitting or lying down to watch television.

4. During the last 7 days, how much time in total did you usually spend *sitting* on a week day?

_____ hours _____ minutes

This is the end of questionnaire, thank you for participating.

APPENDIX 1

At A Glance IPAQ Scoring Protocol (Short Forms)

Continuous Score

Expressed as MET-min per week: MET level x minutes of activity/day x days per week

Sample Calculation

MET levels	MET-minutes/week for 30 min/day, 5 days
Walking = 3.3 METs	$3.3 \times 30 \times 5 = 495$ MET-minutes/week
Moderate Intensity = 4.0 METs	$4.0 \times 30 \times 5 = 600$ MET-minutes/week
Vigorous Intensity = 8.0 METs	$8.0 \times 30 \times 5 = 1,200$ MET-minutes/week
	<hr/> TOTAL = 2,295 MET-minutes/week

Total MET-minutes/week = Walk (METs*min*days) + Mod (METs*min*days) + Vig (METs*min*days)

Categorical Score- three levels of physical activity are proposed

1. **Low**

- No activity is reported **OR**
- Some activity is reported but not enough to meet Categories 2 or 3.

2. **Moderate**

Either of the following 3 criteria

- 3 or more days of vigorous activity of at least 20 minutes per day **OR**
- 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day **OR**
- 5 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum of at least 600 MET-minutes/week.

3. **High**

Any one of the following 2 criteria

- Vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week **OR**
- 7 or more days of any combination of walking, moderate- or vigorous-intensity activities accumulating at least 3000 MET-minutes/week

Please review the full document “Guidelines for the data processing and analysis of the International Physical Activity Questionnaire” for more detailed description of IPAQ analysis and recommendations for data cleaning and processing [www.ipaq.ki.se].

NATIONAL INSTITUTES OF HEALTH
EATING AT AMERICA'S TABLE STUDY
QUICK FOOD SCAN

INSTRUCTIONS

- Think about what you usually ate last month.
- Please think about all the fruits and vegetables that you ate last month. Include those that were:
 - raw and cooked,
 - eaten as snacks and at meals,
 - eaten at home and away from home (restaurants, friends, take-out), and
 - eaten alone and mixed with other foods.
- Report how many times per month, week, or day you ate each food, and if you ate it, how much you usually had.
- If you mark "Never" for a question, follow the "Go to" instruction.
- Choose the best answer for each question. Mark only one response for each question.

1. Over the last month, how many times per month, week, or day did you drink **100% juice** such as orange, apple, grape, or grapefruit juice? **Do not count** fruit drinks like Kool-Aid, lemonade, Hi-C, cranberry juice drink, Tang, and Twister. Include juice you drank at all mealtimes and between meals.

- | | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Never | 1-3 | 1-2 | 3-4 | 5-6 | 1 | 2 | 3 | 4 | 5 or more |
| (Go to | times | times | times | times | time | times | times | times | times |
| Question 2) | last month | per week | per week | per week | per day | per day | per day | per day | per day |

1a. Each time you drank **100% juice**, how much did you usually drink?

- | | | | |
|-----------------------------|-------------------------------------|--------------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Less than $\frac{3}{4}$ cup | $\frac{3}{4}$ to $1\frac{1}{4}$ cup | $1\frac{1}{4}$ to 2 cups | More than 2 cups |
| (less than 6 ounces) | (6 to 10 ounces) | (10 to 16 ounces) | (more than 16 ounces) |

2. Over the last month, how many times per month, week, or day did you eat **fruit**? Count any kind of fruit—fresh, canned, and frozen. **Do not count** juices. Include fruit you ate at all mealtimes and for snacks.

- | | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Never | 1-3 | 1-2 | 3-4 | 5-6 | 1 | 2 | 3 | 4 | 5 or more |
| (Go to | times | times | times | times | time | times | times | times | times |
| Question 3) | last month | per week | per week | per week | per day | per day | per day | per day | per day |

2a. Each time you ate **fruit**, how much did you usually eat?

- | | | | |
|-----------------------------|-------------------------|-----------------------|---------------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Less than 1 medium fruit | 1 medium fruit | 2 medium fruits | More than 2 medium fruits |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Less than $\frac{1}{2}$ cup | About $\frac{1}{2}$ cup | About 1 cup | More than 1 cup |
- OR

3. Over the last month, how often did you eat **lettuce salad (with or without other vegetables)**?

- Never
(Go to Question 4)
- 1-3 times last month
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 times per day
- 3 times per day
- 4 times per day
- 5 or more times per day

3a. Each time you ate **lettuce salad**, how much did you usually eat?

- About ½ cup
- About 1 cup
- About 2 cups
- More than 2 cups

4. Over the last month, how often did you eat **French fries or fried potatoes**?

- Never
(Go to Question 5)
- 1-3 times last month
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 times per day
- 3 times per day
- 4 times per day
- 5 or more times per day

4a. Each time you ate **French fries or fried potatoes**, how much did you usually eat?

- Small order or less
(About 1 cup or less)
- Medium order
(About 1½ cups)
- Large order
(About 2 cups)
- Super Size order or more
(About 3 cups or more)

5. Over the last month, how often did you eat **other white potatoes**? Count **baked, boiled, and mashed potatoes, potato salad, and white potatoes that were not fried.**

- Never
(Go to Question 6)
- 1-3 times last month
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 times per day
- 3 times per day
- 4 times per day
- 5 or more times per day

5a. Each time you ate **these potatoes**, how much did you usually eat?

- 1 small potato or less
(½ cup or less)
- 1 medium potato
(½ to 1 cup)
- 1 large potato
(1 to 1½ cups)
- 2 medium potatoes or more
(1½ cups or more)

6. Over the last month, how often did you eat **cooked dried beans**? Count **baked beans, bean soup, refried beans, pork and beans and other bean dishes.**

- Never
(Go to Question 7)
- 1-3 times last month
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 times per day
- 3 times per day
- 4 times per day
- 5 or more times per day

6a. Each time you ate **these beans**, how much did you usually eat?

- Less than ½ cup
- ½ to 1 cup
- 1 to 1½ cups
- More than 1½ cups

7. Over the last month, how often did you eat **other vegetables**?

- DO NOT COUNT:**
- Lettuce salads
 - White potatoes
 - Cooked dried beans
 - Vegetables in mixtures, such as in sandwiches, omelets, casseroles, Mexican dishes, stews, stir-fry, soups, etc.
 - Rice

COUNT: • All other vegetables—raw, cooked, canned, and frozen

- Never
(Go to Question 8)
- 1-3 times last month
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 times per day
- 3 times per day
- 4 times per day
- 5 or more times per day

7a. Each of these times that you ate **other vegetables**, how much did you usually eat?

- Less than 1/2 cup
- 1/2 to 1 cup
- 1 to 2 cups
- More than 2 cups

8. Over the last month, how often did you eat **tomato sauce**? Include tomato sauce on pasta or macaroni, rice, pizza and other dishes.

- Never
(Go to Question 9)
- 1-3 times last month
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 times per day
- 3 times per day
- 4 times per day
- 5 or more times per day

8a. Each time you ate **tomato sauce**, how much did you usually eat?

- About 1/4 cup
- About 1/2 cup
- About 1 cup
- More than 1 cup

9. Over the last month, how often did you eat **vegetable soups**? Include tomato soup, gazpacho, beef with vegetable soup, minestrone soup, and other soups made with vegetables.

- Never
(Go to Question 10)
- 1-3 times last month
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 times per day
- 3 times per day
- 4 times per day
- 5 or more times per day

9a. Each time you ate **vegetable soup**, how much did you usually eat?

- Less than 1 cup
- 1 to 2 cups
- 2 to 3 cups
- More than 3 cups

10. Over the last month, how often did you eat **mixtures that included vegetables**? Count such foods as sandwiches, casseroles, stews, stir-fry, omelets, and tacos.

- Never
- 1-3 times last month
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 times per day
- 3 times per day
- 4 times per day
- 5 or more times per day

DesignExpert™ by NCS Printed in U.S.A. Mark Reflex® EW-226427-1.654321 HC03

Thank you very much for completing this questionnaire.
Please return it in the enclosed, postage-paid envelope or to the
address listed on the front page.

BIOGRAPHICAL SKETCH

Jenelle Rose Walker was born in Miami, Florida. She however was raised in Northern California and Washington State. After graduating from Washington High School in Tacoma, WA she went to Eastern Washington University. There she completed her B.S. in Biology with a minor in Psychology in 2003 after which she completed a M.S. in Exercise Science in 2006. Her thesis topic was on the biomechanics of abdominal fatigue. After working and volunteering in a motion analysis laboratory and physical therapy clinic she entered the Graduate College at Arizona State University to pursue a doctorate in Physical Activity, Nutrition & Wellness. She received a postdoctoral appointment in the National Institutes of Health for Transdisciplinary Training in Health Disparities Science. She was an active student member of the American College of Sports Medicine (ACSM) and the Southwest regional chapter of ACSM. Her professional goals are to promote health and to help individuals achieve balance in dimensions of wellness.