10-2014

Effects of Mindfulness Practices on Perceived Stress Levels

Kendall Ginn

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October 6, 2014

Capstone Paper

A Paper Presented to Meet Partial Requirements

For NRSG 594

MSN Capstone

Southern Adventist University

School of Nursing

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Introduction

Description of the problem

It has been well established that stress is a major risk factor for multiple health conditions. College students face multiple stressors, transitioning to adulthood and often moving away from home, and learning how to function more independently along with study requirements. These factors, along with developing new relationships, can result in poor choices regarding diet, exercise, sleep, and sexual practices. (Ruthig, Marrone, HIadkyj, & Robinson-Epp, 2011). Research has shown that learning is affected by physical and mental stress. College students struggle with balancing sleep, diet, and studies and their choices often reflect increased stress and decreased health. (Palmer, Economou, Cruz, Abraham-Cook, Huntington, Maris, Makhija, Welsh & Maley, 2014).

Chronic inflammation is a staple finding in health conditions such as diabetes, cancer, and heart and lung diseases; particularly in those who are overweight. Prolonged stress, marked by cortisol and b-endorphins, can lead to metabolic syndrome, depression, poor bone density, and insomnia. (Yadav, Magan, Mehta, Sharma & Mahapatra, 2012).

Research has shown the positive effect that interventions such as spirituality, prayer, yoga, meditation, and Mindfulness-Based Stress Reduction have on stress. These practices have shown both mental and physical health benefits. (Yadav, et al., 2012).

The Zoe Project, at Southern Adventist University, was conducted to look at the effects of a faith based 28-day lifestyle transformation program on cardiovascular markers and spirituality. The study was to evaluate the effects of a natural, plant based diet with added spiritual development and prayer on certain biomarkers in the body.

Definition of terms

Mindfulness is defined as "paying attention in a particular way: on purpose, in the present moment, and nonjudgemental." (Kabat-Zinn, 1994). For the purpose of this paper, mindfulness practices will encompass spirituality, prayer, meditation, and yoga. Meditation is embracing the awareness of one's self, physically, mentally, and emotionally. (Roberts and Danoff-Burg, 2010). Mindfulness-Based Stress Reduction (MBSR) is an eight-week program that integrates the mindfulness meditation of Buddhism into a class to provide techniques that decrease the negative impact of stress, pain, and illness. (Kabat-Zinn, 2003). Yoga, the practice of using postures and breathing, can be used as the most comprehensive health benefit. It has been shown to reduce stress, improve balance and flexibility, decrease weight and increase strength, and improve heart function by lowering blood pressure and increasing oxygen to the body. (McCall, 2007). The Seventh Day Adventist Church defines prayer as talking with God directly, out loud, in private, alone or in groups. Prayer is an intimate, immediate link to God. Research has proven that prayer can reduce negativity and aggressiveness, help heal sickness, increase health and quality of living. (Seventh Day Adventist Church, 2014). The literature review will focus on the wide variety of mindfulness practices. Of these practices, the Zoe project, however, focuses only on mindfulness practices involving meditation on God's word, God-focused spirituality, and prayer with God.

One of the surveys used in the Zoe study to evaluate stress was Cohen's Perceived Stress Scale (PSS), with 14 questions utilizing Likert scale responses. The Daily Spiritual Experience Scale (DSES), a 16 question self-reported measure of a person's spiritual experience, that shows that spiritual experiences are a part of one's daily life. Spiritual Experience Reflections (SEF)

was developed by the researchers as interview questions to examine the spiritual experiences of the participant.

Theoretical framework

Martha Rogers' Science of Unitary Human Beings (SUHB) integrates science and art in nursing. In this model, person and environment are continuously changing energy fields that create a whole, where changes and differences are expected and care is cultivated to meet the needs of the unitary being. (Alligood, 2010). With all of the dynamic changes a student feels when transitioning to college, Rogers' SUHB model is best suited to address those changes. Adventists believe health and taking care of our bodies honors God. Adventists see wellness as God being the energy and love that transfers continuously between being and environment. His love inspires wellness. Beings and environments cannot be separated into parts and treated separately. They make up a whole and the individual has to consciously engage in the life process of change. Three components make up the life process of the unitary being. The first component, the energy field, is the foundation of both the living and nonliving and allows a way to view a patient and their environment as a whole. The second component, openness, refers to the lack of boundaries between individual and environmental energy transfer. Because of the openness, the patient consciously engages in exchanging energies with the environment. Pattern, the third component, is seen as a single wave to identify a particular energy field as physical, mental/emotional, social, or spiritual. (Alligood, 2010). For the Zoe project, the experimental group facilitates the continual transfer of energy through honoring God with changes to diet, exercise, amplified by meditation focused on God's word and prayer to God.

Purpose statement

The purpose of the Zoe research study was to determine the effects of a 28-day whole-food plant-based diet on the resting metabolic rate (RMR), plasma cortisol level, C-reactive protein, lipids, and PLAC values of university students. The hypothesis was that the RMR, inflammatory markers, and serum lipids would decrease after the 28-day whole-food plant-based diet.

Another aspect of the challenge was the focus on the individual's prayer life. The hypothesis was that the spiritual component would serve to enhance the participants' focus on the dietary challenge and that they would experience an increase in strength and self-control from their prayer times and activities during times of temptation and weakness. (IRB, 2014).

PICO question

After learning about the Zoe project and being assigned data entry of the perceived stress scale (PSS), the impact of a primarily vegan diet on perceived stress levels in college students became intriguing. As the literature review progressed, the spiritual side of the Zoe project and how effective prayer was in reducing stress became the focus. Focus turned toward mindfulness practice and how it related to spirituality/prayer as there was not as much primary research focused on prayer specifically. Mindfulness practices encompass multiple modalities such as prayer, meditation and yoga and can provide benefits both physically and mentally. (Yadav, et al., 2012). To learn more about how college age students integrated and utilized these mindfulness practices and the impact on perceived stress led to the question: In a group of apparently healthy young adults, do mindfulness practices improve perceived stress levels?

Literature Review

In the articles reviewed, the author of this paper looked for programs or studies that utilized mindfulness based practices as an intervention to reduce stress in college age young adults. The sources utilized for the research articles reviewed were CINAHL, Medline, Sage, and others through Southern Adventist University library research database. Search key words: prayer, spirituality, mindfulness, meditation, yoga, stress, and stress reduction.

In a single-blinded, randomized controlled trial, with intention to treat analysis study by Warnecke, Quinn, Ogden, Towle, and Nelson (2011), a group of medical school students in their last two years from three different schools were evaluated to determine if mindfulness practices reduced stress. The participants were given an audio compact disc designed for the trial that had 30 minutes of voice guided mindfulness practice that participants were to do on their own daily over 8 weeks. Researchers found statistically significant decreases in scores on PSS and the anxiety portions of the Depression, Anxiety, Stress Scale (DASS). This study confirmed mindfulness as a stress management and coping tool. The study was limited by small study size, decreased adherence to program and the inability to blind the study due to the intervention.

Roberts and Danoff-Burg (2010) conducted a cross-sectional design study to evaluate the relationship between mindfulness and positive and negative health behaviors in college age students. Students already enrolled in the Psychology Research Pool at University at Albany were recruited to participate in online surveys assessing activity, mindfulness, and perceived health and related behaviors such as drinking, exercise, stress, smoking, sleep patterns, and diet. The study revealed that elevated levels of mindfulness correlated with improved physical and psychological health. Students with higher levels of mindfulness had higher incidences of quality sleep, better diet choices and decreased impulse eating, and improved quality of exercise

and decreased stress. The researchers determined that in the face of the stressors encountered by college age students, using mindfulness based interventions can decrease stress and decrease the negative health behaviors associated with those elevated stress levels.

A longitudinal study by Geary and Rosenthal (2011) was conducted to see the impact of MBSR on healthcare workers over a year's time. The study also evaluated pulse rate variability (PRV) as a potential biomarker. Using convenience sampling from employees at University of Texas Medical Branch, the researchers compared a control group to a group with the MBSR program intervention. Self-reporting questionnaires, PRV, and demographics were administered before the program, after the MBSR program and one year later. The significant findings were that daily spiritual experiences were increased, self-reported stress levels decreased, and these results continued after the specific MBSR program concluded. There was no significant correlation between the self reported questionnaires and PRV.

Yadav, Magan, Mehta, Sharma and Mahapatra (2011) used a nonrandomized prospective ongoing study with pre-post design to evaluate the effectiveness of yoga in reducing stress. Asanas (positions) and pranayama (breathing techniques) were the interventions used on patients selected for their chronic inflammatory illnesses (diabetes, hypertension, musculoskeletal pain, asthma, and constipation) and/or for being overweight or obese. The study took place at Integral Health Clinic in New Dehli, India, a part of the Department of Physiology at All India Institute of Medical Sciences. The participants signed consents and committed to 10 days over a 2 week period and lab work (serum cortisol, β-endorphin for stress and IL-6 and TNF-α for inflammation) was obtained prior to the yoga and at the end of the 10^{th} day. The program consisted of two hours for each of the 10 days, one hour focusing on yoga positions and breathing and the other hour was spent in an interactive lecture, discussing diet, stress

management, and disease specific information. Meditation concluded the two hour sessions. The researchers concluded that there were significant reductions in plasma cortisol levels from baseline and the plasma β-endorphin levels showed significant increase overall. The inflammation markers, IL-6 and TNF-α, were both significantly decreased post intervention compared to the pre-intervention. The study reveals that yoga as a lifestyle intervention, can improve stress and inflammation in a short amount of time. Families, while not a part of the study, were encouraged to participate as well to help with compliance. Participants were invited to continue at the Integral Health Clinic after their study. The researchers concluded that a yoga-based lifestyle, that included simple exercises, diet information, stress management techniques, and individualized counseling, has increased potential for clinical success because of its simplicity and cost effectiveness.

Greeson, Webber, Smoski, Brantley, Ekblad, Suarez, and Wolever (2011) conducted a prospective, observational trial study with open enrollment among 279 participants to explore the relationship between spirituality and MBSR. The participants were recruited from a self-enrolled, self-pay MBSR program through Duke Integrative Medicine, during which time, grant money was obtained and used to increase participation and encourage completion of the program and time consuming online surveys. The study's objective was to evaluate if spirituality contributes to health-related quality of life outcomes from MBSR. Significant findings indicated that increases in spirituality and mindfulness were specifically linked with mental health improvements after MBSR. After finding no significance relating the change in mindfulness to change in spirituality, the analysis shifted to an exploratory model which concluded that increased spirituality following MBSR directly and indirectly improved mental health. The data

indicated that increased spirituality with daily awareness and connection to a higher being can be a crucial result of MBSR in overall personal well-being.

A randomized control trial conducted by Shapiro, Brown, Thoresen, and Plante (2011) evaluated the moderating role of a pre-intervention, trait mindfulness, on MBSR results against a control group. Recruitment occurred at a California university through emails, flyers, and recruitment sessions and participants provided signed consent. Following online pretest assessment, random assignment between MBSR and a wait-list control group were made of 30 participants. Online assessments were emailed immediately following the eight-week MBSR course, at two months, and at 12 months. Participants were paid $10, $20, and $30 respectively after completing the assessments. Results showed the MBSR group had statistically significant changes in several aspects of treatment effects from pre-test to the 2 and 12 month reassessments. Even though MBSR was found to have more successful outcomes when baseline mindfulness was higher, all MBSR participants revealed improvement on multiple outcomes over those in the control group.

Methods

Research Design

A mixed-method, quasi-experimental, nonequivalent comparison group pre/post intervention design was used by the researchers on the Zoe project to evaluate the effects of a whole-food plant-based diet and spiritual practice on cardiovascular biomarkers. This design was best suited for the purposes of this study because it utilized convenience sampling from intact groups at SAU. Institutional Review Board approval was obtained prior to the start of the study. Informed consent for all participants was obtained. Participants from two groups of students had resting metabolic rate testing, blood tests, and answered questionnaires, using Likert

scale responses, about current diet, exercise, stress, and spiritual practices. The intervention of a 28-day faith based lifestyle transformation program was assigned to one group and the other group continued with current practices as a control group. After completion of program, participants from both groups were tested and answered the same questionnaires used pre-intervention.

Results and Discussion

Role as Research Assistant

I was first made aware of the role as a research assistant through an email to SAU graduate students. I responded with interest, and then attended a meeting to learn about the Zoe project and the role of research assistant. After accepting the position of research assistant, we were assigned different aspects of the study for data entry and potentially data analysis. I was assigned the pre/post perceived stress scale questionnaires for data entry along with another research assistant to ensure accuracy. The participants were assigned identification numbers to protect privacy. Using SPSS, I entered data under variables delegated for pretest identification and posttest identification; whether participant was in the control group or experimental group, and responses to the pre and post PSS questionnaires. I performed over 60 hours of reading about PSS; correlating, entering, and cleaning data in SPSS, and analyzing data for frequency, normality, and outliers.

Instruments

As a research assistant on the Zoe project, I wanted to look at the reliability and validity of the data collection measures associated with the data entry I performed. The Cohen's Perceived Stress Scale (PSS) is a 14 question (Appendix A), self-reporting measure that evaluates the extent that individuals find situations or experiences hard to handle and

overwhelming. It has well known construct validity supported through good internal reliability, with a Cronbach's alpha coefficient of .84-.86. (Lavoie & Douglas, 2011). PSS-14 scores are achieved by reversing the scores on the seven positive items, e.g., 0=4, 1=3, 2=2, etc., and then totalling across all 14 items. Items 4, 5, 6, 7, 9, 10, and 13 are the positively stated items. (Cohen, Kamarck, & Mermerlstein, 1983).

The Daily Spiritual Experiences Scale (DSES) is a 16-item scale that measures a personal experience of daily spiritual experiences. The scores from this well validated data tool have been previously associated with positive psychosocial status and quality of living. It has a Chronbach's alpha coefficient of .93, demonstrating high internal reliability. (Greeson et al., 2011).

Findings

Data analysis is still ongoing at this time; therefore significant findings are not available to report at this time. Descriptive analysis was run to check for frequency (Appendix B), normal distribution and outliers (Appendix D). Outliers look for extremes in the data sets. Overall, the experimental group was found to have far more outliers than the control group. The experimental group decreased number of outliers from pretest to posttest, while the control group increased number of outliers from pretest to posttest. While unable to determine specific statistical significance at this time, the experimental group had a lower total sum (Appendix C) among all participants on the posttest when compared to pretest, which could represent positive results from the Zoe project. Overall stress levels appear to have decreased, but because the research included multiple interventions, it is unable to be determined whether or not stress reduction was related to diet, exercise, or prayer.

Evaluation

This truly was a great learning experience. This was my first time dealing with a research study first hand. I found that coordinating with someone else for continuity and accuracy is challenging when you are not working side by side. Having two people for data entry is crucial for accuracy and the time it takes to clean data, correlate and fix data entry mistakes took so much longer than I ever expected. I had to re-teach myself how to use SPSS, it was slow going at first even trying to figure out how to set up variables so they would match those already developed by my partner. I had to figure out how to do the scoring with reversal scores and develop correct variables that matched those of my data entry partner. By the end I could quickly interpret the output and pinpoint where the discrepancies were and figure out how to fix them. I now have much greater respect for the amount of time and effort it takes to conduct and complete an accurate research study. I hope that the data analysis reveals the positive impact of diet and prayer and can implement them in a program that students can use in the future. After learning from my specific literature, I would love to see an ongoing program for students implemented that focused on mindfulness practices of prayers and spiritual meditation.

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Appendix A: PSS

PERCEIVED STRESS SCALE (PSS)

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 *how often* you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, rather indicate the alternative that seems like a reasonable estimate.

1. **In the last month, how often have you been upset because of something that happened unexpectedly?**

Never	Almost never	Sometimes	Fairly often	Very often
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?**

Never	Almost never	Sometimes	Fairly often	Very often
0	1	2	3	4

3. **In the last month, how often have you felt nervous and "stressed"?**

Never	Almost never	Sometimes	Fairly often	Very often
0	1	2	3	4

4. **In the last month, how often have you dealt successfully with irritating life hassles?**

Never	Almost never	Sometimes	Fairly often	Very often
4	3	2	1	0

5. **In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?**

Never	Almost never	Sometimes	Fairly often	Very often
4	3	2	1	0

6. **In the last month, how often have you felt confident about your ability to handle your personal problems?**

Never	Almost never	Sometimes	Fairly often	Very often
4	3	2	1	0

7. **In the last month, how often have you felt that things were going your way?**

Never	Almost never	Sometimes	Fairly often	Very often
4	3	2	1	0

8. **In the last month, how often have you found that you could not cope with all the things that you had to do?**

Never	Almost never	Sometimes	Fairly often	Very often
0	1	2	3	4

9. **In the last month, how often have you been able to control irritations in your life?**

Never	Almost never	Sometimes	Fairly often	Very often
4	3	2	1	0

10. **In the last month, how often have you felt that you were on top of things?**

Never	Almost never	Sometimes	Fairly often	Very often
4	3	2	1	0

11. **In the last month, how often have you been angered because of things that happened that were outside of your control?**

Never	Almost never	Sometimes	Fairly often	Very often
0	1	2	3	4

12. **In the last month, how often have you found yourself thinki8ng about things that you have to accomplish?**

Never	Almost never	Sometimes	Fairly often	Very often
0	1	2	3	4

13. **In the last month, how often have you been able to control the way you spend your time?**

Never	Almost never	Sometimes	Fairly often	Very often
4	3	2	1	0

14. **In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?**

Never	Almost never	Sometimes	Fairly often	Very often
0	1	2	3	4

Appendix B: Frequency Distribution

Distribution- Frequency

		Cases					
		Valid		Missing		Total	
	Group	N	Percent	N	Percent	N	Percent
Pre ID Number	Control	15	60.0%	10	40.0%	25	100.0%
	Experimental	35	67.3%	17	32.7%	52	100.0%
Post ID Number	Control	15	60.0%	10	40.0%	25	100.0%
	Experimental	35	67.3%	17	32.7%	52	100.0%

Appendix C: Total Scores Pretest vs. Posttest for the Experimental group

Statistics

		Pre PSS Total Score (Q1,2 3,4r,5r,6r,7r,8,9r ,10,11,12,13r,14)	Post PSS Total Score (Q1,2 3,4r,5r,6r,7r,8,9r ,10,11,12,13r,14)
N	Valid	23	15
	Missing	2	10
Sum		782.00	479.00

Appendix D: PRETEST and POSTTEST Normalcy and Outlier Table

PSS PRETEST QUESTIONS With REVERSALS	**EXPERIMENTAL GROUP** Median[Interquartile Range]	**CONTROL GROUP** Median[Interquartile Range]	**OUTLIERS** E:experiment C:control
Pre-PSS Question 1 Upset	2.0 [1.0]	2.0 [1.0]	E:61,12
Pre-PSS Question 2 Unable to Control	2.0 [1.0]	2.0 [1.0]	E: 61
Pre-PSS Question 3 Felt Nervous	3.0 [2.0]	3.0 [1.0]	NONE
Pre-PSS Question 4 Dealt Successfully	1.0 [1.0]	1.0 [1.0]	NONE
Pre-PSS Question 5 Effectively Coping	2.0 [1.0]	1.0 [1.0]	C: 56
Pre-PSS Question 6 Felt Confident	2.0 [1.0]	1.0 [1.0]	C:56
Pre-PSS Question 7 Going your Way	2.0 [0.0]	1.0 [1.0]	C:76 E: 50,54,53,49 29,60,46,61, 20,12
Pre-PSS Question 8 Could not Cope	2.0[1.0]	2.0[2.0]	E:33,54,39,40 48,35,38,12
Pre-PSS Question 9 Control Irritations	2.0[1.0]	1.0[1.0]	NONE
Pre-PSS Question 10 On top of Things	2.0[2.0]	2.0[1.0]	NONE
Pre-PSS Question 11 Angered	2.0[2.0]	1.0[1.0]	C:56
Pre-PSS Ques 12 Accomplish	3.0[1.0]	4.0[1.0]	C:56 E:38
Pre-PSS Ques 13 Spend your Time	2.0[1.0]	1.0[1.0]	E:39
Pre-PSS Ques 14 Felt Difficulties	2.0[1.0]	2.0[2.0]	E: 12
Pre-PSS Ques 4 Score Reversed	3.0[1.0]	3.0[1.0]	NONE
Pre-PSS Ques 5 Score Reversed	2.0[1.0]	3.0[1.0]	C:56
Pre-PSS Ques 6 Score Reversed	2.0[1.0]	3.0[1.0]	C:56
Pre-PSS Ques 7 Score Reversed	2.0[0.0]	3.0[1.0]	C: 76 E:20,12,29,60, 46,49,50,53
Pre-PSS Quest 9 Score Reversed	2.0[1.0]	3.0[1.0]	NONE
Pre-PSS Ques 10 Score Reversed	2.0[2.0]	2.0[1.0]	NONE
Pre-PSS Ques 13 Score Reversed	2.0[1.0]	3.0[1.0]	E:39
Pre PSS Total Score (Q1,2 3,4r,5r,6r,7r,8,9r,10,11,12,13r,14)	33.0[6.0]	34.0[3.0]	C:69,56

PSS POSTTEST QUESTIONS with REVERSAL	**EXPERIMENTAL GROUP** Median[Interquartile Range]	**CONTROL GROUP** Median[Interquartile Range]	**OUTLIERS** E:experiment C:control
Post-PSS Question 1 Upset	1.0[1.0]	2.0[0.0]	C:75,73,62,65, 17 E:3
Post-PSS Question 2 Unable to Control	2.0[2.0]	2.0[1.0]	C: 66,64,65
Post-PSS Question 3 Felt Nervous	2.0[1.0]	2.0[1.0]	C:70
Post-PSS Question 4 Dealt Successfully	1.0[1.0]	2.0[1.0]	C:65
Post-PSS Question 5 Effectively Coping	1.0[0.0]	1.0[1.0]	E:3,14,40,25 1,61,52
Post-PSS Question 6 Felt Confident	1.0[1.0]	1.0[2.0]	NONE
Post-PSS Question 7 Going your Way	1.0[1.0]	1.0[1.0]	NONE
Post-PSS Question 8 Could not Cope	2.0[1.0]	2.0[1.0]	NONE
Post-PSS Question 9 Control Irritations	1.0[1.0]	1.0[1.0]	NONE
Post-PSS Question 10 On top of Things	1.0[1.0]	1.0[1.0]	NONE
Post-PSS Question 11 Angered	1.0[1.0]	1.0[1.0]	NONE
Post-PSS Ques 12 Accomplish	3.0[1.0]	3.0[2.0]	E: 51
Post-PSS Ques 13 Spend your Time	1.0[1.0]	1.0[1.0]	E:39
Post-PSS Ques 14 Felt Difficulties	2.0[1.0]	2.0[2.0]	E:39
Post-PSS Ques 4 Score Reversed	3.0[1.0]	2.0[1.0]	C:65
Post-PSS Ques 5 Score Reversed	3.0[0.0]	3.0[1.0]	E:61,52,1,14 25,57,3
Post-PSS Ques 6 Score Reversed	3.0[1.0]	3.0[2.0]	NONE
Post-PSS Ques 7 Score Reversed	3.0[1.0]	3.0[1.0]	NONE
Post-PSS Quest 9 Score Reversed	3.0[1.0]	3.0[1.0]	NONE
Post-PSS Ques 10 Score Reversed	3.0[1.0]	3.0[1.0]	NONE
Post-PSS Ques 13 Score Reversed	3.0[1.0]	3.0[1.0]	E:39
Post PSS Total Score (Q1,2 3,4r,5r,6r,7r,8,9r,10,11,12,13r,14)	32.0[4.5]	32.0[4.0]	C:65