Stress Management and Cardiovascular Health: Perceptions of University Employees

Janki Rashmikant Patel

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Stress Management and Cardiovascular Health: Perceptions of University Employees

by

Janki Rashmikant Patel

An Honors Capstone
submitted in partial fulfillment of the requirements
for the Honors Diploma
to

The Honors College

of

The University of Alabama in Huntsville

3 December 2018

Honors Capstone Director: Dr. Louise C. O'Keefe

Director of the Faculty/Staff Clinic and Assistant Professor of Nursing

Janki Patel 12-3-18

Student Date

Louise O'Keefe, PhD, CRNP 12-3-18

Director Date

Aneelha Sidhu, RN 12-3-18

Department Chair Date

Honors College Dean 12/10/18

Date

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Student Name (printed)

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Student Signature

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Date
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Dedication

I would like to dedicate this paper to my friends, family, and faculty who have supported me throughout this journey. I want to thank you all for the patience and encouragement that you have shown me. I would also like to dedicate this paper to the participants who took the time to answer my survey questions and contribute to research. Lastly, I would like to dedicate this to the patients who have given me the honor of helping and serving them during my clinical rotations.
Abstract

Purpose: Stress reduction has numerous benefits for patients who have cardiovascular risk factors. However, it is not a largely emphasized component of cardiac rehabilitation programs. This study aims to explore patient perceptions of their own stress management and their willingness to use a daily app-based stress reduction technique to manage chronic stress.

Methodology: A literature review for this descriptive study was performed by the student researcher regarding the topic of stress and its impact on cardiovascular health. Afterwards, a Qualtrics survey (Healthy Heart and Lifestyle Questionnaire) was sent out to employees of the University of Alabama in Huntsville via email (sample N=231). The survey tool includes the following: a demographic analysis, evaluation of lifestyle factors, a brief health history and perceptions of health, Workplace Stress Survey from the American Institute of Stress, and evaluation of access to smartphone and willingness of using an app (Breathe2Relax) in daily stress management. All surveys were anonymous.

Results: Results show how employees perceive their own health and their perceptions on how well they handle workplace stress. One hundred twenty-nine university employees expressed willingness to use an app as a stress management intervention; 102 employees denied interest in using an app intervention.

Discussion: For healthcare providers, it is essential to evaluate the patient’s own perceptions of his or her health and then formulate a teaching plan. For cardiovascular disease, long-term management of stress is crucial in avoiding adverse cardiac events. Stress management techniques should be advocated in the daily routines of patients, especially those with risk factors or existence of cardiac disease.
SECTION 1: HONORS THESIS

Introduction

The cardiovascular system is a complex system that requires healthy functioning of the heart and blood vessels to provide the tissues with oxygen and nutrients. Arteries carry oxygenated blood from the heart and through the body; the veins carry unoxygenated blood back to the heart to be re-oxygenated and pumped back into the periphery, or the rest of the body, and the cycle repeats itself. The cardiovascular system relies on adequate blood pressure, which is the pressure of blood in the vasculature, and cardiac output, which is measured by multiplying the heart rate per minute times the stroke volume. Approximately a third of deaths in the United States each year result from cardiovascular disease (Schwartz et al., 2012). High cholesterol, high blood pressure, and smoking are three key factors that lead to the development of heart disease. Other factors include genetic disposition, poor eating habits, a sedentary lifestyle, and pathological processes such as diabetes or dyslipidemia (Gillespie, Wigington, & Hong, 2013). In the field of healthcare, the growing numbers of patients worldwide with cardiomyopathies elicits a need for thorough research and implementation of evidence-based practices to ensure effective delivery of care and improved patient outcomes.

For patients with established cardiovascular disorders or known risk factors, the importance of formulating individualized plans of care is to identify the role of nonpharmacological methods in minimizing disease progression and augmenting pharmacologic actions. Patients with coronary heart disease typically receive exercise instruction, dietary counseling, medical management of hypertension and lipid levels, and smoking cessation interventions as part of standard cardiac rehabilitation programs (Blumenthal et al., 2015). Stress management is not a strongly emphasized component of such programs even though growing evidence suggests its critical role in minimizing cardiac disease progression.
Patient education and health promotion efforts should reflect that a healthcare professional is using the most current evidence as well as the patient’s own preferences and values to aid lifestyle modifications. Because nurses spend more interaction time with patients, they play a crucial role in patient teaching. The purpose of this study is to evaluate the various factors that shape the perceptions of university employees (who face varying levels of workplace stress) regarding their overall health. What lifestyle factors may contribute to an increased risk of cardiovascular disorders? Do the participants have access to a smartphone device? What is the level of willingness of participants in using an app in daily stress management? Knowing a patient’s perceptions, willingness, and unique situation enables a health care provider to provide effective education that is consistent with the patient’s level of participation in his or her own health and create a care management plan that has a higher chance of patient compliance.

**Dissemination of Scholarly Work**

- University of Alabama Research Horizon’s Day Poster presentation – April 2018 (see Appendix B)
- University of Alabama College of Nursing Honors Day poster presentation – April 2018 (see Appendix B)
- University of Alabama Honors Capstone Project poster presentation – Fall 2018 (see Appendix D)
- University of Alabama System Honors Research Conference – Fall 2018 (see Appendix D)
- Sigma Theta Tau Healthy Workplace Conference New Orleans, LA student presenter–February 2019
SECTION II: MANUSCRIPT

Professional Journal Selection

The professional journal selected for dissemination of this study is Workplace Health and Safety, an official publication of the American Association of Occupational Health Nurses (AAOHN). This is a scientific peer-reviewed journal; it aims to provide leading edge research findings and evidence-based clinical practices for occupational and environmental health, including health promotion.

Scope of Journal

Workplace Health and Safety publishes information to provide the most up to date research findings for its audience. Some areas of publication include the following: clinical, all-hazard preparedness, health promotion, safety, case management, workers' compensation, business and leadership state-of-art information on issues leading to optimal performance through worker health and well-being.

Aims of Journal

The aim of this journal is to create a positive business and workplace impact through the wellbeing of employees and to advance the knowledge surrounding health factors that influence the workplace. This journal emphasizes the importance of educating patients, families, the workplace, and the public of safe work environments and the health of workers.
Perceptions of Cardiovascular Stress Management in University Employees

Abstract
This study aims to evaluate health perceptions of university employees and their self-reported workplace stress level. A qualitative, survey-based approach was used to understand how employees perceived their stress levels, the existence of other cardiovascular risk factors (positive family history, personal medical history, lifestyle), and willingness to use a smartphone app as a daily stress reduction intervention. A sample (N=231) participated by answering survey questions sent to them via an email link. The survey tool included a demographic analysis, evaluation of lifestyle factors, a brief health history and perceptions of health, Workplace Stress Survey from the American Institute of Stress, and evaluation of access to smartphone and willingness of using an app (Breathe2Relax) for stress management. The results that emerged showed a wide variety of individual factors; 129 university employees expressed willingness to use an app as a stress management intervention; 102 employees denied interest in using an app intervention.

Keywords: Cardiovascular disease, chronic stress, stress management
Perceptions of Cardiovascular Stress Management in University Employees

The cardiovascular system is a complex system that requires healthy function of the heart and blood vessels to provide the tissues with oxygen and nutrients. Arteries carry oxygenated blood from the heart and through the body; the veins carry unoxygenated blood back to the heart to be re-oxygenated and pumped back into the periphery, or the rest of the body, so the cycle can repeat itself. The cardiovascular system relies on adequate blood pressure, which is the pressure of blood in the vasculature, and cardiac output, which is measured by multiplying the heart rate per minute times the stroke volume. Approximately a third of deaths in the United States each year result from cardiovascular disease (Schwartz et al., 2012). In both developed and developing nations, Cardiovascular disease is a leading cause of death for both men and women (Slopen, Glenn, Buring, Lewis, Williams, Albert, 2012). High cholesterol, high blood pressure, and smoking are three key factors that lead to the development of heart disease. Other factors include genetic disposition, poor eating habits, a sedentary lifestyle, and pathological processes such as diabetes or dyslipidemia (Gillespie, Wigington, & Hong, 2013). In the field of healthcare, the growing numbers of patients worldwide with cardiomyopathies elicits a need for thorough research and implementation of evidence-based practices to ensure effective delivery of care and improved patient outcomes.

In the clinical setting, for patients with established cardiovascular disorders or known risk factors, the importance of formulating individualized plans of care is to identify the role of nonpharmacological methods in minimizing disease progression and augmenting pharmacologic actions. Patients with coronary heart disease typically receive exercise instruction, dietary counseling, medical management of hypertension and lipid levels, and smoking cessation interventions as part of standard cardiac rehabilitation programs (Blumenthal et al., 2015). Stress
management is not a strongly emphasized component of such programs even though growing evidence suggests its critical role in minimizing cardiac disease progression.

Patient education and health promotion efforts should reflect that a healthcare professional is using the most current evidence as well as the patient’s own preferences and values to aid lifestyle modifications. Because nurses spend more interaction time with patients, they play a crucial role in patient teaching. The purpose of this study is to evaluate the various factors that shape the perceptions of university employees (who face varying levels of workplace stress) regarding their overall health.

BACKGROUND

Many years of research studies have shown a strong connection between the heart and emotional and physical stressors (Brotman, Golden, & Wittstein, 2007). These stressors can cause physiological changes in the neuroendocrine system and may trigger cardiovascular events such as a myocardial infarction (MI), also known as a heart attack. Homeostasis is the state of equilibrium concerning the body’s physiological processes. Allostasis is used to describe the processes of both the neuroendocrine and autonomic systems that enable the body to return to homeostasis during both external events such as environmental changes and internal events such as inflammation (Brotman et al., 2007). Repetitive stressors or a continuous state of allostatic overload can result in adverse metabolic effects in the body and cardiovascular system, the effects of which will be explored in detail later. Physiologically, a stress response is activated in the hypothalamus of the brain. Corticotropin-releasing hormone promotes the release of corticotropin from the anterior pituitary which in turn stimulates the production of cortisol and other glucocorticoids from the adrenals. This system is known as the HPA-axis, or the
hypothalamic-pituitary-adrenal axis (Brotman et al., 2007). Giannoglou (2015) explains that cardiac pathophysiology is also directly exaggerated by mental stress and its activation of the sympathetic nervous system, which involves epinephrine release from the neuroendocrine pathway. Epinephrine elevates blood pressure and heart rate, initiates vasoconstriction, promotes platelet accumulation, and creates a state of hypercoagulation. These changes contribute to the development of atherosclerotic disorders and thromboembolic complications (Giannoglou, 2015). These disorders contribute to inadequate blood flow and increased workload on the heart.

Longstanding hypertension and diabetes are chronic risk factors that increase the risk for atherosclerosis, or the hardening of arteries due to plaque buildup; however, acute stressors can lead to major short-term complications such as plaque rupture, heart attack, or fatal arrhythmias. Acute stressors such as high job strain, environmental disasters, community wide events, and emotional triggers are considered risk factors for cardiovascular events because they increase sympathetic responses and create a hypercoagulable state. Subsequent plaque rupture, especially in a patient with pre-existing atherosclerotic disease, can result in a myocardial infarction and may lead to death (Shwartz et al., 2012). Therefore, the life-threatening effects of stressful stimuli provokes a need to address these risk factors to minimize disease progression, such as in atherosclerosis, and to prevent major cardiovascular events. Different techniques of stress management must be evaluated to determine their role in improving cardiac health.

THEORETICAL FRAMEWORK

In the theory of uncertainty in illness, Merle Mishel (1988) defines uncertainty as a cognitive state in which a person is unable to predict the outcomes of an event. When a patient is diagnosed with a chronic illness, several factors influence his or her cognitive and behavioral
response. Intact cognitive capacity allows interpretation of given information and appropriate resources help a patient understand and cope with this new information; both elements are essential in reducing this level of uncertainty. Uncertainty can be further reduced by implementing coping strategies as well as evaluating and addressing gaps in the patient’s adaptation process. This includes the ability to understand the illness and its outcomes along with having a support system.

Cardiovascular disorders entail uncertainty because of the different possible outcomes of cardiac pathology. While clinical lab tests can provide measurable information regarding health, cardiac events may only be expected, not predicted. This uncertainty can cause distress for a patient. In addition, inconsistency in symptoms over the progression of a chronic illness can cause uncertainty. For example, a heart attack has different clinical appearances in different population groups ranging from heavy pressure on the chest to unexplained falls. Patients may be confused between what is normal and what is not. Education and social support are beneficial to patients because this enables the patient and caregiver to improve communication and set goals to improve wellbeing. When a social group involves others who have experienced the same condition, shared meaning is created and allows the patient to receive assurance and stability (Mishel, 1988). Furthermore, information is sought from nurses, providers, and significant others and is used by a patient to interpret events and their significance on health (Mishel, 1988).

CURRENT EVIDENCE

Evidence suggests that exposure to chronic, daily stress may increase the risk of developing cardiovascular disease. According to a metanalysis of prospective observational studies, work-related stress can increase risk of cardiovascular disease by as much as 40%; social
isolation and loneliness was found to increase this risk by as much as 50%. In patients with established cardiovascular disorders, chronic stressors are also associated with worse prognosis (Cohen, Edmondson, Kronish, 2015). According to Cohen et al., in patients with existing coronary artery disease, psychological stressors can be contributing factors to the development of myocardial ischemia, or the decrease or lack of perfusion to the muscle of the heart. Evidence suggests that stress-related accumulation of atherosclerotic plaque and acute myocardial ischemia contributes to adverse cardiovascular events.

A 10-year prospective study of female health professionals conducted by Slopen et al. (2012) revealed that women with active jobs with high job strain were 38% more likely to experience a cardiovascular event in relation to their counterparts who reported low job strain.

In addition to the known effects of stress, the lack of workplace stress levels and lack of stress management interventions should be addressed. 64% of US employees reported receiving insufficient stress management interventions from employers (Heber, Lehr, Ebert, Berking, Riper, 2016). In a study of 264 employees, a web- and mobile-based intervention has proven effective in reducing long-term stress in employees (Heber et al., 2016). Such mobile based interventions should be further explored as possible tools for stress management in the workplace.

METHODOLOGY

A university Institutional Review Board at the University of Alabama in Huntsville approved this study to distribute a survey tool to the employees of the University of Alabama in Huntsville (UAH). The main goal of this study is to better understand the health perceptions of a population of people (university employees) who have varying levels of stress. Inclusion criteria included
the following: age 19 years and older, employed at UAH, and ability to read and understand English. Exclusion criteria included the following: age 18 years and younger, inability to read and understand English. Convenience sampling was used for this study; email addresses of employees at UAH were used to recruit study participants. The email provided a short description of the study, its’ purpose, and a Qualtrics link to access the survey titled Healthy Heart and Lifestyle Questionnaire (see Appendix C). No individual identifying information was obtained. Participants could access and complete the survey from the end of the month of May of 2018 throughout the month of July of 2018.

**Measures**

The Healthy Heart and Lifestyle Questionnaire was developed by the student researcher with a total of 32 questions obtained from various sources. This tool is composed of 4 questions assessing demographic information, 7 questions assessing lifestyle factors, 5 questions assessing health perceptions, 10 questions from the Workplace Stress Survey from the American Institute of Stress, and 6 questions to evaluate access to technology and level of willingness for health promotion. Survey questions 5, 6, 12, and 30-32 were obtained from the Cardiac Health History Questionnaire from SpecialtyHealth, Inc. Survey questions 7-11 and 13-16 were obtained from the Healthy Heart Questionnaire which was used in University of Colorado Denver’s CDC-funded project called the Center of Excellence for Eliminating Disparities (CEED). Survey questions 17-26 were the Workplace Stress Survey used to quantify the participant’s level of workplace stress. All questions were used after obtaining permission via email from the appropriate department at each of the organizations. Survey measures were reviews and approved by the faculty advisor. Qualtrics is the online software used to create and distribute this
survey tool as well as analyze the data. No participant identifying information was collected or stored and anonymity was maintained.

**DATA ANALYSIS**

In total, 263 employees completed the survey tool. Surveys that were incomplete were excluded, leaving a total of 231 surveys that were used as part of data analysis. Qualtrics was used to generate data percentages and cross-tabulation to better understand the results of this considerable sample size.

**RESULTS**

Results from this study were gathered in the Qualtrics system from 231 completed survey responses. All participants met inclusion criteria. The research focus was on how employees perceived their own health; this was used to guide data analysis and to assess correlation among perceptions, lifestyle factors, and risk factors.

**Demographics**

Out of 231 participants (N=231), 76 (32.9%) were male and 155 (67.1) were female. The age ranges were the following: 18-29 years old = 34 participants (14.72%); 30-49 years old = 93 participants (40.26%); 50-64 years old = 93 participants (40.26%); 65 years old and over = 11 participants (4.76%).

Levels of education among the participants also varied. One participant (0.43%) reported being a high school graduate; 20 participants (8.66%) reported having attended some college; 5 participants (2.16%) reported having trade/technical/vocational training; 70 participants (30.3%)
reported being a college graduate; 18 participants (7.79%) reported having some postgraduate work; and 117 participants (50.65%) reported having a postgraduate degree.

Marital status was also evaluated. One hundred sixty-three participants (70.56%) report being married; 4 participants (1.73%) report being widowed. 22 participants (9.52%) report being divorced; 1 participant (0.43%) reports being separated; and 41 participants (17.75%) report never having been married.

**Lifestyle**

The following table demonstrates the number of participants who reported how many hours per day they spent watching television, sitting at a computer, playing videogames, doing beadwork, or other sedentary activities that do not require much physical work.

<table>
<thead>
<tr>
<th>Number of Hours</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or less</td>
<td>7</td>
</tr>
<tr>
<td>2-4</td>
<td>40</td>
</tr>
<tr>
<td>4-6</td>
<td>30</td>
</tr>
<tr>
<td>6-8</td>
<td>47</td>
</tr>
<tr>
<td>8-10</td>
<td>47</td>
</tr>
<tr>
<td>10 or more</td>
<td>60</td>
</tr>
</tbody>
</table>

**Table 1**

66.7% of participants (154 participants) report spending 6 or more hours per day spent on sedentary activities. Of these 154 participants, 89 participants report the intention to increase the amount of physical activity they get each week in the next 30 days, 33 participants report the intention to increase the amount of physical activity they get each week in the next 6 months; and 32 participants report no intention of increasing their amount of weekly physical activity.
Smoking is one of three key factors that increases risk of cardiovascular disease (Gillespie, Wigington, & Hong, 2013). 189 participants reported never having smoked while 42 participants reported either current or previous smoking.

**Health Status and Perceptions**

The following table demonstrates the number of participants who report either having been diagnosed with certain cardiovascular disorders or never having been diagnosed.

<table>
<thead>
<tr>
<th>Diagnoses/condition</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart attack (myocardial infarction)</td>
<td>2</td>
</tr>
<tr>
<td>Angina pectoris or Coronary Artery Disease (CAD)</td>
<td>5</td>
</tr>
<tr>
<td>Coronary artery surgery</td>
<td>2</td>
</tr>
<tr>
<td>Stroke/TIA</td>
<td>0</td>
</tr>
<tr>
<td>Peripheral Artery Disease (PAD)</td>
<td>0</td>
</tr>
<tr>
<td>Aortic Aneurysm</td>
<td>1</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>11</td>
</tr>
<tr>
<td>N/A</td>
<td>209</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 2

For health perceptions, the survey evaluated participant’s views on a large waist size, blood pressure, physical activity and heart health, and the impact of stress on heart health. When asked whether a large waist size (>35 inches for women and >40 inches for men) can increase the risk of heart disease, 196 participants responded “yes”, 4 participants responded “no”, and 31 participants responded with “don’t know/not sure”.

When asked if a blood pressure of 140/90 mmHg is considered high, 174 participants responded “yes”, 14 participants responded “no”, and 43 participants responded “don’t know/not sure”.
When asked if being physically active is a way to reduce the risk of heart disease, 225 participants responded “yes”, 2 participants responded “no”, and 4 participants responded “don’t know/not sure”.

When asked whether stress (job stress, financial concerns, family problems, etc.) can negatively impact health, 229 participants responded “yes” and agreed that stress can poorly impact health while 2 participants responded with “don’t know/not sure”.

**Workplace Stress Survey: American Institute of Stress**

Participants were asked to rate 10 statements with a value on a scale of 1-10 to determine overall level of workplace stress. These statements were adopted from the American Institute of Stress Workplace Stress Survey.

While 51.3% of patients believe they respond well to workplace stress; only 2.2% reported encountering problems in the workplace. The remaining 46.5% believe they respond moderately well to workplace stress.

These statistics represent a participant’s own perception of how he or she perceives stress levels in the day-to-day work environment. It does not evaluate outside factors or other sources of stress outside the workplace nor does it evaluate positive and/or negative coping mechanisms and the impact of that on how well or how poorly workplace stress is being managed.

**Access to Smartphone**

Out of 231 participants, 222 participants (96.52%) reported having access to a smartphone device, while only 8 participants (3.48%) denied having access to a smartphone device. Of the 222 participants who report having a smartphone, 181 report being very confident
in using their device, 38 report being fairly confident, and 3 report not being confident at all. This is an additional factor that must be considered for such technological interventions.

The smartphone application-based stress management intervention (Breathe2Relax) which was used as an example to assess participants’ willingness to engage in daily stress reduction requires access to a smartphone. While participants were not required to download or actually use this application, this was given as an example to assess their willingness or lack of willingness.

In healthcare, it is important to evaluate what type of access or lack of access a patient may have. Interventions can then be guided to better serve each individual patient’s situation. For research purposes, this data helps evaluate participant’s ability to engage in a technological intervention. An overwhelming majority of participants reported having access to a smartphone.

**Willingness to use a smartphone application (Breathe2Relax)**

When asked whether they would be interested in using a mobile-application (example given was Breathe2Relax) for daily stress reduction, 129 participants reported “yes” they are willing to use this intervention. 102 participants reported “no” denying willingness to use this intervention. Barriers to willingness were not evaluated in this survey. The bar graph below displays a visual representation of this data.

![Bar graph showing willingness to use a smartphone application](image)

**Figure 1**
IMPLICATIONS

This study highlights several factors that shape an individual’s perceptions of his or her own health: lifestyle, willingness to change lifestyle factors according to proper knowledge of health attributes (stress, blood pressure, waist size, current medical conditions). In the United States, not enough emphasis is placed upon lifestyle management as a method of primary prevention for cardiovascular disease. Evaluating and incorporating patient perceptions accordingly for health management is a major factor in the difference that healthcare providers can make in the lives of individuals, especially for chronic disease management.

Not only do stress management programs effectively manage cardiovascular disease progression, they also have beneficial implications to nursing and medical practice. Stress is a known contributor to acute cardiac events such as a myocardial infarction or plaque rupture (Shwartz et al., 2012). If the rate of adverse clinical events such as heart attacks and other cardiac complications decline due to stress management interventions, the cost of healthcare, which is a global concern, will decline as well. Comprehensive cardiac rehabilitation and disease management programs can help decrease hospital readmissions and help increase the quality of life for both patients and their families.

CONCLUSION

Overall, personal perceptions of health and wellness have an impact on health management. Varying levels of stress and other risk factors contribute to the overall health of a person, and for those with cardiovascular diseases, stress management may be an effective intervention for chronic disease management. It is important to evaluate willingness and motivation of a patient to determine how active of a role he or she is willing and able to play in self-management. This
research study aimed to evaluate stress levels and willingness of employees to participate in a given example of a stress management intervention. Further research must be done to support and explore the statistics found in this study.
References


Strain, Job Insecurity, and Incident Cardiovascular Disease in the Women’s Health Study: Results from a 10-Year Prospective Study. PLOS ONE 7(7): e40512. https://doi.org/10.1371/journal.pone.0040512

Author Biographies

Dr. Louise O’Keefe is the director of the University of Alabama in Huntsville Faculty/Staff Clinic and Assistant Professor at the College of Nursing at the University of Alabama in Huntsville Research. Her research interests are occupational health research particularly focused on the relationships of job stress, obesity, and prediabetes.

Janki R. Patel is an honors student researcher in the BSN program of study at the University of Alabama in Huntsville, College of Nursing completing her Honors Capstone project.
Figures, Illustrations, and Tables

Table 1: Number of reported hours spent on sedentary activities per day

<table>
<thead>
<tr>
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<th>Number of participants</th>
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<tbody>
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<tr>
<td>10 or more</td>
<td>60</td>
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</table>
### Table 2: Reported Cardiovascular disorders

<table>
<thead>
<tr>
<th>Diagnoses/condition</th>
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<tbody>
<tr>
<td>Heart attack (myocardial infarction)</td>
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<td>5</td>
</tr>
</tbody>
</table>
Figure 1

Employee's willingness to use mobile app

<table>
<thead>
<tr>
<th>Willing to use</th>
<th>129</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not willing to use</td>
<td>102</td>
</tr>
</tbody>
</table>

0 33 65 98 130
April 18th 2018

Janki Patel
Department of Nursing
University of Alabama in Huntsville

Dear Janki Patel,

The UAH Institutional Review Board of Human Subjects Committee has reviewed your proposal, *Effectiveness of a mobile phone app as a stress management intervention in university employees*, and found it meets the necessary criteria for approval. Your proposal seems to be in compliance with this institution's Federal Wide Assurance (FWA) 00019998 and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46).

Please note that this approval is good for one year from the date on this letter. If data collection continues past this period, you are responsible for processing a renewal application a minimum of 60 days prior to the expiration date.

No changes are to be made to the approved protocol without prior review and approval from the UAH IRB. All changes (e.g. a change in procedure, number of subjects, personnel, study locations, new recruitment materials, study instruments, etc) must be prospectively reviewed and approved by the IRB before they are implemented. You should report any unanticipated problems involving risks to the participants or others to the IRB Chair.

If you have any questions regarding the IRB’s decision, please contact me.

Sincerely,

Bruce Stallsmith
IRB Chair
Professor, Biological Sciences
Expedited:
☐ Clinical studies of drugs and medical devices only when condition (a) or (b) is met. (a) Research on drugs for which an investigational new drug application (21 CFR Part 312) is not required. (Note: Research on marketed drugs that significantly increases the risks or decreases the acceptability of the risks associated with the use of the product is not eligible for expedited review. (b) Research on medical devices for which (i) an investigational device exemption application (21 CFR Part 812) is not required; or (ii) the medical device is cleared/approved for marketing and the medical device is being used in accordance with its cleared/approved labeling.

☐ Collection of blood samples by finger stick, heel stick, ear stick, or venipuncture as follows: (a) from healthy, nonpregnant adults who weigh at least 110 pounds. For these subjects, the amounts drawn may not exceed 550 ml in an 8 week period and collection may not occur more frequently than 2 times per week; or (b) from other adults and children, considering the age, weight, and health of the subjects, the collection procedure, the amount of blood to be collected, and the frequency with which it will be collected. For these subjects, the amount drawn may not exceed the lesser of 50 ml or 3 ml per kg in an 8 week period and collection may not occur more frequently than 2 times per week.

☐ Prospective collection of biological specimens for research purposes by noninvasive means. Examples: (a) hair and nail clippings in a nondisfiguring manner; (b) deciduous teeth at time of exfoliation or if routine patient care indicates a need for extraction; (c) permanent teeth if routine patient care indicates a need for extraction; (d) excreta and external secretions (including sweat); (e) uncannulated saliva collected either in an unstimulated fashion or stimulated by chewing gumbase or wax or by applying a dilute citric solution to the tongue; (f) placenta removed at delivery; (g) amniotic fluid obtained at the time of rupture of the membrane prior to or during labor; (h) supra- and subgingival dental plaque and calculus, provided the collection procedure is not more invasive than routine prophylactic scaling of the teeth and the process is accomplished in accordance with accepted prophylactic techniques; (i) mucosal and skin cells collected by buccal scraping or swab, skin swab, or mouth washings; (j) sputum collected after saline mist nebulization.

☐ Collection of data through noninvasive procedures (not involving general anesthesia or sedation) routinely employed in clinical practice, excluding procedures involving x-rays or microwaves. Where medical devices are employed, they must be cleared/approved for marketing. (Studies intended to evaluate the safety and effectiveness of the medical device are not generally eligible for expedited review, including studies of cleared medical devices for new indications).

☐ Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis).

☐ Collection of data from voice, video, digital, or image recordings made for research purposes.

☐ Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.
Exempt

☐ Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (a) research on regular and special education instructional strategies, or (b) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods. The research is not FDA regulated and does not involve prisoners as participants.

☒ Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interviews, or observation of public behavior in which information is obtained in a manner that human subjects cannot be identified directly or through identifiers linked to the subjects and any disclosure of the human subject’s responses outside the research would NOT place the subjects at risk of criminal or civil liability or be damaging to the subject’s financial standing, employability, or reputation. The research is not FDA regulated and does not involve prisoners as participants.

☐ Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement) survey procedures, interview procedures, or observation of public behavior if (a) the human subjects are elected or appointed public officials or candidates for public office, or (b) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter. The research is not FDA regulated and does not involve prisoners as participants.

☐ Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. The research is not FDA regulated and does not involve prisoners as participants.

☐ Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs. The protocol will be conducted pursuant to specific federal statutory authority; has no statutory requirement for IRB review; does not involve significant physical invasions or intrusions upon the privacy interests of the participant; has authorization or concurrent by the funding agency and does not involve prisoners as participants.

☐ Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture. The research does not involve prisoners as participants.

1 Surveys, interviews, or observation of public behavior involving children cannot be exempt.
Appendix B
Research Horizon’s Day Poster Presentation

Perceptions of a Cardiovascular Stress Management intervention in University Employees

Janki R. Patel, Honors BSN Student, College of Nursing
Louise C. O’Keefe, PhD, CRNP, CNE, FAANP

Overview

- What are the perceptions of university employees about their own cardiovascular health? Are they willing to utilize a smartphone application (Breathe2Relax) for daily stress management?

- Method: Quantitative survey using Qualtrics and the Healthy Heart and Lifestyle Questionnaire

Review Of Evidence

- Repetitive stressors (mental, physical, financial, and job-related) can result in adverse metabolic effects in the cardiovascular system such as high blood pressure and plaque build up in vessels.

- Studies show that stress management interventions such as breathing techniques are effective in reducing the long-term risk of adverse cardiac events such as heart attack and stroke.

Impact

- Findings from this research can help clinicians understand the role of technology in shaping health and stress management for those at increased risk of heart disease.

- Results may lead to improved patient education for those with high stress levels regarding benefits of easy-to-use technology in improving overall heart health.

Acknowledgements

I would like to extend my gratitude to Dr. Louise C. O’Keefe for her guidance; this project would not be successful without her constant support. I would like to thank the American Institute of Stress, SpecialtyHealth, and UC Denver for their contribution to the research survey. Also to the UAH Office of the Provost, UAH Office of the Vice President for Research and Economic Development, Dr. Ann Bianchi, and the UAH Honors College.
Appendix C

Healthy Heart and Lifestyle Questionnaire – Survey tool

Heart Health and Lifestyle Questionnaire
The purpose of this survey is to learn more about the heart health of University Employees and the level of willingness to participate in stress management techniques to improve cardiovascular health. This survey should take less than 20 minutes to complete.

First, we would like to begin by asking you some general information.
1. What is your gender?
   - Male
   - Female

2. What is your age?
   - 18-29 years old
   - 30-49 years old
   - 50-64 years old
   - 65 years and over

3. What is the highest level of education you have completed?
   - some high school
   - high school graduate
   - some college
   - trade/technical/vocational training
   - college graduate
   - some postgraduate work
   - post graduate degree

4. Are you now married, widowed, divorced, separated, or never married?
   - Married
   - Widowed
   - Divorced
   - Separated
   - Never married

Next, we are interested in learning more about your lifestyle.
5. In a typical week, how often do you engage in moderate activity, such as brisk walking, bicycling, vacuuming, or gardening? Moderate activity results in light sweating and mild increase in heart rate.
   - None or rarely
   - 1-2 days/week
   - 3-4 days/week
   - 5-7 days/week
6. In a typical week, how often do you engage in strenuous activity, such as running, aerobic exercise or heavy physical work? Strenuous activity results in heavy sweating and large increase in pulse or breathing rate.

- None or rarely
- 1-2 days/week
- 3-4 days/week
- 5-7 days/week

7. Over the past 30 days in general, how many hours per day did you usually spend watching television, sitting at a computer, playing video games, doing beadwork, or other activities that don’t require much physical activity?

- 1 hour or less
- 2 – 4 hours
- 4 – 6 hours
- 6 – 8 hours
- 8 – 10 hours
- 10 or more hours

8. Do you plan to increase the amount of physical activity you get every week?

- Yes, I intend to in the next 30 days
- Yes, I intend to in the next 6 months
- No, and I do not intend to in the next 6 months

9. Do you currently or have you ever smoke cigarettes?

- Yes
- No

10. Are you seriously thinking of quitting smoking?

- Yes, within the next 30 days
- Yes, within the next 6 months
- No, not thinking of quitting
- Not applicable

11. How many servings of fruits and vegetables do you eat per day?

- Less than 2
- 2 – 4 servings
- 4 – 6 servings
- 6 – 8 servings
- 8 – 10 servings

Next, we have some questions about your health history and perception of health

12. Have you ever had or been diagnosed with the following?

___ Heart Attack (myocardial infarction)
Angina pectoris or coronary artery disease
Coronary artery surgery (angioplasty, stent, or coronary bypass)
Stroke (TIA “small stroke” or major stroke) or coronary artery obstruction
Peripheral artery disease (PAD, artery blockage in the legs)
Aortic aneurysm
Diabetes mellitus (sugar diabetes)

13. Can a large waist (>35 inches for women or >40 inches for men) increase your risk of heart disease?
   • Yes
   • No
   • Don’t Know/Not Sure

14. Is a blood pressure of 140/90 mmHg considered high?
   • Yes
   • No
   • Don’t Know/Not Sure

15. Is being physically active a way to reduce your risk for heart disease?
   • Yes
   • No
   • Don’t Know/Not Sure

16. Do you believe that stress (job stress, financial concerns, family problems, etc.) can negatively impact your heart health?
   • Yes
   • No
   • Don’t Know/Not Sure

Next, we would like to know more about the impact of stress on your health. The following questions are directed from the Workplace Stress Survey from the American Institute of Stress.

Please rate the following statements on a scale of 1-10 (1 being Strongly disagree and 10 being Strongly Agree.)

17. I can’t honestly say what I really think or get things off my chest at work. ______
18. My job has a lot of responsibility, but I don’t have very much authority. ______
19. I could usually do a much better job if I were given more time. ______
20. I seldom receive adequate acknowledgement or appreciation when my work is really good. ______
21. In general, I am not particularly proud or satisfied with my job. ______
22. I have the impression that I am repeatedly picked on or discriminated against at work. ______
23. My workplace environment is not very pleasant or safe. ______
24. My job often interferes with my family and social obligations, or personal needs. ______
25. I tend to have frequent arguments with superiors, coworkers or customers. ______
26. Most of the time I feel I have very little control over my life at work. ______

Some health programs use TVs, computers, cell phones or cell phone applications to help people improve their health. To know how well those kinds of programs might work for people, we would like to learn about the kinds of electronic equipment you use.

27. Do you have a smartphone?
   • Yes
   • No

28. How confident are you in using your smartphone or cellular device?
   • Very confident
   • Fairly confident
   • Not at all confident

29. Would you be interested in using a mobile app (called Breathe2Relax) in order to help with daily stress management?
   • Yes
   • No

30. On a scale of 1 (very low) to 5 (very high), how important is managing your lifestyle in controlling your weight, reducing your blood pressure, improving your cholesterol, or lowering your blood sugar?

31. On a scale of 1 (very low) to 5 (very high), how interested are you in changing your lifestyle to improve your heart health?

32. On a scale of 1 (very low) to 5 (very high), how confident are you that you can make the necessary lifestyle changes to meet your health goals?
Appendix D
Honors Capstone Project Poster Presentation

Honors Capstone Research (HCR)
Summer Program 2018

Perceptions of Cardiovascular Stress Management in University Employees

Janki R. Patel, Honors College, BSN Student, College of Nursing
Louise C. O’Keefe, PhD, CRNP, CNE, FAANP

Introduction
- Repetitive stressors (mental, physical, financial, and job-related) can result in adverse metabolic effects in the cardiovascular system such as high blood pressure and plaque build up in vessels.\(^1\)
- Studies show that stress management interventions such as breathing techniques are effective in reducing the long-term risk of adverse cardiac events such as heart attack and stroke.\(^2\)

Overview
- What are the perceptions of university employees about their own cardiovascular health and stress levels? Are they willing to utilize a smartphone application (Breathe2Relax) for daily stress management?
- Method: Quantitative survey using Qualtrics and the Healthy Heart and Lifestyle Questionnaire

Results/Conclusions
Results show how employees perceive their own health status and how they respond to workplace stress. While 51.3% of patients believe they respond well to workplace stress, only 2.2% reported encountering problems in the workplace. The remaining 46.5% believe they respond moderately well to workplace stress.

129 university employees expressed willingness to use an app as a stress management intervention; 102 employees denied interest in using an app intervention. Further research may reveal barriers to participation.

Impact
Research findings indicate that while the majority of participants are willing to use a smartphone application for daily stress management, there is a large percentage who are not willing. This indicates that perceptions about one's own stress may impact participation in stress management programs. Further research would be needed to determine the barriers to participation.

References

Acknowledgements
I would like to extend my gratitude to Dr. Louise C. O’Keefe for her guidance. Jessica Smith for her assistance with Qualtrics, ROSE login, Dr. Bertrand Vogler and Danor C. for their guidance, Dean Weathers, Director of the Office of the Vice President for Research and Economic Development, Dean Adams and the College of Nursing, Dr. Ann Bianchi, and the Univer Honors College. In addition, I would like to thank the American Institute of Stress, Specialty Health, and UC Denver for their contributions to the research survey.
Stress management in University Employees

Appendix E

University of Alabama Honors Research Conference Poster Presentation

Honors Capstone Research (HCR)
Summer Program 2018

Perceptions of Cardiovascular Stress Management in University Employees

Janki R. Patel, Honors College, BSN Student, College of Nursing
Louise C. O’Keefe, PhD, CRNP, CNE, FAANP

Introduction

- Repetitive stressors (mental, physical, financial, and job-related) can result in adverse metabolic effects in the cardiovascular system such as high blood pressure and plaque build-up in vessels.
- Studies show that stress management interventions such as breathing techniques are effective in reducing the long-term risk of adverse cardiac events such as heart attack and stroke.

Overview

- What are the perceptions of university employees about their own cardiovascular health and stress levels? Are they willing to utilize a smartphone application (Breathe2Relax) for daily stress management?
- Method: Quantitative survey using Qualtrics and the Healthy Heart and Lifestyle Questionnaire

Results/Conclusions

Results show how employees perceive their own health status and how they respond to workplace stress. While 51.3% of patients believe they respond well to workplace stress, only 22.2% reported encountering problems in the workplace. The remaining 46.5% believe they respond moderately well to workplace stress.

129 university employees expressed willingness to use an app as a stress management intervention; 102 employees denied interest in using an app intervention. Further research may reveal barriers to participation.

Impact

Research findings indicate that while the majority of participants are willing to use a smartphone application for daily stress management, there is a large percentage who are not willing. This indicates that perceptions about one’s own stress may impact participation in stress management programs. Further research would be needed to determine the barriers to participation.

References


Acknowledgements

I would like to extend my gratitude to Dr. Louise C. O’Keefe for her guidance, Janice Smith for her assistance with Qualtrics, Robyn and Dr. Beth Vinger and David Cook for her guidance, Dean Williams, UNA Office of the Provost, UNA Office of the Vice President for Research and Economic Development, Dean Adams and the College of Nursing, Dr. Ann Bianchi, and the UNA Honors College. In addition, I would like to thank the American Institute of Stress, Specialty Health, and UnClever for their contribution to the research survey.
Appendix F

Workplace Health & Safety Submission Guidelines

This journal is a member of the Committee on Publication Ethics (COPE).

MISSION STATEMENT AND PURPOSE

The American Association of Occupational Health Nurses, Inc. (AAOHN) is dedicated to advancing and maximizing the health, safety, and productivity of domestic and global work forces by providing education, research, public policy, and practice resources for occupational and environmental health nurses through education and research, professional practice/ethics, communications, governmental issues, and alliances.

Workplace Health & Safety (WHS) (formerly AAOHN Journal) welcomes the submission of original manuscripts of interest to occupational and environmental health nurses. International submissions are welcome. They must relate to the mission of WHS and meet WHS’s standards for manuscript preparation. Authors are encouraged to seek an expert in translation to assist with the manuscript’s final development before submission to facilitate the review process. Authors may submit manuscripts in the following categories:

TYPES OF ARTICLES

Professional Practice article—A short (6 to 10 double-spaced pages) manuscript focused on current issues in occupational and environmental health nursing practice, education, or research with particular interest in advanced practice, global health, case management, hospital employee health, occupational safety, and occupational health and safety regulation, law, and ethics. Requires an unstructured abstract of 50 to 150 words.

Continuing education article—A “state-of-the-art” report of a current topic (e.g., occupational health, safety, or leadership) conducive to the continuing education format. Requires an unstructured abstract of 50 to 150 words. Please contact Associate CNE Editor, Dr. Karen Heaton, at khamp@uab.edu if interested in this option.

Current Topics article – The back-page manuscript focused on a specific current topic that can be addressed in just one page (approximately 700 words including the abstract, keywords, and references). Please contact Associate Current Topics Editor, Prof. Susan Randolph, at susan.randolph@unc.edu if interested in this option.

General Submission Articles

Research study—A report of an original study, including methodology, results, and discussion; a substantive section at the end of the article “Implications for Practice”; and a brief summary of practical applications/implications of the research for the reader to be highlighted in a sidebar “Applying Research to Practice.” Requires an unstructured abstract of 50 to 150 words.

Review article—A review of existing occupational and environmental health nursing or related literature using a research approach (i.e., research question, keywords, criteria for inclusion and exclusion) to define the articles included in the review. The manuscript should provide conclusions based on the review and recommend new approaches for occupational and environmental health nursing practice, research, or education. Requires an “In Summary,” consisting of three or four items, each one or two sentences in length, that summarize the article. Requires an unstructured abstract of 50 to 150 words.
Stress management in University Employees

Clinical article—A report of new techniques, interventions, or program implementation in clinical practice. Requires an “In Summary,” consisting of three or four items, each one or two sentences in length, that summarize the article. Requires an unstructured abstract of 50 to 150 words.

Case report—A report of a clinical case affecting or involving occupational and environmental health nursing. Requires an “In Summary,” consisting of three or four items, each one or two sentences in length, that summarize the article. Requires an unstructured abstract of 50 to 150 words.

Successful programs article—A report of the planning, implementation, and evaluation of successful programs in the workplace. Requires an “In Summary,” consisting of three or four items, each one or two sentences in length, that summarize the article. Requires an unstructured abstract of 50 to 150 words.

Business and leadership article—A discussion of a business or leadership theory, issue, or process of interest to occupational and environmental health nurses. Requires an “In Summary,” consisting of three or four items, each one or two sentences in length, that summarize the article. Requires an unstructured abstract of 50 to 150 words.

Letters to the Editor—WHS accepts Letters to the Editor about previously published articles or other topics relevant to occupational and environmental health nurses. A Letter to the Editor should not be used as a substitution for a peer-reviewed manuscript.

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Manuscripts should be between 3,700 and 4,200 words, not to exceed 20 typed pages. Manuscripts should be written in the third person. They must conform to the following guidelines:

• Typing. Double space throughout the manuscript, including acknowledgments, abstract, text, references, figure legends, and tables. All pages should be numbered.

• Title Page/Author Information. All uploaded manuscript files should be devoid of author identifiers (e.g., name, institution), including title page, to facilitate blind peer review.

• Abstract. All articles require an unstructured abstract of 50 to 150 words.


• References. References must conform to APA style. The authors are responsible for the accuracy of references.

• Tables. Tables should be placed at the end of the manuscript, one to a page.

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Manuscripts meeting the stated guidelines undergo blind peer review by the Editorial Review Panel. Following review, the author will be notified of the decision of the Editorial Review Panel.

For more information, contact the editorial office at drew.editorialasst.whs@gmail.com.

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Identifying details should be omitted if they are not essential. Complete anonymity is difficult to achieve, however, and informed consent should be obtained if there is any doubt. For example, masking the eye region in photographs of patients is inadequate protection of anonymity. If identifying characteristics are altered to protect anonymity, such as in genetic pedigrees, authors should provide assurance that alterations do not distort scientific meaning and editors should so note. When informed consent has been obtained it should be indicated in the submitted article.

Funding

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Revised July 2015