THESIS

STRESS, COPING, AND EMOTIONAL DISTRESS OF MEDICALLY UNDERSERVED LUNG AND HEAD-AND-NECK CANCER PATIENTS

Submitted by

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ABSTRACT

STRESS, COPING, AND EMOTIONAL DISTRESS OF MEDICALLY UNDERSERVED LUNG AND HEAD-AND-NECK CANCER PATIENTS

The intent of this study was to investigate how lung cancer (LC) and head and neck cancer (HNC) patients who are medically underserved (i.e. uninsured, underinsured, low income) experience emotional distress (symptoms of depression and anxiety) after being diagnosed with LC or HNC. Participants were recruited from four Colorado hospitals. They completed a baseline survey which included measures of perceived stress, coping self-efficacy, depression symptoms, and anxiety symptoms. The Transactional Model of Stress and Coping (TMSC) was used as a theoretical guide for analyses about the relations of stress coping and emotional distress. When age, sex, and stage of cancer were controlled for, levels of perceived stress were observed to be positively associated with experience of emotional distress. Further, coping was shown to be an effective moderator of the relation of perceived stress to emotional distress. The TMSC is a functional theoretical model for organizing the understanding of stress, coping and emotional distress for medically underserved LC and HNC patients. Further research should be conducted to assess for changes in these variables overtime, particularly if psychological interventions can be used to influence each variable.

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CHAPTER I

Introduction

The intent of this study was to investigate how those who are medically underserved (i.e. uninsured, underinsured, low income) experience emotional distress after being diagnosed with cancer. Emotional distress, within this paper, refers to experiencing symptoms of depression and anxiety. Depressive symptoms relate to changes in mood and anxiety symptoms are associated with worry, so emotional distress is used as an umbrella term to describe difficult psychological states patients experience. Depression and anxiety symptoms range from mild to severe (American Psychiatric Association, 2013). The participants in this study were recently given a diagnosis of lung cancer (LC) and/or head-and-neck cancer (HNC). Receiving a LC or HNC diagnosis is an incredibly stressful event and patients often experience emotional distress (Andrykowski & Kangas, 2010). One aim of the present study was to assess the impact of a stressful LC or HNC diagnosis on emotional distress, specifically in a medically underserved sample at baseline, before any intervention was used. Furthermore, research indicates that the level of emotional distress a patient experiences is related to the way they cope (Kvillemo & Bränström, 2014). Coping is defined as the way a person manages a stress (Lazarus & Folkman, 1984). The second aim of this study was to determine if coping moderates the relation between stress of diagnosis and emotional distress among medically underserved patients who have recently received a LC and/or HNC diagnosis.

Lung Cancer and Head-and-Neck Cancer

LC is the second most commonly diagnosed cancer in the United States (American Cancer Society, 2017). By the end of 2019, an estimated 228,150 individuals will have been diagnosed with new cases of LC (American Cancer Society, [ACS] 2019). A higher percentage of new lung cancer cases are diagnosed in men than in women with statistics indicating approximately 60.7 men out of 100,000 men are diagnosed with lung cancer compared to 47.7 women out of 100,000 women (National Cancer Institute, 2016). Within ethnic groups, Non-Hispanic White people, Non-Hispanic Black people and American Indian/Alaska Native are diagnosed with approximately the same rate (approximately 63 cases) per 100,00 people. Rates in Hispanic/Latino people and Asian/Pacific Islanders are approximately 33 cases per 100,000 people. According to the American Cancer Society, there are two types of LC: small cell lung cancer and non-small cell lung cancer. About 80-85 percent of LC diagnoses are non-small cell LC. Cancer diagnoses are given based on stages ranging from I to IV with I indicating cancer cells are the most localized and IV indicating the cancer has metastasized to other parts of the body (ACS, 2017). Identifying the stage of the cancer informs prognosis and treatment. For those who are diagnosed with Stage I non-small cell LC, the 5-year survival rate is between 45-49 percent. Stage II non-small cell LC patients have a 5-year survival rate between 30-31 percent. Those diagnosed at Stage III have a 5-14 percent 5-year survival rate. At Stage IV, the 5-year survival rate is only 1 percent (ACS, 2017). These statistics make LC the second most diagnosed of all cancers, and the most lethal.

Typically, once detected, LC is treated with surgery, chemotherapy, and radiation. Surgery can be an effective treatment for people diagnosed at an early stage of the LC. However, surgery is not always effective for later stages when cancer has already spread. LC surgery is considered a major operation and possible complications during and after surgery include: reaction to anesthesia, bleeding, blood clots, infection and pneumonia. Because of these possible complications, people who have good heart and lung health are often good fits for surgery. While surgery can be a good option for some people, other individuals may need treatments other than surgery, like chemotherapy and radiation (ACS, 2017). Chemotherapy is a cancer treatment that involves the use of medication and drugs to kill cancer cells (ACS, 2018). Radiation is a treatment that uses “high-energy radiation to shrink tumors and kill cancer cells” (Lawrence, Haken, Giaccia, 2008).

If a treatment team establishes that a patient cannot tolerate surgery, radiation and chemotherapy are treatments that can be given alone, before or after surgery, or concurrent at any stage of LC. For those at the later stages of LC, targeted treatment drugs can be effective. Lastly, immunotherapy can be helpful in treating some kinds of non-small LC by stimulating a person’s immune system to effectively recognize and destroy cancer cells. Different treatment approaches are chosen based on stage of LC (ACS, 2017).

Many of these treatments have harsh side effects, which adds to the stress of LC diagnoses. Common side effects of surgery, radiation, and chemotherapy include: fatigue, nausea and vomiting, skin rash or peeling, loss of appetite, constipation, diarrhea, low white blood cell count leading to increased risk of infection, headache, mouth sore, hair loss, easily bruising or bleeding, loss of appetite and weight loss. Nausea has been described as one of the worst symptoms effecting the daily lives of LC patients (Schmidt et al., 2016). When radiation and chemo are given together, side effects tend to be worse (ACS, 2017). The intensity and severity of these harsh symptoms can add to the stress of a LC diagnosis.

Lung cancer often co-occurs with HNC. Co-occurrence is mostly due to metastasis, with cancer cells beginning in the head-and-neck region and spreading to the lungs (ACS, 2016). HNC includes cancer of the oral cavity, pharynx, larynx, paranasal sinuses and nasal cavity, and salivary glands (National Cancer Institute, [NCI], 2017). The American Cancer Society (2019) estimates 18,290 cases of larynx cancer and other respiratory system malignancies are expected to be detected in 2019 alone. Additionally, 53,000 new cases of oral cavity and pharynx cancer are estimated (ACS, 2017). Men receive a head-and-neck cancer diagnosis two-to-three times more often than women (ACS, 2017).

Head-and-neck cancers are diagnosed based on stages in the same way LC is diagnosed. However, because head-and-neck is an umbrella term, each type has varying ways of defining stage. Broadly, stage I and II HNC diagnoses are less severe and earlier in development than later stages III and IV. Like LC, HNC treatment varies based on specific diagnosis. Common treatments include surgery, chemotherapy, and radiation. Side effects of these treatments remain the same as listed previously for LC. As such, treatment of HNC can have severe symptoms which increase the stress of receiving an HNC diagnosis (National Cancer Institute, 2017).

Medically underserved LC and HNC patients are further disadvantaged in timely receipt of treatment because they are less likely to go to regular cancer screens (Ayanian, Weissman, Schneider, Ginsburg & Zaslavsky, 2000; Carrasquillo & Pati, 2004; Ioannou, Chapko & Dominitz, 2003). In the research, medically underserved is defined based on varying criteria including but not limited to income, insurance status, and SES. A lack of screening results in illness or disease having progressed to more developed stages for underserved patients (Roetzheim et al., 1999; Ayanian, Kohler, Abe & Esptein, 1993; Bradley, Given & Roberts, 2001). Delayed visits to the doctor has implications for frequency and severity of LC and HNC for underserved patients. Research shows that people who are uninsured or underinsured are more likely to be diagnosed with an advanced stage of cancer development than those with private insurance (Halpern et al., 2008). As discussed, advanced stages of cancer are often treated with radiation and chemotherapy which typically have harsher side effects than surgery.

As such, medically underserved LC and HNC patients may face higher stress with diagnosis and treatment because of their medical status.

Another example of health disparity for the medically underserved is related to the type of treatment they receive. As noted, the most common treatments for LC and HNC are surgery, chemotherapy and radiation (American Cancer Society, 2018). In 2012, Yorio et al. analyzed and reported differences in treatment for varying health insurance levels (Yorio, Yan, Xie & Gerber, 2012). Their study provided evidence that people with Medicare or non-private health care were far less likely to have the standard treatment of surgery for non-small cell LC (NSCLC) stage I and II. For those diagnosed with Stage III NSCLC, the standard treatment is chemotherapy and radiation. In their study, participants with Medicare or non-private health care with Stage III were also less likely to receive standard treatment. Additionally, the researchers analyzed survival rates for the different insurance groups. The people in the non-private insurance category had a risk of death twice as likely as people with private insurance (Yorio, et al, 2012). These results indicate that treatment and survival outcomes vary greatly depending on insurance status.

Stress

Cancer patients diagnosed with various forms of cancer experience high amounts of stress (Golden-Kreutz et al, 2005; Edgar, Rosberger & Nowlis, 1992). Stress is operationally defined in this study to mean “a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being” (Lazarus & Folkman, 1984, p. 19). This study focused on the degree to which the relation between a person and a diagnosis of cancer and its treatment are appraised as taxing, exceeding resources, and endangering well-being. As discussed, LC diagnosis can be lethal and is a threat to well-being because the survival rate is so low. Sources of stress for LC and HNC patients include: physical side effects of treatment, negative implications for daily living, financial burden, and role changes.

Previous studies have found evidence of the link between psychological symptoms experienced with a cancer diagnosis/treatment and trauma symptoms (Andrykowsk & Kangas, 2010). In addition to diagnosis, the disgust response to treatment side effects is also a stressor (Powell, Azlan, Simpson, & Overton, 2016). These events are all considered stressors that present once someone is diagnosed with and begins treatment for LC and/or HNC cancer.

In addition to physical side effects of treatment, stress also stems from LC and HNC impacting many domains of daily living (Hansen & Sawatzky, 2008; Devins et al., 2013). Basic tasks of daily living are often a stress for LC and HNC patients. Patients report difficulty with breathing, talking, sleeping, eating and drinking, and sexual intimacy (Lou, Chen, He et al., 2017; Fodeh, Lazenby, Bai, Ercolano, Murphy, & McCorkle, 2013; Lindau, Surawska, Paice, & Baron, 2011).

LC and HNC patients face financial stressors associated with the cost of treatment and the need to leave work (Shart, Carsin, & Timmons, 2013). Cost of LC and HNC treatment is steep for both patients and insurance companies (Cipriano et al., 2011). The average cost of the most common type of LC is approximately $2,000 in patient out-of-pocket cost. Insurance companies typically pay $67,000. Medically underserved patients, by definition, have minimal funds and insurance to cover their costs. In addition, cancer patients are often unable to work for periods of time during and after treatment (ACS, 2017). Patients often spend time way from work due to treatment or side effects of treatment. Losing income can be a major stressor for patients, especially those who are underserved. Both the cost of treatment and the loss of income influence financial stress of LC and HNC diagnosis.

A third area of stress comes from inability to maintain previous roles (Downe-Wamboldt, Butler & Couler, 2006; Ledeboer, Velden, Boer, Feenstra, & Pruyn, 2005). As discussed, a patient might need to leave work and find that changing taxing or exceeding their resources. An individuals’ sense of self is often negatively impacted. Because surgical treatments of the head, neck, and lungs are common within this population, sense of self is often diminished due to major changes in appearance or ability to speak the way they had before cancer (Carper, Fleishman & McGuire, 2004). Many patients begin to rely more on their partners for daily care, which can be appraised as taxing or exceeding resources of either partner in a relationship. As parents, LC and HNC patients are sometimes unable to care for their children in the same way as they previously could (Schmidt, Damm, Prenzler, Golpon & Welte, 2016). LC and HNC diagnoses and treatment increase stress in interpersonal relationships (Kaptein, Kobayashi, Matsuda, Kubota, Nagai, & Momiyama et al, 2015). As discussed, some cancer patients who need to leave work. This can leave patients with a lost sense of meaning and purpose when they are unable to work. Clearly, intrapersonal sense of self and interpersonal relationships are impacted by LC and HNC.

Stressors of physical illness, changes in daily living, finances, and role changes contribute to a patients overall psychological state. One way to conceptualize the impact of stress is as a contributor to symptoms of anxiety and depression, referred to in this study as “emotional distress”. Previous research indicates that LC and HNC patients show symptoms of emotional distress that range from mild to severe (Breitbart & Holland, 1988; Baile & Gibertini 1992).

Some researchers have explored how stressors are related to emotional distress (Kugaya et al 2000).

Emotional Distress

Depression LC and HNC patients report an elevated level of depressive symptoms compared to the general public (Krebber et al. 2014). Symptoms of depression include: sad or depressed mood most days of the week, diminished interest and motivation in activities, significant change in appetite with either over- or under-eating, changes in sleep, fatigue, restlessness or psychomotor agitation, feelings of worthlessness, diminished ability to think or concentrate. Sometimes people experiencing depression have thoughts of death or suicide. While depression is a disorder recognized by the American Psychiatric Association with a prevalence rate in the US population of seven percent each year, there are many people who may experience depressive symptoms without receiving a diagnosis (American Psychiatric Association, 2013). For individuals experiencing depressive symptoms, there is a range of impairment to functioning in physical ability, social connectedness and other social roles (American Psychiatric Association, 2013).

Depression symptoms can be present at any stage of cancer and at various time points during treatment (Krebber et al., 2014). A meta-analysis by Krebber et al. (2014), estimated that the prevalence of depression associated with LC is 3 percent. However, other studies estimate that rates of depression for cancer patients are much higher. Other data approximate that 50 percent of HNC patients, and 11-44 percent of LC patients, report depressive symptoms (Massie, 2004). There is evidence that there prevalence rates differ due to racial/ethnic differences, with one study citing elevated rates of emotional distress for Black and Hispanic/Latino populations

(Alcalá 2014). Factors that have been identified as important to increased risk of depression in HNC patients are malnutrition and lack of social support (Frampton, 2001).

Previous research indicates differences in the experience of depression based on characteristics like age, gender, and stage of cancer. Carver and Connor-Smith (2010) found that older adults have an easier time matching coping strategies to bad news, like a cancer diagnosis, because they have lived experience with more negative events than younger people. Adams, Winger and Mosher (2015) suggest this might mean younger adults experience more distress than older adults when given a cancer diagnosis. When assessing cancer survivorship, younger adults tend to report poorer well-being, more depressive symptoms and anxious symptoms after their treatment ends (Costanzo, Tyff & Singer, 2009). Costanzo, Tyff and Singer propose that a developmental theory explains this difference in distress by years of age. According to Neugarten & Hagestad, 1976, a developmental explanation is that a cancer diagnosis is a "off-time" life event for younger people where in such a diagnosis is not inside a typical developmental trajectory and is distressing and possibly traumatic.

Anxiety Anxiety is described as anticipating threat when no actual threat is present (American Psychiatric Association [APA], 2013). Minimal sense of control is common for people experiencing anxiety. In preparation for a fear response, people with anxiety experience muscle tension and vigilance. When feelings of fear and avoidance of anxiety-provoking situations become severe, an anxiety disorder may be diagnosed (APA, 2013). However, many cancer patients experience anxiety symptoms without meeting criteria for a diagnosis (ACS, 2017). Whether an individual meets criteria for a diagnosis or not, experiencing symptoms of anxiety can make it challenging to fulfill social and occupational roles (American Psychiatric Association, 2013).

These studies shed light on the impact that LC and HNC diagnoses have on patients' emotional distress, including how they might contribute to depression and anxiety symptoms in this patient population. Because emotional distress is treatable, it is worthwhile to assess for depressive and anxious symptoms early in the patient's treatment trajectory (American Psychiatric Association, 2013). Thus, screening for symptomology at the time of diagnosis can help health care providers understand the trajectory of emotional distress for underserved LC and HNC patients. Once the timeline of emotional distress is understood, interventions that target indicators of emotional distress will be beneficial to patient's mental health.

Transactional Model of Stress and Coping

Health psychology researchers are interested in the ways that stress and emotional distress are related. Because emotional distress symptoms vary in intensity for LC and HNC patients, it is insufficient to conclude that stress directly causes emotional distress. The intent of this study was to examine how the two experiences, stress and emotional distress, are related. A well tested theoretical model, the Transactional Model of Stress and Coping (TMSC), is proposed as the best way to understand the relation between stress and emotional distress.

Richard Lazarus and Susan Folkman proposed the TMSC in 1984. The model focuses on the relation between a stressful circumstance, in this study a cancer diagnosis, and the experience an individual has of the stressful circumstance. TMSC posits that there is a process of cognitive appraisal mediating the relation between a potentially stressful environmental situation and the experience of stress. Lazarus and Folkman define psychological stress as "a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus and Folkman, 1984, p. 19).

A key component of this definition of stress is cognitive appraisal. Cognitive appraisal is defined as one's beliefs about a stressful situation. Cognitive appraisal has a primary and a secondary component. Primary appraisal involves the person assessing if there is a presence of stress. When stress is perceived to be present, secondary appraisal also occurs. In secondary appraisal, the person is in the process of deciding how to handle the stress (Lazarus and Folkman, 1984). This process of deciding how to handle stress is called coping.

Coping Coping is the term used for the process of deciding how to manage stress. Coping is defined as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus and Folkman, 1984, p. 141). In the TMSC, coping is categorized as either emotion-focused or problem-focused. Emotion-focused coping approaches focus on manipulation of one's internal experience of the stressor. On the other hand, when using problem-focused coping, people attempt to change or solve aspects of the environmental situation. The use of emotion-focused and problem-focused coping strategies can lead to adaptive of maladaptive outcomes in living (Lazarus and Folkman, 1984).

In TMSC, adaptive and maladaptive outcomes in the quality of life are assessed. Adaptive and maladaptive outcomes are evaluated in social relationships, morale, and somatic health. In this study, maladaptive outcomes are analogous to emotional distress. The focus in the TMSC is that perception of stress and use of coping strategies are always changing. The process of cognitive appraisal is dynamic and bidirectional (Lazarus and Folkman, 1984). By using the TMSC to organize the analysis of this study's data, it was hypothesized that levels of emotional distress may depend on the interaction of experienced stress and level of coping.

Emotional Distress Over the Course of Treatment There is evidence that the TMSC is useful for understanding the experience of other cancer patients (Park & Folkman, 1997). Burgess and colleagues (2005) found emotional distress among 33 percent of breast cancer patients who reported experiencing depression and anxiety at the time of diagnosis. Three months after diagnosis, the prevalence of anxiety and depression decreased to 24 percent. After one year of treatment, only 15 percent of patients reported experiencing anxiety and depression (Burgess et al., 2005). Previous research has found that distress levels change over the course of treatment in LC studies (Cooley, Short, & Moriarty, 2003).

Purpose of Current Study

The purpose of this study was to understand how stress, coping, and emotional distress are related. This study tested a predictive relation between the stress of LC and/or HNC diagnosis and emotional distress for medically underserved patients. Coping was tested as a variable moderating the effect of stress on emotional distress. Previous research using the TMSC has explored these relations and found support for coping as a moderator between stress and emotional distress. However, this study expands on previous research by examining these relations that have not been tested among a sample of medically underserved LC and HNC patients.

1. Primary research question: What is the relation between stress of LC and/or HNC diagnosis and emotional distress for medically underserved patients?
2. Secondary research question: Is the relation of stress and emotional distress moderated by coping for medically underserved patients?

Hypotheses:

1. Hypothesis 1: There will be a positive association between stress and emotional distress among medically underserved LC and HNC patients after diagnosis.
2. Hypothesis 2: Coping will moderate the relationship between stress and emotional distress.

CHAPTER II

Methods

The current study was part of a larger ongoing randomized control trial (RCT) funded by the Patient-Centered Outcomes Research Institute (PCORI) (Evelinn Borrayo, PI). The larger study is titled "A Stepped-Care Intervention to Reduce Disparities in Mental Health Services among Underserved Patients and Caregivers with Lung and Head and Neck Cancer." The larger study focuses on adapting evidence-based Cognitive Behavioral Therapy (CBT) treatment to fit with the level of mental health symptoms patients and caregivers are experiencing (stepped-care). The aim of the larger study is to compare this stepped-care approach to enhanced usual care. The project is multisite with standardized protocol between sites for training, recruiting participants, and administering measures. The current proposed study did not focus on the intervention, rather the relation of stress, coping, and distress at the baseline cross-section of all patients recruited into the study.

Participants

Participants in the study were medically underserved and have recently received a diagnosis of LC and/or HNC. Patients were recruited within 30 days of their first oncology appointment. They were recruited from four Colorado hospitals: Denver Health Hospital in Denver, Saint Mary's Hospital and Reginal Medical Center in Grand Junction, Saint Joseph Hospital in Denver, and National Jewish Health in Denver. English and Spanish speaking patients were recruited. Per qualifying criteria, all patients were medically underserved. For this study, medically underserved is defined as meeting one or more of the following criteria: living below 400 percent of the 2016 Federal Poverty Level (FPL), uninsured or underinsured with public insurance. Another group that qualified as medically underserved is those who live below

200 percent of the 2016 FPL and spend more than 10 percent of annual income on out-of-pocket medical expenses.

Sample size calculation A gap in the literature exists such that there are no studies that provide information about the effects of stress and coping on experienced distress for this specific population. Previous studies estimate the percentage of cancer patients that experience depression and anxiety to be between 6-21 percent (Walker, 2014 et al). Information about the effect of stress and coping on emotional distress was estimated based on previous studies. One study of cancer survivors measured a .27 R^2 effect of stress coping-style on the outcome of emotional health behaviors (Parelkar, Thompson, Kaw, Miner, & Stein, 2013). It is important to note that this sample studied people who had survived cancer and were currently in remission. Because there is limited literature that reports effect size estimates for this population, it is difficult to estimate the sample size needed to find an effect of stress and coping on emotional distress. Thus, to calculate the sample and power for the current study, the only similar study (Parelkar et al, 2013) R^2 effect size of .27 was utilized. Using the f^2=.37 effect size, power of .95, 6 predictors (age, gender, stage of cancer, stress, coping, stress X coping), Gpower software (Faul, Erdfelder, Buchner & Lang, 2009) estimated that 64 participants would be needed for a fixed multiple regression analysis, R^2 derivation from 0.

A post-hoc power analysis was computed using G*Power. Power analysis was used to measure the probability of rejecting the null hypothesis that there is no effect of stress, coping, and their interaction on depression and anxiety. For depression, an F-test, R^2 derivation from 0 was computed using f^2=1.17, alpha=.05, total sample size 188, number of predictors=6. The power calculated was 1.00 indicating that there was enough power to reject the null hypothesis. For anxiety, an F-test, R^2 derivation from 0 was computed using f^2=1.32, alpha=.05, total sample size=188, total predictors=6. Results indicated power of 1.00 indicating the study had enough power to reject the null hypothesis.

Measures

Demographic information. Demographic variable of interest were collected about age, race/ethnicity, sex, and stage. Age, stage 0, stage 1, stage 2, stage 3, stage 4, and gender were controlled for due to impact of these variables that were established in previous studies.

Perceived Stress Scale The Perceived Stress Scale (PSS) was used to measure to what extent events in the last month were appraised as stressful. While there are multiple versions of the PSS, the version in the study had 10 items with 5-items Likert type scale. Principle components analysis (PCA) of the PSS-10 had a resulting .42 first factor loading. In the PCA two factors emerged, one of positively worded questions and a second factor for negatively worded questions. The total explained variance was 48.9 percent when factors were combined. This scale has been used with cancer patients and its internal consistency reliability ranges between .80 and .89. This scale's predictive validity is interpreted to last 4-8 weeks because it measures current daily stress (Cohen, Kamarck, & Mermelstein, 1983; Cohen & Williamson, 1988). The review also found evidence that White people had lower scores on the PSS than Black, Hispanic and other minority individuals (Cohen, Kamarck, & Mermelstein, 1983). For this study, internal consistency (Chronbach's alpha) was calculated for PSS (α=.86).

Coping Self-Efficacy Scale The Coping Self-Efficacy Scale (CSES) was used to measure how much confidence a person has in their ability to cope when things are not going well. An exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to measure factor structure of the scale. Results indicate there are three separate factors: problem focus coping (6 items, α=.91); emotion focused (4 items, α=.91); and social support (3 items, α=.80). The first two factors coincide with the TMSC problem-focused and emotion-focused coping. Internal consistency and test-retest validity were strong for all factors. The results indicate that the scale has predictive properties. When scores on this coping scale increase over time, scores on measures of psychological distress are lower (Chesney et al., 2006). For this study, internal consistency (Chronbach's alpha) was calculated for CSES (α=.96).

The CSES has been adapted for this low literacy population to include three options in the response scale instead of the original 1-10 scale. Because this sample qualifies as medically underserved, there are mostly of low socioeconomic status (SES), which correlates with low literacy (Buckingham, Wheldall, & Beaman-Wheldall, 2013). Choices for participants include "Certainly cannot do", "Maybe can do", and "Certainly Can Do". Although cutting down the number of response items reduces variability, the research team decided it would be more appropriate for this sample.

Patient-Reported Outcomes Measurement Information System The Patient-Reported Outcomes Measurement Information System (PROMIS) was developed to measure the impact of chronic illness on health related quality of life. The measures correlate with specific DSM-V diagnostic criteria.

Depression The PROMIS Cancer Depression 32 item scale has a bank of items that can differentiate from other psychological illness and leaves out somatic symptoms that could be due to physical illness. (National Institute of Health, 2007; Choi, Schalet, Cook & Cella, 2014) The PROMIS Depression measure is a T-score metric with a mean of 50 and standard deviation of 10 (Pilkonis, Yu, Dodds, Johnston, Maihoefer & Lawrence, 2014). Previous measures of reliability for this scale give a Cronbach's alpha of .92 (Pilkonis, Yu, Dodds, Johnston, Maihoefer & Lawrence, 2014). Results of convergent validity with the Patient Health Questionnaire (PHQ-9) and the Center for Epidemiological Studies Depression scale (CESD) were statistically significant (.72-.84) with a sample of about 194 depressed outpatients ranging from ages 18-83 across three time points (Pilkonis, Yu, Dodds, Johnston, Maihoefer & Lawrence, 2014)

Anxiety The PROMIS Cancer Anxiety scale focuses on fear, anxious misery, hyperarousal, and somatic symptoms and has been established as a common metric (Shalet, Cook, Choi & Cella, 2014). Schalet et al (2016) found the PROMIS Anxiety cancer standard response mean to be between .35 and .72. PROMIS items range in alpha levels from .86 to .97 (Cella et al., 2014; Cella et al., 2008).

Assessment of Chronbach's alpha for PROMIS-Depression was .97 and PROMIS-Anxiety was .97. These scores were calculated using the raw PROMIS data. However, calculated T-scores from REDCap database were used in the data analysis.

Procedures

Institutional Review Board (IRB) approval was obtained through the Colorado Mult-Institutional Review Board through the University of Colorado Denver for the aforementioned PCORI-funded study. To identify eligible participants there was a monthly audit of medical records at each hospital site to find newly diagnosed LC and HNC patients. In addition, physician and research coordinator attendance at cancer tumor boards, and daily reviews of LC and HNC patients who visit oncology clinics, ear-nose-and-throat (ENT) clinics, and radiation oncology units at each hospital will help to identify possible patient participants. Site Research Coordinators (SRC) discussed the study with the patients at the time of their first oncological appointment. As patients expressed interest, SRCs followed HIPPA compliant procedures to recruit and consent patients in private and comfortable medical rooms. Forms for participation agreement and consent were administered electronically and participants were offered a hard copy for their own records.

After being consented, patient participants were given the baseline survey, either via email or paper copy. If a patient was unable to fill out a survey on their own, one acceptable mode of administration was paper format with a SRC in person. Based on the patient's primary language, measures were administered either in Spanish or English. The baseline survey includes a demographics questionnaire, PSS, CSES, PROMIS-Ca Depression and PROMIS-Ca Anxiety. When patients return baseline surveys they received a $25 gift certificate in the mail. All responses from the baseline measure were entered into a secure REDCap database. This author was involved in construction of the demographics and baseline survey, called participants to remind them to complete surveys after being consented, and worked on general administrative tasks for the PCORI project and the collection of data for this study. For this study, data will be used from all participants in the project who qualify as underserved because this study focuses on assessing the baseline cross-section only.

CHAPTER III

Results

Missing Data and Tests of Assumptions

Data were analyzed for exclusion criteria and missing variables. Data from participants who met exclusion criteria (e.g. were incarcerated, had serious mental health diagnoses, were pregnant) was deleted. Missing data, due to questionnaire skips, was then assessed to determine whether or not it was missing at random. Missing not at random is problematic because it may indicate that something about the item influenced missing answers. Sometimes there are characteristics about an item the respondents find to be offensive or too revealing to answer. Items like this sometimes are left missing systematically (Little & Rubin, 2019). Missing data from control variables (age and sex) were assessed for the assumption of Missing Completely at Random (MCAR) and determined to be missing completely at random so no further assessment was needed (χ^2=220, DF=2, p=.90). The items of the Perceived Stress Scale (PSS) were assessed with MCAR and it provided evidence that items were missing at random based on observed variables (χ^2=49.21, DF=53, p=.623). The items of the Coping Self-Efficacy Scale (CSES) were assessed for data missing not at random which was significant (χ^2=309.69, DF=223, p=.000). Further analysis of the data indicated that one questions was missed 5 times (2.3% of the time). The question was “Pray or Meditate” to which respondents were expected to answer if they could use to cope. Because some people may not have felt comfortable answering a questions related to religion/spirituality, these 5 missing values were replaced by the mean. This choice was made so as not to get rid of a potentially important item in the scale and to delete those who did not want to disclose information about spiritual or religious beliefs from the study. Analyses were rerun without these participants deleted as well and differences in effect size was negligible. PSS and CSES used sum totals to calculate scores so no data could be missing from these scales. As such, all remaining participants who had missing data were deleted listwise. 188 participants remained for further analysis out of 213.

The data was then assessed for linear regression test assumptions including linearity, homoscedasticity, normality and independence. Linearity was tested by regressing the standardized residuals of the outcome variables (depression and anxiety) against the standardized residuals of the predictors variables (perceived stress and coping). Scatter plots showed that all relations appeared linear such that each of the following was linear: the relation of perceived stress to depression; perceived stress and coping to depression; perceived stress to anxiety; and perceived stress and coping to anxiety. These plots demonstrated a linear relation between variables so a linear regression analysis was deemed to be appropriate.

Next, assumptions of homoscedasticity were tested to assess for equality of variance of the data across all levels of the predictors. Homoscedasticity was analyzed using scatter plots to visually represent the degree of variance in responses. Each plot (perceived stress to depression; perceived stress and coping to depression; perceived stress to anxiety; and perceived stress and coping to anxiety) reveled heteroscedasticity visually. Further testing was done using Modified Breusch-Pagan tests to test the null hypothesis of homoscedasticity. Chi-squares were significant for each model which indicated the assumption of homoscedasticity was not upheld, which is not acceptable because it indicates that the data was not equally variable across all levels of the predictor (χ^2=26.98, p=.00; χ^2=36.04, p=.00; χ^2=11.77, p=.00; χ^2=9.90, p=.00). A heteroscedasticity-corrected matrix was then used because the Chi-square tests were significant. When these matrices were used, coefficient values remained the same which indicated that levels of heteroscedasticity did not impact the model to a degree that the analysis was impacted. As such, no adjustments were made to the data.

Next, outcome data was assessed for normality of the distribution (e.g. skew and kurtosis). An acceptable range for each is (-2,2) (Kline, 2005). For PROMIS-Depression skew and kurtosis were determined to be within acceptable limits (Skew=1.297, SE=.177; Kurtosis= .843, SE=.353). For PROMIS-Anxiety skew and kurtosis were also determined to be within normal limits (Skew=.878, SE=.177, Kurtosis= -.101, SE= .353).

Then the data was assessed for multicollinearity which tests the extent to which scales are correlated with other scales. It is important the each predictor in the model has the potential to be uniquely related to the outcome. If two predictors are very highly correlated, then the collinearity impacts interpretation of the regression coefficients. One widely accepted limit of multicollinearity, .80, was used for this analysis (Thompson, Kim, Aloe, Becker, 2017). Tests determined that scales correlated between -.68 to .79 and as such were determined to not have problems of multicollinearity (See Table 2). The correlation that approached .80 was the correlation between anxiety and depression which are theoretically similar in that they are emotional distress. Assumptions of independence were upheld.

Descriptive Statistics

Descriptive statistics including frequencies, means, standard deviations, reliabilities correlations were conducted. Frequencies for variables of sex, stage, race, age, and ethnicity are listed in Table 1. Correlations indicate that all variables were significantly related at a .001 level (See Table 2). As mentioned, no scales reached the point of multicollinearity.

Inferential Statistics

The first hypothesis outlined in this study was that there would be a positive association between stress and emotional distress among medically underserved LC and HNC patients after diagnosis. A linear regression was fit to the data to test this hypothesis. The analysis first controlled for variables of sex, age, and stage of cancer based on previous research. Then, perceived stress was used to predict outcomes in anxiety and depression. Perceived stress was centered at the mean in order to define a meaningful intercept. Results of linear hierarchal regression modeling indicated that, when controlling for sex, age, and stage of cancer, perceived stress has a significant positive association with depression (b=.52, p<.001) and anxiety (b=.62, p<.001) (see Table 3 & Table 4). The model for the relationship between of perceived stress and depression indicated that 6 percent of the variance was accounted for by control variables. The R^2 change was 41 percent when perceived stress was added to the model. The model for the relationship between of stress and anxiety indicated that 9 percent of the variance in scores was explained by the control variable. The R^2 change was 43 percent when stress was added to the model for anxiety.

The second hypothesis was that coping would moderate the relationship between stress and emotional distress. The proposed method to test this hypothesis was to use linear regression analysis. The analysis first controlled for variables of sex, age, and stage of cancer. Then, perceived stress, coping, and an interaction term of perceived stress and coping, were used to predict outcomes in anxiety and depression. Coping and stress were centered at the mean prior to analysis to create a meaningful intercept for each variable and so that each simple slope would represent the effect when the other variable was at the mean. Results of linear hierarchal regression model indicated that, when controlling for sex, age, and stage of cancer, coping has a significant moderating effect on the influence of stress on depression (*b*=-.02, *p*<.001) and anxiety (*b*=-.01, *p*<.000) (see Table 5 & Table 6). The model for the impact of coping moderating the impact of perceived stress on depression indicated that 6 percent of the variance was accounted for by control variables. The R^2 change was 48 percent when coping, perceived stress and their interaction were added to explain depression. The model for the impact of stress on anxiety indicated that 9 percent of the variance in scores was explained by the control variables. The R^2 change was 47 percent when coping, perceived stress and their interaction were added to explain anxiety.

Additional analysis was done to probe the significant interaction. Hayes PROCESS Macro was used with SPSS to assess for the impact of coping on the relation of stress and distress by probing at three levels of coping (Hayes, 2017). The results of PROCESS Model 1 indicated that the effect of stress on depression was significant when coping was 1 standard deviation below the mean (*b*=.58), at the mean (*b*=.41) and 1 standard deviation above the mean (*b*=.28) and on anxiety when was coping was 1 standard deviation below the mean (*b*=.63), at the mean (*b*=.51) and 1 standard deviation above the mean (*b*=.40), so coping was consistently identified as a significant moderator for both outcomes. However, the effect of stress on anxiety and depression was mitigated as coping increased and are represented as simple slopes in the figures (See Figure 1 and 2). There were no statistically significant transition points within the observed range of the moderator found using the Johnson-Neyman method. That is, stress remained a significant predictors of distress at all levels of coping.

CHAPTER IV

Discussion

The intent of this study was to examine the relation of stress, coping, and emotional distress (symptoms of anxiety and depression) of medically underserved LC and HNC patients. Specifically, the intent of this study was to use the theoretical Transactional Model of Stress and Coping to explain the relations of these variables. The TMSC posits that stress is positively related to emotional distress. The model also posits that the relation of stress to emotional distress is moderated by coping. Therefore, the first aim of this study was to assess for the relation of stress to emotional distress. Results indicated significant and positive relation of levels of perceived stress and emotional distress. A second aim of this study was to assess for a significant moderating effect of coping on the relation of stress to emotional distress. Results suggest coping was a significant moderator.

Perceived Stress and Emotional Distress

Previous research indicates that an individual’s level of stress is positively related to their experience of emotional distress. Emotional distress for this study was measured using symptoms of depression and anxiety. The first hypothesis of this study was supported because levels of stress were found to positively relate to emotional distress. A large portion of the variance in depression and anxiety scores was attributed to amount of perceived stress. These results lend support for the use of TMSC for the specific population. While research exists for the relation of stress on emotional distress for LC and HNC cancer patients, these results specify values for the amount that stress impacts depression and anxiety symptoms for medically underserved LC and HNC patients.

In the context of cancer research, many researchers have been interested in the positive relation of a stressful cancer diagnosis and treatment to experience of emotional distress (Kupst, Butt, Stoney, Griffith, Salsman, Folkman, & Cella, 2015; Swartzman, Booth, Munro, & Sani, 2017). This relation of stress to distress seems to be well established. In this study, the relation was deemed to be linear across cases. Some studies of medically underserved patients have attempted to measure main sources of impact on receiving a stressful diagnosis including parsing out how much perceived stress can be attributed to low SES, race/ethnicity, and gender (Islami, Kahn, Bickell, Schymura, & Boffetta, 2013). Yin, Morris, Allen, Cress, Bates and Liu (2010) analyzed data from five major cancer sites to assess for differences in cancer incidence among varying racial/ethnic and SES. Their findings indicate that for most groups, incidents of LC increased with decreased SES, however this relation was opposite for Hispanic men and women. Each of these factors seem to have their own impact on the perceived stress and emotional distress which underserved cancer patients face. This study specified the relation of perceived stress of diagnosis and treatment to emotional distress for a majority White, non-Hispanic medically underserved population of LC and HNC patients in Colorado.

Perceived Stress, Coping, and Emotional Distress

As discussed, the results of this study demonstrated a positive relation of perceived stress to emotional distress. These results illuminate the difficult reality of a stressful LC or HNC diagnosis. However, the TMSC, which was tested with these analyses, also theorizes that adaptive coping can help to decrease the impact that stress has on emotional distress. Coping, for this study, was defined as the way a person manages a stress (Lazarus & Folkman, 1984).

Results of the moderating effect of coping were significant. This indicates that an individual's level of coping impacted their experience of emotional distress. More specifically, adaptive coping helped to decrease the impact of perceived stress on the presence of depression and anxiety symptoms. Coping was observed to decrease the impact of stress at high, medium, and low levels of coping. This is informative and encouraging because regardless of the level of coping a participant had, their coping did help to buffer the impact of stress on emotional distress. It is important to note that for participants with higher coping, the impact of perceived stress on emotional distress was smaller than for participants with lower levels of coping. These results support the use of the TMSC with medically underserved LC and HNC patients.

In reviewing the literature, it was clear that there was a gap in the understanding of how much coping moderated the relation of perceived stress to resultant emotional distress for this population. Only one estimate of this effect was found and it was not specific to underserved LC and HNC patients (Parelkar et al, 2013). Now, three measures of this impact have been created for varying levels of the moderator.

The broader research area of moderators and mediators for distress in cancer research has been wide and varied to include many kinds of coping assessments and coping interventions (Moyer, Goldenberg, Hall, Knapp-Oliver, Sohl, Sarma & Schneider, 2012). For underserved cancer patients, this study serves as part of the growing literature to understand the impact of coping skills and resources available to learn how to cope for this population (Thompson, Shelton, Mitchell, Eaton, Valera, & Katz (2013). Carrion, Nedjat-Haiem, Macip-Billbe, and Black (2017) used qualitative methods to assess for coping strategies used by Latino cancer patients; the study included a majority of breast cancer and prostate cancer patients. Results indicated that Latinos used coping which included meaning-based coping, family support, and religion and spirituality. The CSES measured used in this study did include items related to each of these areas.

Implications for Research and Practice

Results of this study have promising implications for research and practice. This research adds to the field a snapshot of the perceived stress, coping, and emotional distress present at the time of diagnosis for medically underserved LC and HNC patients. Implication for this research include supporting an integrative theory, providing estimates of effects, providing a place of intervention of clinicians working with LC and HNC, and lends support for the larger PCORI study that this data was extracted from.

The first implication of this study is the support for the use of the TMSC as an appropriate model for medically underserved LC and HNC patients. The TMSC has been tested with varying populations of people with health concerns, including cancer patients (Sorato & Osório, 2015). However, after a review of the literature, it had not been tested specifically with medically underserved LC and HNC patients in the United States. Results of this analysis support future use of the TMSC with this population.

Another implication for this study is a measure of the impact that stress and coping have of emotional distress. This study used valid and reliable measures to estimate the impact that stress and coping having on symptoms of anxiety and depression for this specific population. This study used the PROMIS measures to evaluate depression and anxiety symptoms, which goes a step beyond other research that focused on the construct of quality of life which is often used as the outcome variable in cancer research (Rinaldis, Pakenham, & Lynch (2012). Previous studies typically included patients with various cancer diagnoses, did not include the effect size of the interaction of stress and coping, and were not specifically observing medically underserved participants (Parelkar et al, 2013). Now, future researchers interested in the same variables and population can have estimated of the effect size of stress and coping on emotional distress for this population.

Clinically, the results of this study can provide a helpful tool to assess for risk of emotional distress. If a clinician can assess for stress and coping of a medically underserved LC or HNC patient, they can make informed assessment of the patient's emotional distress. For example, for clients with high levels of stress and low coping, clinicians can been particularly attuned to the increased chances for high levels of emotional distress. Additionally, clinicians and patients alike can use this information as a source of hope for relief from emotional distress. Hope has shown to be an impactful construct in impacting coping with emotional distress for cancer patients (Griffith, 2014). Because results of this study indicate that higher coping lessens the impact of stress on emotional distress, learning how to cope effectively is a worthwhile endeavor. Research does support that coping can be learned (Brothers, Yang, Strunk, & Andersen, 2011). The Brothers et al. article described that through CBT techniques such as assessing automatic thoughts, behavior activation, and adaptation of core beliefs about self, others, and the world, decreased symptoms of depression with cancer patients.

Lastly, since research indicates that coping can be taught, and because the results in this study support coping as a moderator, this study lends support for the larger PCORI study. The larger PCORI study from which this data was extracted aims to measure the changes in emotional distress over time when a CBT intervention is used to help increase coping skills. Results from the present study provide support for the continued analysis of the relations of stress, coping, and emotional distress over time as planned for the PCORI study.

Limitations and Future Directions

One limitation of this study was the cross-sectional nature of the data. Observing participants at only one time-point limits the ability to gather information about the participants and forces the study design to rely heavily on theory for making conclusions about causality and directionality of the variables. For instance, this study relied heavily on the TMSC to determine perceived stress as the predictor, coping as the moderator, and emotional distress as the dependent variable. Relying on the theory and only having observed data at one time point may limit the ability to understand how these variables impact each other overtime.

Another limitation of this study was having some missing data. While missing data is normal with human participants and was assessed appropriately for missing not at random, there may have been some participant information lost because of missing data. Lastly, this sample was largely comprised of data from White participants. According to the American Cancer Society, Black American and US living Hispanic/Latino people are more likely to be medically underserved than Non-Hispanic White people (ACS 2019). While the sample is specific in many was including only those LC and HNC patients who are medically underserved, the ability to generalize these finding may be limited by factors of race/ethnicity that were not fully represented in the data. Since previous research does indicate that race/ethnicity can have an impact of stress of diagnosis above and beyond socioeconomic status, this is a limitation.

Future directions for data related to stress, coping, and emotional distress of medically underserved LC and HNC are promising. As more longitudinal data is analyzed, these variables can be observed overtime. Observing them over time will lead to continued understanding of the way stress, coping, and emotional distress impact each other. The TMSC is a reciprocal model and continued testing of the theory will aid in a fuller understanding of this population (Lazarus

& Folkman, 1984). As discussed above, research indicates coping can be learned. If coping can be learned, then emotional distress may be observed to decrease if measured longitudinally.

Longitudinal data analysis, including both quantitative and qualitative measures, for this population will also aid in creating time appropriate interventions. Research indicates that levels of stress change over the course of cancer diagnosis, treatment, and remission (Cooley, Short & Moriarty, 2003). Researchers can utilize continued measures of stress, coping, and emotional distress to create appropriate interventions at each stage of illness as well as at varying levels of stress and coping.

TABLES

Table 1

Study Demographic information, n=188

	n	%
Sex		
Male	113	60.1
Feale	75	39.9
Age in years		
75 and older	33	17.55
65-74	73	38.83
55-64	56	29.79
45-54	15	7.98
35-44	7	3.72
34 and below	4	2.13
Ethnicity		
Not Hispanic	150	79.8
Hispanic	37	19.7
Race		
White	161	85.6
Black	10	5.3
Asian	1	.5
American Indian/Native Alaskan	1	.5
Hawaiian	0	0
Other race	7	3.7
Stage		
0	59	31.4
1	25	13.3
2	41	21.8
3	45	23.9
4	18	9.6

Table 2

Variable Means, Standard Deviations, Reliabilities, and Regression Correlations

Variable	1	2	3	4
1. Perceived Stress				
2. Coping	-.52*			
3. Depression	.68*	-.52*		
4. Anxiety	.71*	-.51*	.79*	
Mean	12.91	41.59	12.79	14.61
(*SD*)	(7.24)	(10.76)	(5.64)	(6.53)
Cronbach's α	.86	.96	.97	.97

Note: * p < .001

Table 3

Hierarchical regression prediction of depression

Variable	*B*	*SE (B)*	*t*	*p*	*LLCI*	*ULCI*
Step 1						
Age	-.09	.04	-2.54	.01*	-.16	-.02
Sex	1.17	.83	1.40	.16	-.48	2.82
Stage						
1	-.29	1.33	-.22	.83	-2.91	2.34
2	1.18	1.13	1.04	.30	-1.06	3.41
3	.70	1.10	.63	.53	-1.48	2.87
4	-.73	1.50	-.48	.63	-3.69	2.24
Step 2						
Age	-.02	.03	-.88	.38	-.08	.03
Sex	.38	.63	.59	.55	-.87	1.62
Stage						
1	.14	1.00	.13	.89	-1.84	2.11
2	.14	.86	.17	.87	-1.55	1.84
3	-.92	.84	-1.09	.28	-2.58	.75
4	-1.22	1.13	-1.08	.28	-3.45	1.01
PSS	.52	.04	11.78	.00**	.44	.61

Note: (N = 188). PSS = Perceived Stress Scale. R^2 = .06 for control variables; R^2 change = .41 when predictors are included. Total R^2 = .47. Note: Reference group for sex was males and reference group for stage was Stage 0. Note: * p < .05, ** p < .01.

Table 4

Hierarchical regression prediction of anxiety

Variable	*B*	*SE (B)*	*t*	*p*	*LLCI*	*ULCI*
Step 1						
Age	-.14	.04	-3.38	.00**	-.22	-.06
Sex	.97	.95	1.02	.31	-.90	2.84
Stage						
1	.14	1.51	.09	.93	-2.85	3.12
2	1.87	1.29	1.45	.15	-.68	4.41
3	2.27	1.25	1.81	.07	-.20	4.75
4	-.43	1.71	-.25	.80	-3.80	2.93
Step 2						
Age	-.06	.03	-1.94	.05	-.12	.00
Sex	.03	.70	.04	.97	-1.34	1.40
1	.64	1.10	.58	.57	-1.54	2.81
2	.65	.94	.69	.49	-1.22	2.51
3	.37	.93	.39	.69	-1.46	2.19
4	-1.02	1.24	-.82	.41	-3.47	1.44
PSS	.62	.05	12.67	.00**	.52	.72

Note: (N = 188). PSS = Perceived Stress Scale. R^2 = .094 for control variables; R^2 change = .427 when predictors are included. Total R^2 = .521. Note: Reference group for sex was males and reference group for stage was Stage 0. Note: * $p < .05$, ** $p < .01$.

Table 5

Hierarchical regression prediction of depression with coping as moderator

Variable	*B*	*SE (B)*	*t*	*p*	*LLCI*	*ULCI*
Step 1						
Age	-.09	.04	-2.54	.01*	-.16	-.02
Sex	1.17	.83	1.40	.16	-.48	2.82
Stage						
1	-.29	1.33	-.22	.83	-2.91	2.34
2	1.18	1.13	1.03	.30	-1.06	3.41
3	.70	1.10	.63	.53	-1.48	2.87
4	-.73	1.50	-.48	.63	-3.69	2.24
Step 2						
Age	-.03	.03	-1.21	.23	-.08	.02
Sex	.63	.59	1.07	.29	-.54	1.80
Stage						
1	-.02	.94	-.02	.98	-1.87	1.83
2	-.34	.81	-.41	.68	-1.94	1.27
3	-.65	.79	-.83	.41	-2.20	.90
4	-1.07	1.06	-1.02	.31	-3.16	1.01
PSS	.42	.05	8.53	.00**	.32	.52
CSES	-.09	.03	-2.71	.01**	-.16	-.03
PSSxCSES	-.02	.00	-3.51	.00**	-.02	-.01

Note: (N = 188). PSS = Perceived Stress Scale. CSES=Coping Self-Efficacy Scale. R^2 = .06 for control variables; R^2 change = .48 when predictors are included. Total R^2 = .54. Note: Reference group for sex was males and reference group for stage was Stage 0. Note: * p < .05, ** p < .01.

Table 6

Hierarchical regression prediction of anxiety with coping as moderator

Variable	*B*	*SE (B)*	*t*	*p*	*LLCI*	*ULCI*
Step 1						
Age	-.14	.04	-3.38	.00**	-.22	-.06
Sex	.97	.95	1.02	.31	-.90	2.84
Stage						
1	.14	1.51	.09	.93	-2.85	3.12
2	1.87	1.29	1.45	.15	-.68	4.41
3	2.27	1.25	1.81	.07	-.20	4.75
4	-.43	1.71	-.25	.80	-3.80	2.93
Step 2						
Age	-.07	.03	-2.34	.02	-.12	-.01
Sex	.25	.67	.38	.71	-1.07	1.57
Stage						
1	.55	1.06	.52	.61	-1.54	2.64
2	.28	.92	.31	.76	-1.52	2.09
3	.59	.89	.67	.50	-1.16	2.34
4	-.92	1.19	-.77	.44	-3.27	1.42
PSS	.51	.06	9.25	.00**	.40	.62
CSES	-.10	.04	-2.66	.01**	-.18	-.03
PSSxCSES	-.01	.00	-2.38	.02**	-.02	-.00

Note: (N = 188). PSS = Perceived Stress Scale. CSES=Coping Self Efficacy Scale. R^2 = .09 for control variables; R^2 change = .47 when predictors are included. Total R^2 = .57. Note: Reference group for sex was males and reference group for stage was Stage 0. Note: * p < .05, ** p < .01.

FIGURES

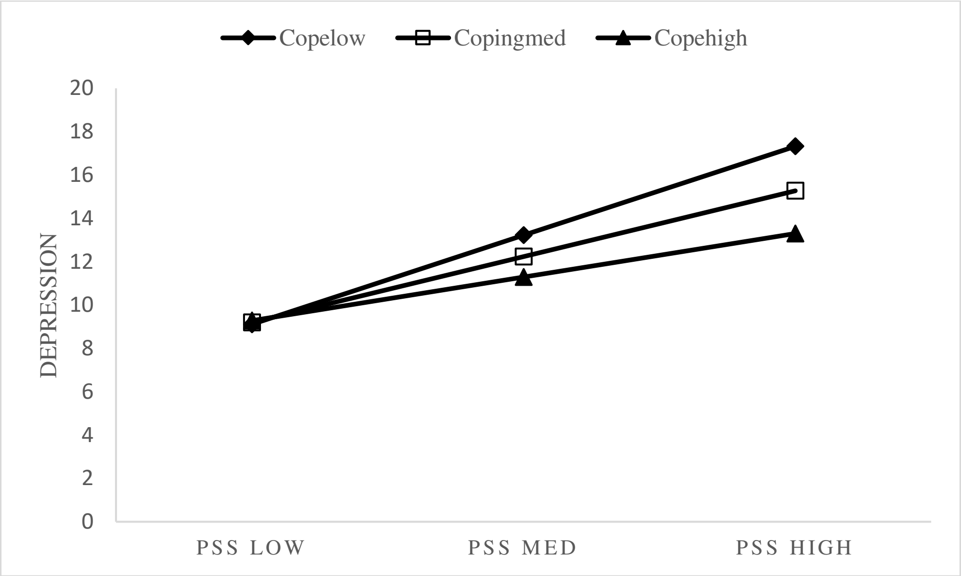

Figure 1. Simple slopes moderation of coping on the relation of stress to depression.

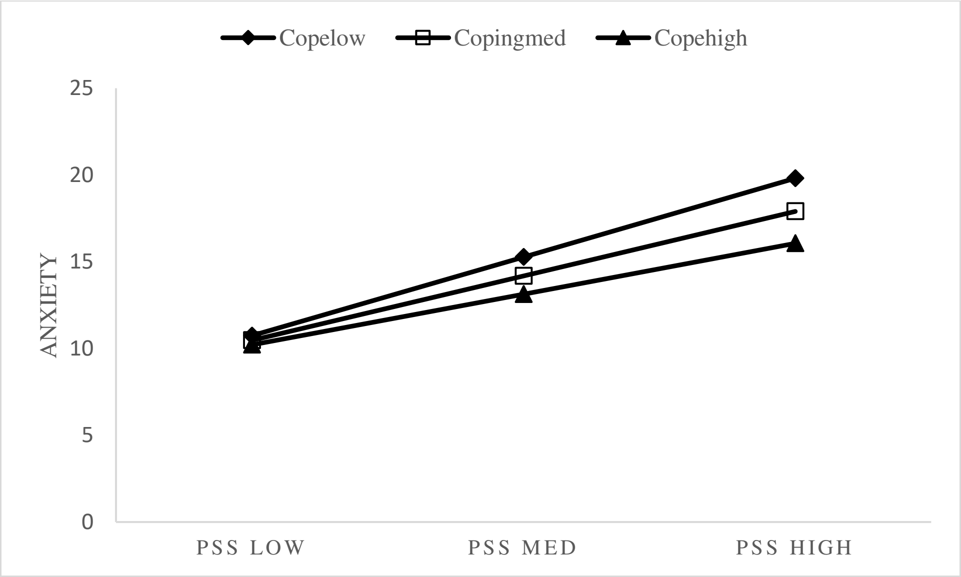

Figure 2. Simple slopes moderation of coping on the relation of stress to anxiety.

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APPENDIX A

Measures

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**

Coping Self Efficacy Scale

When things aren't going well for you, or when you're having problems, how confident or certain are you that you can do the following:

Cannot do 0
Maybe can do 1
Cannot do 2

For each of the following items, write a number from 0 - 2, using the scale above.
When things aren't going well for you, how confident are you that you can:

1. Keep from getting down in the dumps.
2. Talk positively to yourself.
3. Sort out what can be changed, and what can not be changed.
4. Get emotional support from friends and family.
5. Find solutions to your most difficult problems.
6. Break an upsetting problem down into smaller parts.
7. Leave options open when things get stressful.
8. Make a plan of action and follow it when confronted with a problem.
9. Develop new hobbies or recreations.
10. Take your mind off unpleasant thoughts.
11. Look for something good in a negative situation.
12. Keep from feeling sad.
13. See things from the other person's point of view during a heated argument.
14. Try other solutions to your problems if your first solutions don’t work.
15. Stop yourself from being upset by unpleasant thoughts.
16. Make new friends.
17. Get friends to help you with the things you need.
18. Do something positive for yourself when you are feeling discouraged.
19. Make unpleasant thoughts go away.
20. Think about one part of the problem at a time.
21. Visualize a pleasant activity or place.
22. Keep yourself from feeling lonely.
23. Pray or meditate.
24. Get emotional support from community organizations or resources.
25. Stand your ground and fight for what you want.
26. Resist the impulse to act hastily when under pressure.

Emotional Distress-Anxiety

Please respond to each item by marking one box per row.

In the past 7 days…

		Never	**Rarely**	**Sometimes**	**Often**	**Always**
EDANX27	I felt something awful would happen	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX53	I felt uneasy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX05	I felt anxious	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX12	I felt upset	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX55	I had difficulty calming down	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX01	I felt fearful	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX02	I felt frightened	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX33	I felt terrified	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX08	I was concerned about my mental health	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX47	I felt indecisive	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX18	I had sudden feelings of panic	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX26	I felt fidgety	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDANX07	I felt like I needed help for my anxiety	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Emotional Distress-Depression

Please respond to each item by marking one box per row.

	In the past 7 days…	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
EDDEP06	I felt helpless	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP19	I felt that I wanted to give up on everything	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP35	I found that things in my life were overwhelming	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP05	I felt that I had nothing to look forward to	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP41	I felt hopeless	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP28	I felt lonely	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP09	I felt that nothing could cheer me up	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP31	I felt discouraged about the future	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP46	I felt pessimistic	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP17	I felt sad	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP29	I felt depressed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP36	I felt unhappy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
EDDEP54	I felt emotionally exhausted	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5