The Acceptability, Feasibility, and Preliminary Effects of a Cognitive Behavioral Skills Building Intervention in Adolescents With Chronic Daily Headaches

by

Carolyn Hickman

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

Approved July 2012 by the
Graduate Supervisory Committee:

Bernadette Melnyk, Chair
Bonnie Gance-Cleveland
Diana Jacobson
Laura Szalacha

ARIZONA STATE UNIVERSITY

August 2012

ABSTRACT

Approximately 3.5% of adolescents in the United States have chronic daily headache (CDH). Chronic daily headaches in adolescents are often refractory to the adult pharmacological interventions. And as a result, adolescents typically experience increased levels of stress, which exacerbates their headaches. Chronic daily headaches negatively impact both the adolescent and their family. Adolescents with CDHs frequently exemplify comorbid psychiatric symptoms such as anxiety, depression, and increased risk for suicide. Risk factors for CDH in adolescents have been well studied; however, few studies have focused on psychologically based interventions to enhance effective coping, positive mental health, and pain relief in this group of teens. Given the paucity of psychologically focused interventions in this group, further research is necessary to test and develop the effectiveness of cognitive behavioral skills building (CBSB) interventions. This pilot study focused on the use of a CBSB intervention that emphasized problem solving, cue recognition, effective communication, behavior modeling, cognitive reappraisal, stress management, effective coping, and positive thinking. A randomized controlled trial pilot study was conducted. The intervention group received a seven-week intervention focused on CBSB techniques and headache education, while the comparison headache education group received a seven-week program focused on basic headache hygiene measures (e.g., adequate sleep, adequate hydration, dietary triggers, environmental triggers). The total sample included 32 adolescents inclusive of the ages 13 and 17 years. Paired t-tests resulted in significant preliminary positive

effects for COPE-HEP on anxiety, depression, beliefs, headache disability, headache frequency, and headache duration. Comparison group education resulted in significant preliminary positive effects on anxiety, depression, headache disability, headache frequency, headache pain level, headache duration, and medication frequency. There were no significant changes over time in means of parent perception of pain interference for both groups. Independent t-tests revealed that COPE-HEP teens had significantly less anxiety and headache duration at post-intervention. The acceptability of the COPE-HEP intervention with adolescents with CDHs in a specialty care setting is supported by this study, while the feasibility of conducting this study in a specialty care setting is partially supported. These findings support a need to refine the intervention and test both its short and long-term effects in a full-scale randomized controlled trial with adolescents who have CDHs.

DEDICATION

This dissertation is dedicated to my parents and grandparents who worked hard with minimal resources so that their children and grandchildren could have better and more fulfilling futures.

ACKNOWLEDGEMENTS

I am grateful for the support of my mentor and committee chair, Dr. Bernadette Melnyk, Dean and Distinguished Professor, who motivated me through her inspiration and dedication as a nurse scientist. Thank you, Dr. Melnyk for your positive energy and for helping me to realize that I could accomplish my goal by taking "one bite of the elephant at a time." I want to thank Dr. Bonnie Gance-Cleveland who also provided mentorship and support through this experience. Thank you, Dr. Gance-Cleveland for sharing your wisdom. I am fortunate to have guidance of Dr. Diana Jacobson, who I admire and highly respect as a budding nurse scientist. I hope to have similar writing and editing skills as I continue my research career. I would also like to acknowledge Dr. Laura Szalacha for her support and patience during the data analysis phase of this experience. Dr. Szalacha, I appreciate your practical approach to statistics. Thank you to Levi Colton and Christina Peete in the PhD program office for their unwithering support and for always steering me in the right direction.

To my physician and nurse colleagues at Phoenix Children's Hospital and the community physicians in the metropolitan area, I am grateful for your support in recruiting participants for this pilot study. You prove to me that collaboration with research can work among the many disciplines in health care. I look forward to working with each of you again with future studies. I am delighted to have gone through this program with Angela Allen, Jewel Bishop, Anne-Mari O'Brien, Siobhan McMahon, and Kathy Ward, five great colleagues in my cohort who were always there when I needed them.

To my husband, Fred, and children, Erin, Teddy, and Ian, thank you for your love, patience, and emotional and technical support during this experience. To my children, I hope that my hard work and accomplishments motivate you to reach for the sky as you continue your education and pursue your dreams.

This research was funded by the National Institute of Nursing Research at the National Institutes of Health through a National Research Service Award (Grant #: 1F31NR012112-01A1) and by the Hearst Foundations. In addition to funding this research, I want to thank the NINR/NIH for providing me the opportunity to attend its Pain Management Boot Camp and the National Institute of Neurological Diseases and Stroke at the National Institute of Health for allowing me to present a poster at its 7th Annual Pain Symposium. These scholarships were vital in helping me to focus on my research and grow as a nurse scientist.

TABLE OF CONTENTS

CHAPTER Page

LIST OF TABLES

LIST OF FIGURES

Figure Page

Chapter 1

INTRODUCTION

Management of chronic daily headache (CDH) in adolescents is a challenge for healthcare providers as they cause significant morbidity if not treated effectively and in a timely manner (Galli et al., 2004; Spittler, 2008). Lipchik and Nash (2002) contended that CDHs are a biological disorder with physical, environmental, social, and psychological factors playing a role in its onset, maintenance, and exacerbation. CDH is defined as a primary headache type that occurs greater than or equal to 15 days a month for more than three consecutive months (Silberstein & Lipton, 1996). More recent classification approaches by Silberstein, Lipton, and Sliwinski (1996) describe four categories of CDHs-based on symptoms. These include (a) transformed migraine or chronic migraine, (b) chronic tension-type headache, (c) new daily persistent headache, and (d) hemicrania continua (Silberstein et al., 1996). These headaches are not attributed to an underlying disorder (e.g., infection such as meningitis, brain tumor, pseudotumor cerebri, stroke, traumatic brain injury, inflammation, or problems with vessels) (Scher, Midgette, & Lipton, 2008). Chronic daily headaches adversely impact daily functioning, emotional/mental health (Wang, Fuh, Lu, & Juang, 2006), work and academic performance (McGrath, 2001; Mueller, 2000; Tenhunen & Elander, 2005), and overall functional performance (Gilman, Palermo, Kabbouche, Hershey, & Powers, 2007). Mood disorders such

as anxiety and depression have been documented as common comorbid conditions with CDHs (Dodick, 2006; Wang, Fuh, Lu, & Juang, 2007b).

The estimated annual prevalence of CDHs occurs in as many as 3.5% of adolescents (Lipton et al., 2011). The frequency of daily or near daily headache attacks in children and adolescents was reported to be about 1-2% in some studies (Dodick, 2006; Scher, Stewart, Ricci, & Lipton, 2003; Stovner et al., 2007). Current management of CDHs in adolescents is based largely on adult interventions, findings from childhood episodic studies, and expert opinion (Mack, 2010) with many focusing on adult pharmacological treatment modalities (Lopez & Rothrock, 2008). For example, in 2009, approximately 5.6 million prescriptions were written for opioids in children and teens between ages 5 to 18 years with chronic pain (Schottenfeld, 2012).

While adult-borrowed approaches have demonstrated some efficacy in adolescents with CDHs, many adolescents are refractory to these approaches and, thereby, experience increased levels of stress, which may exacerbate their headaches (Holroyd et al., 2000). In response, some of these teens develop maladaptive emotion-focused coping behaviors and skills. This maladaptive coping can interfere with the adolescents' appraisal of their condition, leading to a potential negative reaction to the headaches (Bacon, Milne, Sheikh, & Freeston, 2009). In addition, the maladaptive coping may exacerbate comorbid depressive and anxiety symptoms (Eccleston, Jordan, & Crombez, 2004).

The increasing prevalence of CDHs in adolescents, the lack of adequate treatment modalities for this age group (Gladstein & Mack, 2005; McGrath, 2001) and comorbid mental health conditions elevate this phenomena to the forefront of challenges for healthcare providers (Gladstein & Mack, 2005; Spittler, 2008). Primary and specialty care providers (e.g., nurse practitioners, physician assistants, physicians) are in ideal positions to use theory-driven evidenced-based interventions to help with this growing chronic healthcare problem; however, few programs exist.

Adolescents, along with their parents, frequently seek medical attention for their debilitating headaches. They utilize primary care services, specialty care services, and emergency department services (Chan & Ovens, 2004). According to Chan and Ovens (2004), patients with chronic headaches are a subgroup of patients who visit emergency department frequently. The current dilemma is how best to treat these teens, especially those with comorbid depressive and anxiety symptoms (Mueller, 2000; Wang, Fuh, & Lu, 2009). For many years, pain has been treated one-dimensionally from a pharmacological perspective. Since pain is a multidimensional problem with cognitive and behavioral implications, it needs to be treated in a multidimensional way. Interventions targeting adolescents with CDHs and comorbid psychiatric conditions are not well studied (Galli et al., 2004). Unlike most studies that require a trained mental health specialist to deliver the intervention, the purpose of this study is to test the

feasibility, acceptability, and preliminary effects of a theory-based manualized intervention on anxiety, depression, headache disability (school and/or work attendance, participation in sports or other activities), headache frequency, headache pain level, headache duration, and medication frequency in teens with CDHs that can be implemented by healthcare providers in a neurology specialty clinic. It is expected that the knowledge and problem solving skills acquired through cognitive behavioral skills building (CBSB) intervention will shift the teens' locus of control from external to internal, giving them a sense of control over their perceived ability to manage their headaches and thus erasing negative schemas that fuel anxiety and depressive symptoms.

Herman, Kim, and Blanchard (1995) identified a need for more theory-driven research in order to determine the most promising treatment approaches for pediatric migraine decades ago. This review yielded only one study that utilized theory in the research design. Based on these findings, there continues to be a need for theory-driven research to address the headache needs in children and adolescents.

Background and Significance

The impact of headaches on adolescent development. Adolescence is a period of rapid physical and emotional development (Eccleston, Wastell, Crombez, & Jordan, 2008; Erikson, 1968). These developmental changes can be challenging for the adolescent and their family. Adolescents developmentally

transition through the following three phases: (a) early adolescence (10 to 13 years), (b) middle adolescence (14 to 17 years), and (c) late adolescence (18 to 21 years) (Crockett & Peterson, 1993). Each phase has its unique cognitive, physical, and psychosocial milestones (Piaget & Inhelder, 1973). During adolescence, teens strive to become more independent, vacillating back and forth between independent and dependent roles (Erikson, 1968). There is an emergence of autonomous behavior and decreased dependence on parents. An increased identity and dependence on peers is important during this stage of development (Eccleston et al., 2008). During middle adolescence, which is the target phase for this intervention, there is transition to formal operational thought patterns (Piaget & Inhelder, 1973). As part of formal operational thinking, adolescents are able to (a) think and plan for future, (b) use abstract and scientific reasoning, and (c) associate consequences with behavior (Adams, 2000; Crockett & Peterson, 1993). There is also increased challenge of moral conventions and the development of codes of ethics possibly different from that of their parents (Reynolds, 2006). Healthy cognitive and emotional development is necessary for mastery of the developmental tasks of each phase of adolescence, and is necessary to effectively cope with various stressors (Crockett & Peterson, 1993). In middle adolescence, the presence of formal operational thinking is an important attribute that may influence the choice of coping strategies. Some studies have suggested that developmental level impacts the type of coping strategies utilized (Martyn-

Nemeth, Penckoter, Gulanick, Velsor-Friedrick, & Bryant, 2009; Reeves, Nicholls, & McKenna, 2009). With the emergence of formal operational thinking, adolescents in this study should have the capacity to understand consequences, problem-solve, and use inductive reasoning, which should enhance their ability to receive, practice, and model the intervention.

Autonomy. Illness threatens the adolescent's autonomy and can result in poor coping behaviors, which may result in emotional and social withdrawal (Eccleston et al., 2008). Low levels of autonomy have been found to be a predictor of low adolescent functioning (Palermo, Putnam, Armstrong, & Daily, 2007). Parents of teens with chronic illnesses are typically more involved with their teens and exert more control over their lives because of their health condition (Palermo et al., 2007). According to Palermo and colleagues (2007), parental controlling behavior may impact adolescents' attainment of autonomy, thereby impacting their perception of their ability to manage their headaches. Coping effectively with headaches is vital to the emotional and psychosocial development of this age group. Many sufferers of chronic headaches underestimate their level of control over their headaches (Siniatchkin, Riabus, & Hasenbring, 1999). Developmentally appropriate mastery and control of tasks are key antecedents for effective appraisal and coping in this age group. In addition, hypothetical thinking and abstract reasoning facilitate the use of cognitive coping skills such as problem solving (Devonport & Lane, 2009). Nash and Thebarge

(2006) postulate that the adolescents' ability to adjust to their headaches is impacted by their interpretation of (appraisal) and response to pain and other life stressors.

Self-esteem. Positive body image and self-esteem are essential to healthy ego development (Cast & Burke, 2002). Cast and Burke (2002) posit that self-esteem is a necessary ingredient in the self-evaluation process within and across social groups. Self-esteem is defined as an individual's overall positive evaluation of self (Gecas, 1982; Rosenbaum, Schooler, Schoenbach, & Rosenberg, 1995). Role identity increases an individual's self-worth and self-esteem (Cast & Burke, 2002). Poor self-esteem is a consequence for children with chronic pain (Denniston, Roth, & Gilroy, 1992; Rhee, 2000). Denniston and colleagues (1992) posit that poor self-esteem is associated with depression, heightened anxiety, and development of maladaptive behaviors such as dysphoria and negative and cognitive evaluations of one's body. While there have been no major studies examining self-esteem in adolescents with CDHs (Rhee, 2000), adult studies have shown that self-esteem mediates headaches through depression (Silberstein, Lipton, & Breslau, 1995). In a study of adult psychiatric patients, Romney (1994) reported that self-esteem accounted for more than 80% of the variance in attribution style. Self-esteem is important because it motivates individuals to form and maintain relationships that verify identity (Cast & Burke, 2002). Based on Beck's (1979) theory, positive self-evaluations are an important

antecedent to the development of healthy management of headache and lifestyle preventive behaviors. Healthy headache behaviors include getting regular sleep; eating regular meals; getting moderate amounts of routine exercise; drinking plenty of water; limiting caffeine, alcohol, and other drugs; and reducing stress (Buse, 2011).

The Social and Economic Impact of Chronic Headaches

The burden of headaches, socially and economically, is alarming. Approximately 60% of pediatric patients presenting to specialty headache clinics have CDHs (Hershey, Powers, Bentti, LeCates, & DeGrauw, 2001a). Chronic daily headaches cause substantial stress for adolescents and their families. These headaches can cause disruption of normal activities and can have an adverse impact on overall functioning. More specifically, many scholars have found that CDHs impact the adolescent's psychosocial and emotional functioning. Adolescents with chronic pain are not only affected emotionally and psychosocially but the pain and suffering also can impact aspects of their quality of life, especially functional ability (Fichtel & Larsson, 2002; Gilman et al., 2007; Hershey et al., 2001a; 2009; Palermo et al., 2007; Talraska & Zgorzalewicz-Stachowiak, 2007). The resulting functional disability leads to school and work absences, decreased work and academic performance, lack of participation in after school or social activities, increased risk taking behaviors, and family dysfunction. The added stress on the adolescent and family impacts overall

family dynamics and eventually may lead to discord and role strain on various family members (Palermo et al., 2007).

Healthcare expenditures related to disabling headaches are increasing. The estimated national annual burden of adult headaches to U.S. employers is approximately $11.1 billion (Hawkins, Wang, & Rupnow, 2007). Approximately two thirds of the financial burden can be attributed to indirect costs (reduced productivity, missed worked days) (Edmeads & Mackell, 2002). Hawkins and colleagues (2007) compared 215,209 patients with migraines with matched controls and found that patients with migraines had significantly higher average costs related to health expenditures compared with matched controls. The average healthcare expenditure for migraneurs was $7,007 per year compared to $4,436 per year for non-migraine sufferers (Hawkins et al., 2007). A similar study by Edmeads and Mackell (2002) found significantly higher direct and indirect costs related to increased headache disability. Healthcare expenditures for the migraneurs in this study were $1,242 per year and $929 per year for the comparison group. From a clinical perspective, a comparison study of long-term costs of minimal contact behavioral treatment to preventive drug treatment demonstrated that limited format behavioral interventions are cost effective in the early phase of treatment and become more cost effective as the years of treatment accrue (Schafer et al., 2011).

Comorbid Mood Disorders among Adolescents With CDHs

Comorbidity of mental health problems (e.g., depression and anxiety disorders) is substantial in teens affected by CDHs (Fichtel & Larsson, 2002; Pearlman, 2007; Wang et al., 2007b). Galli and colleagues (2004) postulate that there is an increased prevalence of psychiatric disorders in patients with CDHs than patients with other headache types. The chronicity of CDHs increases in the presence of psychiatric comorbidities (Guidetti et al., 1998), which makes treating these headaches more difficult (Gladstein & Mack, 2005; Pakalnis, Greenberg, Drake, & Paolicchi, 2001). Inadequately treating teens with CDHs and comorbid depression and anxiety places them at risk for significant impairment, morbidity, and mortality (Rosenbaum & Covino, 2005).

Depression. Depression is a known risk factor for the development of headaches (Dooley, Gordon, & Wood, 2005; Gordon, Dooley, & Wood, 2004). Children and adolescents presenting to healthcare providers with CDHs often have symptoms of depression (Powers, Gilman, & Hershey, 2006; Wang et al., 2007b). Wang et al. (2007b) studied the outcomes and predictors of CDHs in a two-year longitudinal study of 122 adolescents and found major depression to be an independent predictor of CDHs in adolescents. In a sample of 143 clinic-referred children and adolescents with CDHs, 9% of the participants met DSM-IV diagnostic criteria for depression (Seshia, 2004). Findings from the Centers for Disease Control and Prevention's *2011 Youth Risk Behavior Survey* revealed that

approximately 28.5% of U.S. high school students reported that they felt sad or hopeless almost every day for two or more weeks in a row (Eaton et al., 2012).

Anxiety. Anxiety is a well documented risk factor for adolescents with headaches (Mazzone, Vitiello, Incorpora, & Mazzone, 2006; Seshia, 2004). Data from a study by Seshia (2004) showed that a large percentage of children and adolescents with headaches reported symptoms of stress that precipitated their CDHs, suggesting that anxiety and stress are contributors to headache onset. In addition, anxiety is a predictor of poorer outcomes in adolescents with CDHs (Galli et al., 2004).

Suicide. In the general population, suicide accounts for 12% of death in adolescents and is the third leading cause of death in this age group (Hallfors et al., 2005). In a special report, the American Academy of Pediatrics reported that suicide increased by 300% over a 40-year period in teens. Findings from the *2011 Youth Risk Behavior Surveillance Survey* show that approximately 16% of U.S. high school students had seriously considered suicide during the 12 months before the survey, with approximately 7.8% attempting suicide (Eaton et al., 2012). Suicide risk rate among adolescents with CDHs is at least six times greater than adolescents without headaches (Cassels, 2007). Suicide risk rates are determined by the number of teens seriously considering suicide and the number who attempted suicide at least in the preceding year (Hallfors et al., 2005). In a

study of 122 community-based adolescents with CDHs, Wang, Juang, Fuh, & Lu (2007a) found a high current risk of suicide (> than 20%) among the participants.

CDH Risk Factors Among Adolescents

Risk factors for the development of CDHs include stress, gender and age, sleep disturbance, low socioeconomic status, unhealthy family functioning, medication overuse, depression, anxiety, and unhealthy lifestyle behaviors have been demonstrated across studies. Each of these entities with supporting studies will be discussed in further detail in this section.

Stress. Stress is considered a substantial risk factor for CDHs (Seshia, 2004; Winner & Gladstein, 2002). Stress occurs when a person's perceived demands exceed their perceived resources (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Lazarus, 1990; Nash & Thebarge, 2006). This imbalance results in increased demand on a person's biological system. Psychological stress is triggered by perceived threats that are either physical or emotional (Nash & Thebarge, 2006). There are reports that stress or daily frustrations increase the risk of headaches in adolescents (Massey, Garnefski, Gebhardt, Van Der Leeden, 2009; Nash & Thebarge, 2006). Stress may also worsen headache related disability and quality of life and accelerate progression of headache chronicity (Nash & Thebarge, 2006).

Gender and age. There is limited gender specific data on CDHs in adolescents (Scher et al., 2008), although several studies have suggested a higher

prevalence in adolescent girls ages 15 and older (Cuvellier, Couttenier, Joriot-Chekaf, & Vallée, 2008; Fichtel & Larsson, 2002; Hershey et al., 2001a; Pakalnis, Butz, Splaingard, Kring, & Fong, 2007; Scher et al., 2008; Talraska & Zgorzalewicz-Stachowiak, 2007; Unalp, Dirik, & Kurul, 2006; Wang et al., 2007a, 2007b). Hershey and colleagues (2009) also found that female gender influenced headache outcome, with more than twice as many girls as boys experiencing CDHs.

Sleep disturbances. Poor sleep hygiene behaviors are associated with headache disability. Children with migraines have a high prevalence of sleep disorders (Vandrame, Kaleyias, Valencia, Legido, & Kothare, 2008). Specific sleep behaviors such as nightmares, difficulty falling asleep, staying up late at night, early morning awakenings, and poor quality of sleep are significantly correlated with frequency and intensity of headaches (Gilman et al., 2007). Other studies involving children and adolescents also demonstrated a high correlation between headaches and sleep disorders (Bruni et al., 1997; Del Bene, 1982). Sleep behavior is often an indicator of poorer quality of life among patients with chronic headaches (Passchier, De Boo, Quaak, & Brienen, 1996). Sleep disturbance in headache sufferers is two-fold in that sleep problems increase with chronic headaches (Paiva, Farinha, Martins, Batista, & Guilleminault, 1997) and chronic headaches increase with sleep problems (Sahota & Dexter, 1993). Polysomnographic findings in children and teens with headaches suggest

disrupted sleep architecture with reduced rapid eye movement and slow-wave sleep in severe and chronic headaches, which may support an intrinsic relationship between sleep and headache disorder (Vandrame et al., 2008).

Socioeconomic status. Level of socioeconomic status is associated with increased risk for CDHs. The effects of poverty on children's and teens' health are mediated through economic, ecologic, and family influences (Wood, 2003). Families at lower socioeconomic levels are often isolated by the violence that is prevalent in their neighborhoods (Wood, 2003). There is increased child abuse, stress, and family dysfunction, subsequent to lack of opportunity for parents to build social support systems (Napoli, Axia, & Battistella, 2002). According to Napoli and colleagues (2002), psychosocial environment and family ecology impact primary headaches in children. Molarius, Tegelberg, and Ohrvik (2008) found that teen and adult headache sufferers with frequent economic problems had twice the risk of recurrent headache or migraines compared to subjects with no economical problems. These authors also found that poor social support was associated with increased headache disorder. Unalp and colleagues (2006) also found that lower income levels were associated with increased headache frequency, thereby predisposing to CDHs in the adolescent age group. Lower income levels also were associated with poorer prognosis and increased prevalence of CDHs.

Family functioning/social support. Traditionally, the social support systems of adolescents include extended family as well as peers. Parent-child conflict increases during adolescence (Crockett & Peterson, 1993). Family discord is a risk factor for CDHs (Pakalnis et al., 2007; Palermo et al., 2007). Recurrent pain in the adolescent can have a significant impact on family functioning (Palermo, 2000; Palermo & Chambers, 2005). Divorce and physical abuse increase in families of the adolescents with CDHs (Juang, Wang, Fuh, Lu, & Chen, 2004). Data from Palermo and colleagues' (2007) study show that family functioning is significantly related to more pain related impairment and increased depressive symptoms in teens. These authors also concluded that general family functioning and adolescents' autonomy were significant individual predictors of functional impairment in adolescents with recurrent headache. In a study examining social development and chronic pain, Eccleston and colleagues (2008) found that greater family dysfunction had a negative effect on emotional adjustment. Although peer relations and social networks are more important at this stage of development than family relationships (Crockett & Peterson, 1993), healthy family functioning is necessary to de-emphasize the impact of CDHs headaches in teens (Mueller, 2000). Challenges to this developmental process interfere with the development of the adolescent's emotional regulation skills (Grotevant, 1987).

Medication overuse. Analgesic overuse is a well-known risk factor for CDHs (Fichtel & Larsson, 2002; Scher et al., 2008; Seshia, 2012). Analgesia overuse is defined as the use of analgesics at least daily, for five or more days per week for more than two weeks (Seshia, 2012). Medication overuse impacts treatment and prognosis of headaches. Adolescents may use over-the-counter analgesics excessively in a quest to find relief for their constant headaches. Headache frequency has been shown to correlate highly with medication over-usage (Fichtel & Larsson, 2002). Approximately 60% of CDH sufferers overuse medication (Pakalnis al., 2007), with ibuprofen (48%) and acetaminophen (22%) being the most frequent over-the-counter medications used. Medication overuse is reported as the third most common cause of headache disorders (Flippen, 2001; Gladstone, Eross, & Dodick, 2003).

Lifestyle behaviors. Lifestyle and dietary habits such as regular sleep patterns, regular mealtimes, regular exercise or physical activity, non-caffeinated beverages, and adequate hydration are important for maintaining a healthy lifestyle (Blau, 2005). Lewis (2002) and Kelman (2007) found an association between headaches and skipping meals. Physical inactivity is associated with both increased stress and frequent headaches (Yokoyama et al., 2009). Caffeine (Scher, Stewart, & Lipton, 2004) and inadequate hydration (Blau, 2005; Hering-Hanit & Gadoth, 2003; Spigt et al., 2005) are also risk factors for CDHs. Diener

and Limmroth (2004) posit that caffeine intake may be the most causative agent in the adolescent population.

Obesity. There is prevalence of obesity in individuals with CDHs (Scher et al., 2008). These authors found that a significantly higher proportion of obese and morbidly obese teens and adults have CDHs. Obesity was defined in this study as a body mass index $\geq$ 30. Hershey and colleagues (2001b) also found a correlation among raw BMI scores and frequency among overweight teens with CDHs. Findings from their study indicated that greater reduction in BMI was associated with increased reduction in headache frequency.

Perception of Pain Interference

Teens' and parents' perception of the extent to which headaches interfere with daily functioning varies. Palermo and colleagues (2007) found more positive perception of family functioning with headache-related disability in teens as compared to their parents. Arndorfer and Allen (2001) explored the efficacy of thermal biofeedback as an intervention in non-daily tension-type headaches and found higher parent perception of pain interference with family relationships and daily functioning such as chores, school attendance, and participation in recreational activities as compared to adolescents.

Psychological Treatment of Headaches

The nature of CDHs and its associative comorbidities requires an integration of therapeutic modalities for better management. One focus of

psychological therapies is to promote changes in cognitive-emotional and cognitive-behavioral processes influencing pain (Kröner-Herwig, 2011). A review of randomized controlled trials and meta-analyses revealed that the mainstays of psychological therapies are biofeedback, relaxation training, and multimodal cognitive behavioral therapy (CBT). Evidence suggests that psychological therapies have efficacy in children and adolescents with chronic or recurrent headaches, with clinical relevant improvement seen in approximately 70% of treated children at follow-up (Kröner-Herwig, 2011), yet in clinical practice these therapies are not readily utilized. There also is supporting evidence that children with mild depressive and anxiety symptoms successfully respond to various psychological interventions (Compton et al., 2004; Kendall, Chu, Pimentel, & Choudbury, 2000; Lusk & Melnyk, 2011; Prins & Ollendick, 2003).

Summary. Treatment decisions for CDHs in children and adolescents continue to be made using data from adult studies, childhood studies of episodic migraine, or expert opinion (Mack, 2010). A gap exists in the literature as how best to treat and manage adolescents with CDHs using a theory-driven approach. The results of this study may fill this gap by using the Creating Opportunities for Personal Empowerment Headache Education Program (COPE-HEP), which is a theory-based intervention for adolescents with CDHs and mild to moderately elevated depressive symptoms and, therefore, increase the scientific body of knowledge in this area. One of the advantages of the COPE-HEP intervention is

that it is manualized; therefore, it is reproducible and may be feasible in most clinical settings and utilized by healthcare providers (e.g., nurses, physicians, nurse practitioners, physician assistants, psychologists, and counselors) after training. Given the increasing prevalence of CDHs and comorbid psychiatric symptoms (e.g., mild depressive and anxiety symptoms) in teens, it is imperative that healthcare providers better equip themselves with the knowledge and skill to help teens to incorporate positive, realistic attitudes, thoughts, and beliefs about their headaches into behavioral changes which will be evidenced by more problem focused coping behaviors.

Specific Aims and Research Questions

In order to address the gap found in the science of theory-driven intervention research with adolescents with CDHs and associated mild depressive and anxiety symptoms, a randomized controlled pilot study to assess the acceptability, feasibility, and preliminary effects of a CBSB theory-based intervention was proposed as a first step. The next step will be to test the intervention in a larger full-scale randomized controlled study (RCT) with longitudinal follow-up to assess more long-term effects. This proposed pilot RCT answered the following questions:

Research question 1. Is a theory-driven COPE-HEP intervention program with emphasis on coping, beliefs, cognition, and cognitive restructuring

in adolescents ages 13 to 17 years with CDHs and mild to moderate depressive symptoms feasible and acceptable to adolescents?

Research question 2. What are the preliminary effects of COPE/HEP on teens who have CDHs with mild to moderate symptoms as compared to a control group of adolescents with CDHs as measured by anxiety, depression, headache disability (e.g., attendance at school, involvement in school, sports, or other age-appropriate activities), headache frequency, headache pain level, headache pain level, and parent perception of pain interference?

Research question 3. What is the relationship among mediating and outcome variables (i.e., beliefs, perceived stress, anxiety, depression, headache disability, headache frequency, headache pain level, headache duration, medication frequency, and parent perception of pain interference) in teens with CDHs?

Theoretical Framework

Importance of theory to guide intervention research. Cognitive theory and the psychological theory of stress and coping are the theories that were used to guide the proposed COPE-HEP intervention for teens with CDHs and mild to moderate depressive symptoms. Interventional theory-based research is needed to help advance clinical knowledge (Reed & Shearer, 2011) and inform clinicians about how best to intervene with teens with CDHs. These theories were chosen to guide the COPE-HEP intervention because they both make specific predictions

about health and behavioral changes expected after the intervention is delivered (Cook, Gerkovich, Hoffman, McClernon, & O'Connell, 1996). Clear conceptual links between the theory and the phenomenon of interest accelerates knowledge development (Conn, Rantz, Wipke-Tevis, & Maas, 2001). The utilization of theory to guide the intervention is necessary to provide constructs and innovations that bridge the gap between theory and practice (Reed & Shearer, 2011). Sidani and Sechrest (1999) postulate that understanding the relationships among key concepts allows for a better understanding of the theoretical framework, including the strengths of the intervention and how it works. It is imperative that researchers and healthcare practitioners develop and implement age-appropriate theory-based interventions when working with adolescents with CDHs in order to have a systematic process for understanding the intervention. Interventions that are developmentally appropriate enhance the potential effects of the intervention (Stanton, Kim, Galbraith, & Parrott, 1996; Varricchio, 1995). It is well recognized that chronic headaches are a major stressor for adolescents and that comorbid depressive and anxiety symptoms are common (Cuvellier et al., 2008; Fichtel & Larsson, 2002; Pakalnis et al., 2007; Wang et al., 2007a). Therefore, from a practice and theoretical perspective, cognitive theory and theory of stress and coping provided a relevant foundation for this study, which implemented a COPE-HEP intervention to initiate behavioral change in adolescents with coexisting CDHs and mild to moderate depressive symptoms.

Cognitive Theory. Cognitive behavioral therapy has underpinnings in Cognitive Theory and the seminal works of cognitive theorists to include Skinner (1969), Ellis (Ellis & Dryden, 2007), Seligman (1980), Lewinsohn (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993), Beck (1979), and Bandura (1986). Cognitive Theory attempts to explain human behavior through thought processes (Beck, 1979; Beck & Mahoney, 1979). An assumption of Cognitive Theory is that how one thinks impacts how one perceives and behaves (Beck, 1963, 1964). Skinner (1969) theorized that learning is a function of change in overt behavior. The main premise of Skinner's (1969) operant conditioning theory is that individuals operate within an environment, and during this operation, individuals encounter a stimulus or re-enforcer, which has the effect of increasing the behavior occurring prior to the re-enforcer. An individual's response to environmental stimuli results in change in behavior and produces a consequence. The tendency to repeat the behavior in the future is modified by the nature of the consequence (Skinner, 1969). Ellis and Dryden (2007) proposed that through rational thinking and cognitive reconstruction, individuals could understand their negative behavior as related to their irrational beliefs and, as a result, develop more rational constructs. Ellis and Dryden (2007) viewed irrational beliefs as the impetus that leads individuals to overact emotionally to certain preceding events. Seligman (1980) concluded that when confronted with a negative event, people tend to experience depression with the belief that their behavior has no impact or

influence on the outcome. Seligman (1980) theorized that a depressogenic thinking style included internal attributions for negative events and unstable attributions for positive events. In essence, these individuals are more prone to depression and other illnesses because of their association of negative events in their lives with a feeling of worthlessness and a feeling that negative consequences will follow a negative event. Lewinsohn and colleagues (1993) postulated that depression stems from the lack of positive reinforcement from pleasurable activities. They also contended that deficits in social skills and frequent negative experiences lead to low levels of positive reinforcement (Lewinsohn et al., 1993).

Cognitive Theory also has tenets in the work of Albert Bandura (1986). Bandura (1986) recognized the interplay of environment, behavior, and a person's psychological processes. He contended that individuals possess the innate ability or self-beliefs that help enable them to have a sense of control over their thoughts, feelings, and actions (Bandura, 1986). Bandura (1986) broadened his social learning theory to include principles of observational learning (modeling) and vicarious reinforcement and later changed the name of the theory to Social Cognitive Theory.

In later years, Beck (1979) joined the concepts of behavioral and cognitive theories and succinctly addressed the cognitive and behavioral aspects of functioning. Beck (1979) incorporated a negative triad in his Cognitive Theory

(Tanaka et al., 2006). He theorized that a negative triad is made up of negative schemas (beliefs) and cognitive biases of the person (Beck, 1979). In addition, he proposed that cognitive biases (a person's view of the world) perpetuate negative schemas, which may lead to depression and other clinical disorders (Beck, 1979; Nemade, Reiss, & Dombeck, 2009). The building blocks of Beck's cognitive model of depression describe an individual's negative way of thinking about self, world, and future, which exacerbate the extent, severity, and recurrence of the depressive symptoms. Thus, the core components of Beck's theory are self-relevant schemas, the cognitive triad, and information processing errors (Beck, 1963, 1964). These components are shaped throughout development and across the lifespan. They are organized, maintained, and revised based on interactions with environmental stimuli (Clark, Beck, & Alford, 1999). In essence, the theory suggests that a person's emotions and behaviors are largely determined by their cognitive appraisal of the world (Beck & Mahoney, 1979). The primary construct of Cognitive Theory is schemas.

Schemas. A schema is a knowledge structure used for screening, coding, and evaluating impinging stimuli (Beck, 1964). Schemas are the mode by which a person breaks down the environment and organizes it into relevant pieces. A schema represents a person's knowledge about and interpretation of all the concepts they have stored in memory. For example, schemas include situational rules such as what to expect or how to behave in a given situation (Nisbett &

Ross, 1980). Schemas are interrelated and are organized in a hierarchical manner from the very specific to the most abstract (Hollon & Kriss, 1984). Schemas represent the primary constructs of Beck's theory. Beck (1967) theorized that schemas are responsible for the organization of prior experience and cognitive representations of past events, interpretation of new experiences, and formation of expectancies for the future. Schemas are activated or deactivated by certain stimuli and, therefore, may be active or inactive at times (Beck, 1979). Several researchers have suggested that the adaptive nature of emotions stems from how individuals organize social communication, goal achievement, and cognitive processes from an early age (Ekman, 1994; Izard, 1993; Thompson, 1994).

Schemas contain beliefs and rules about self and become a person's core beliefs. Schemas compose the specific content of the mind's cognitive structures that have developed about the self and others (Beck, 1964). The content of schemas corresponds to an individual's attitudes, goals, values, and conceptions. Schemas found in people with psychopathology can be seen by the typical recurrent misconceptions, distorted attitudes, invalid premises, and unrealistic goals and expectations (Beck, 1963). An example would be a person with an acute illness experiencing anxiety or depressive symptoms prior to a doctor's visit because of the fear of being diagnosed with a chronic, life-threatening illness. In this case, the external stimuli (doctor's visit) evoked the schema (belief), which

abstracted the specific details of the situation, and produced the cognition (bad news about health status).

A person's beliefs, attitudes, and assumptions, which influence the way they orient to a situation, recognize and label the salient features, and conceptualize the experience, result from active schema (Beck, 1964). When idiosyncratic depressogenic schemas (negative) are activated, there are negative conceptions of the individual's worth, personal characteristics, performance or health, and overall expectations (Seligman, 1980). These schemas produce negative thought content and lead to feelings of depression to include sadness, guilt, loneliness, and pessimism (Beck, 1964). Depression causes deepening of the negative schemas, allowing them to increasingly dominate the cognitive processes. This behavior spirals to deeper depression and it eradicates the more appropriate schemas (positive) and interferes with the cognitive processes necessary for attaining self-objectivity and reality testing because the negative schema is pervasive and is actively guiding information processing (Beck, 1995). The negative core beliefs in depressed individuals influence information processing through cognitive misconceptions and errors in information processing (Beck, 1995). Based on this knowledge, the goal of CBSB would be to shift the individual's cognitive appraisal of self and the world from a deductive to a more inductive form of reasoning. For example, through inductive reasoning, the individual would form judgment based on objective information rather than from

misconceptions and distorted or biased assumptions. Therefore, the theory targets behavioral change through change in cognitions (Beck & Mahoney, 1979).

Psychological Theory of Stress and Coping. The second theory that guided the testing of the brief CBSB COPE/HEP intervention is the Psychological Theory of Stress and Coping. This theory is based on the seminal work of Richard Lazarus and his colleagues (1987). The Psychological Theory of Stress and Coping is based on the premise that the transaction between the person and the environment is the source of the stress rather than the person or environment causing the stress independent and in isolation of each other (Lazarus & Folkman, 1987). According to Lazarus (1990), transaction implies that stress is neither in the person nor the environmental input but rather reflects the conjunction of a person with certain motives and beliefs with an environment whose characteristics pose harm, threats, or challenges depending on the person's characteristics. The theory hypothesizes two processes that are central mediators of stress person-environment relations (Lazarus, 1990). These processes are cognitive appraisal and coping. This theory utilizes two coping pathways in response to stress: (a) one concerned with the regulation of emotional responses (e.g., depressive and anxiety symptoms) to stressors; and (b) one concerned with the regulation of a person's functional response (e.g., participation in school or work, participation in sports or other activities, medication usage) to stressors (Lazarus & Folkman, 1987). The psychological theory of stress and coping will guide measurement of

emotional and functional coping outcomes in this theory-based study. The major constructs of this theory are stress, coping to include emotion-focused and problem focused stages of coping and person, and environment interaction.

Stress. Lazarus and Folkman (1987) define stress as a relationship between the person and the environment in which perceived demands exceed available resources. Other definitions for stress include (a) the number and magnitude of daily hassles or life events (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982; Nash & Thebarge, 2006), (b) a set of psychological responses that occur some pressure, (c) state of emotional distress, and (d) the inability to deal with life demands (Nash & Thebarge, 2006).

Stress is a critical contributing factor to a person's overall well being. Evidence shows that children with more frequent and severe headaches experience more stress than children with less frequent and severe headaches (Bandell-Hoekstra et al., 2002; Björling, 2009; Fearon & Hotopf, 2001). Stress, in mild to moderate amounts, may be a motivating factor for some individuals while in cases of extreme exposure it may cause illness (Stein, 2001). Pierce (1987) postulated that stressful events are intrinsic and unavoidable and serve as an adaptive purpose by helping to maintain humans in a state of readiness to respond to increasing stressful events. A person's response to stress is mostly determined by their perception of stress (Lehrer, Woolfolk, & Sime, 2007).

Lazarus (2000) described an interrelationship between stress and emotions. He concluded that if stress is present or involved, so are emotions. Reid, Gilbert, and McGrath (1998) found more emotional distress, less coping effectiveness, and higher levels of pain in adolescents with internalizing catastrophizing behaviors. According to Reicherts and Pihet (2000), emotional responses occur as stressful events unravel. When emotional reserves are taxed, there is an increase in ineffective coping responses (Folkman & Lazarus, 1980).

Each individual responds to stress differently. The period of adolescence poses its own stressors to those associated with everyday stressful life events (Devonport & Lane, 2009; Massey et al., 2009). Adolescents are confronted with less developed adaptive coping skills (Frydenberg & Lewis, 2004) as well as the stress of sports, academics, and/or employment (Dugdale, Eklund, & Gordon, 2002). According to Seshia (2012), stressors are different in children and teens from those in adults. Current stressors for this age group includes (a) challenges with peer relationships, (b) bullying and school conflict (Strom & Strom, 2009), (c) cyberbullying through use of Internet and other communication technologies (Sourander et al., 2010), (d) conflict with parents (Pakalnis et al., 2007; Palermo et al., 2007) and gender conflict (Strom & Strom, 2009). In addition, adolescents with CDHs have an additional stressor: headaches. Massey and colleagues (2009) found that daily frustration to attaining goals was an important stressor contributing to concurrent and prospective headache occurrence in adolescents.

These authors posit that strategies such as catastrophizing, self-blame, and rumination may be related to increase headaches. These emotion-focused behaviors interfere with coping efficacy beliefs, which impact goal attainment (Massey et al., 2009).

Coping. Folkman and colleagues (1986) defined coping as the person's constantly changing cognitive and behavioral efforts to manage specific external and internal commands that are appraised as taxing or exceeding the person's resources. Coping, then, is viewed as contextual in that it is influenced by the person's appraisal of the demands and the available resources for managing them rather than as a stable entity (Holahan, Moos, & Schaefer, 1996). An individual's primary appraisal of the encounter has direct impact on the type of coping strategies they will use (Folkman & Lazarus, 1980). An individual's coping strategies are the cognitive or behavioral actions taken in response to a stressful encounter. The coping strategies selected are based on an individual's cognitive appraisal of the stressful encounter and success with that strategy in the past (Hansell, Thorn, Prentice-Dunn, & Floyd, 1998). For example, an individual with negative schema may perceive an event as more stressful, threatening, and uncontrollable than a person who is more realistic (Lehrer et al., 2007). Bacon and colleagues (2009) viewed appraisal of stress and coping as a fluctuating process, with adaptation being made in response to the success or failure of coping strategies. Pierce (1987) posits that the most effective coping occurs when

coping patterns are flexible, coherent, changeable, evolving, and available. Sidani and Sechrest (1999) postulate that understanding the relationship among key concepts allows for a better understanding of the theoretical framework, including the strengths of the intervention and how it works.

Coping becomes increasingly important during adolescence as adolescents experience the increased physical, psychosocial, and emotional demands of this developmental phase. Failure to cope has negative consequences, such as mental and physical health problems (Geisthardt & Munsch, 1996). The mechanisms or strategies adolescents with headaches use to cope with their chronic pain and disability impact their overall health status, especially their mental health (Eccleston & Malleson, 2003). Moore and Shevell (2004) found that children with CDHs frequently utilized ineffective coping strategies including overuse of analgesics. According to Richardson, Gilbourne, and Littlewood (2004), effective coping impacts adaptational outcomes. Snyder and Lopez (2001) described coping as a proactive approach towards the achievement of self-imposed goals and personal growth. These authors postulate that clarity of the goals facilitate the use of appropriate coping resources for goal-attainment, thus suggesting that goals enhance motivation through a cognitive process.

Emotion-focused coping. Emotion-focused coping is one of the ways an individual may respond to stress. Emotion-focused coping involves the regulation of stressful emotions. Folkman et al. (1986) identified five emotion-focused

strategies: (a) self-control, (b) distancing, (c) positive reappraisal, (d) accepting responsibility, and (e) escape/avoidance. There are different approaches to emotion-focused coping, one involving strategies that facilitate action (adaptive) and others involving strategies that facilitate avoidance (maladaptive) behaviors (Stanton & Franz, 1999). Emotion-focused coping behaviors that are adaptive (e.g., positive thinking) lead to positive desired outcomes (e.g., perceived self efficacy, improved academic performance) (Frydenberg & Lewis, 1999). A study by Ebata and Moos (1994) found that older adolescents who used adaptive emotion-focused coping strategies were more active, appraised the focus of their stress as controllable and challenging, and found more ongoing social resources. Emotion-focused coping becomes a problem when active strategies for coping are replaced by inactive ones (e.g., self-blame, worry) (Holden, Gladstein, Trulsen, & Wall, 1994). This behavior leads to emotional avoidance and maladaptive coping (Frydenberg & Lewis, 2004).

Evidence suggests that maladaptive emotion-focused coping strategies and emotional avoidance negatively impact mental and physical health outcomes (Gross & Levenson, 1997). Higher levels of depression were found to be associated with emotion-focused avoidance in both sexes (Keogh & Eccleston, 2006). Higher levels of somatic symptoms and disability were reported in adolescents with chronic pain who reported infrequent use of active coping strategies (Simons, Claar, & Logan, 2008). Holden and colleagues (1994) found

that children and adolescents with CDHs reported more externalizing behaviors (e.g., yelling, blaming) as a pain coping strategy than those with recurrent headache. Bandell-Hoekstra and colleagues (2002) further described nonproductive emotion-focused coping in a study of children with recurrent headaches. These researchers found that children with more frequent, intense, and lengthy headaches used less distraction and more catastrophizing, and internalizing than children with less frequent, intense, and lengthy headaches. Lewis and Frydenberg (2002) found a positive relationship between professed ability to cope and emotional focused coping strategies. Overall, these findings suggest that maladaptive emotion-focused coping is associated with poorer adjustment, increase distress, and more behavioral problems.

Problem-focused coping. Problem-focused coping is an action-focused attempt to change a situation perceived as threatening (Taylor & Aispinwall, 1996). Lazarus and Folkman (1984) suggest that change in the perceived threatening situation is accomplished by altering the environment, changing external pressures, or making the distressing situation less stressful through the utilization of resources. Hillson and Kuiper (1994) posit that coping is more adaptive when the situation has been appraised as being amenable to change. Problem-focused coping is utilized when there is challenge appraisal, which is a person's subjective assessment of an environmental encounter as threatening, harmful, or uncontrollable (Hansell et al., 1998; Lazarus & Folkman, 1984).

Folkman and colleagues (1986) identified three problem-focused strategies: (a) confrontive coping, (b) seeking social support, and (c) problem solving.

Evidence shows that Lazarus' Psychological Theory of Stress and Coping (i.e., emotion-focused and problem-focused) has considerable utilization for teaching coping processes in children as well as adults (Pincus & Friedman, 2004)). Both problem-focused and emotion-focused coping behaviors are necessary for healthy adaptation to stress, although certain strategies may be more adaptive in some situations than others (Pincus & Friedman). Mauss, Cook, Cheng, and Gross (2007) reported that coping strategies that may have been beneficial initially in a situation may become maladaptive as the situation changes. Individuals with more flexibility in their coping choices may better adjust to stress than those with no flexibility in their coping strategies (Lazarus & Folkman, 1984). Evidence shows that children and adolescents change their coping behaviors based on situational demands, especially older children (Pincus & Friedman). Campbell, Kirkpatrick, Berry, & Lamberti (1995) reported that children and adolescents use a variety of coping strategies given the encounter. In this study, problem-focused strategies were primarily used to cope with academic situations while emotion-focused strategies were used primarily to cope with medical-related situations. These findings support that emotion-focused coping is readily used in situations perceived as uncontrollable, and problem-solving coping

is used in situations perceived as controllable (Folkman et al., 1986; Hansell et al., 1998; Lazarus & Folkman, 1984).

Application of Psychological Theory of Stress and Coping in Research

Numerous studies have demonstrated application of Lazarus' Psychological Theory of Stress and Coping. In a study exploring the interrelations of control, coping, and distress for chemotherapy and breast cancer, Bussell (2005) found support for the premise that there is a problem-directed focus to coping as well as a more emotion-directed focus through the guide of Lazarus' theory. Bussell (2005) found that emotion-focused coping was positively related to depression, anxiety, perceived stress, distressed mood, and fatigue and that problem-focused coping was not related to any measure of distress. Martyn-Nemeth and colleagues (2009) used concepts of Lazarus' theory to frame a study examining relationships among self-esteem, stress, social support, and coping and to test a model of their effects on eating behavior and depressive mood in adolescents. The theory supported that stress and low self-esteem and avoidant coping were related to unhealthy eating behavior. In addition, Lazarus' transactional perspective of stress and coping provided theoretical construct in a study by Reeves and colleagues (2009) that examined stressors and coping strategies among early (12-14 years) and middle adolescence (15-18 years) soccer players. Findings supported that middle adolescents identified more stressors, reported a greater number and variety of coping

strategies, and used more problem-focused strategies, but fewer avoidance strategies than teens in early adolescence. Furthermore, in a systematic review, Garcia (2010) found that Lazarus' Psychological Theory of Stress and Coping is one of the theories that have advanced the science regarding stress, coping, and measurement of these constructs.

Cognitive Behavior Therapy (CBT)

Cognitive Behavior Therapy provides a theoretical and empirical approach for assessing, treating, and understanding emotional disorders (Leahy, 1996). Cognitive Behavior Therapy originated from Beck's (1963) cognitive theory of depression. Cognitive Behavior Therapy is a combination of cognitive therapy and behavioral therapy and is unified into a form of psychotherapy. Its goals are to transform irrational beliefs into realistic optimistic thoughts (Beck, 1995). This therapy induces positive emotions, which lead to more desirable behavior. Cognitive Behavior Therapy attempts to collectively address cognition, emotion, and behavior and the co-relationship of these constructs. The goal of CBT is to work to change negative cognitions by recognizing incongruencies between reality, thoughts, and resultant behaviors so that more positive emotions and behaviors are realized. These therapeutic techniques emphasize that how one thinks impacts how one feels and behaves (Melnyk et al., 2009).

Cognitive Behavior Therapy is typically delivered by trained therapists who can be distinguished from other therapists through the comprehensive

training received and adherence to the CBT model (Leahy, 1996). Through CBT, the therapist should be able to identify irrational thoughts, which can be maladaptive, thus leading to negative feelings. The therapist works to reverse negative feelings and emotions that are the outcome of an individual's maladaptive and incongruent beliefs or thoughts, assisting them with the skill needed to interact in a more adaptive way with their environment. The therapist attempts to help the individual substitute more positive alternative thoughts for their irrational thoughts. The modalities most commonly used in adolescents in CBT are self-assurance, problem solving, cognitive restructuring, behavioral modification techniques (Trautmann & Kröner-Herwig, 2010), training about self-control, self-statement modification, and training related to social perception (Grave & Blissett, 2004).

The efficacy of CBT with adolescents with mental health disorders (e.g., depression and anxiety) has been demonstrated in numerous research studies (Butler, Chapman, Forman, & Beck, 2006; Compton et al., 2004; Lewinsohn & Clarke, 1999; Lusk & Melnyk, 2011; Melnyk et al., 2009). A few studies involving adolescents with recurrent headaches have utilized CBT by framing behavioral, psychosocial, and social risk factors of headaches (Kröner-Herwig & Denecke, 2002; Trautmann & Kröner-Herwig, 2010).

Trautmann and Kröner-Herwig (2010) compared a CBT intervention and applied relaxation in children and adolescents with recurrent headaches. The

CBT training in this study included education on headaches, strategies for coping and stress management, cognitive restructuring, self-assurance, and problem solving. The applied relaxation training included passive relaxation, cue-controlled relaxation, and differential relaxation. The CBT techniques were found to improve the participants' ability to cope with their headaches at post-test with no significant deteriorations or improvement of headache variables at six-month follow-up suggesting that the improvement remained stable.

In a correlational study using a healthy lifestyles intervention that utilized CBSB techniques, Melnyk and colleagues (2007) found that teens with higher state and trait anxiety and depressive symptoms had less healthy lifestyle beliefs. Stronger beliefs about the ability to engage in a healthy lifestyle demonstrated positive correlations with healthier attitudes and lifestyle choices. These teens with higher beliefs in their ability to lead a healthy lifestyle had less perceived difficulty in leading a healthy lifestyle. Results of the study support that utilizing an intervention based upon CBSB techniques with teens may play a significant role in replacing their negative schemas and boosting the adolescents' beliefs about their readiness to make healthy lifestyle choices. Furthermore, Gil and colleagues (2001) examined the one-month effects of a brief CBT in children with sickle cell and found increased use of positive coping and improved behaviors on days when the children had pain. These studies suggest that psychological interventions to include CBT have positive outcomes in children and teens with

chronic pain and emotional disorders. Cognitive behavioral skills building techniques can be used by healthcare providers and lay people if they receive training in how to assist individuals change negative unrealistic thoughts and beliefs into positive thoughts and behaviors (Lam, 2005).

Theoretical Constructs

Beck's Cognitive Theory and Lazarus' Psychological Theory of Stress and Coping provided constructs for explaining the proposed mediators of CDHs: beliefs and perceived stress. Based on these theoretical frameworks, it was proposed that the adolescents' beliefs about their headaches and their perceived stress affect their perception of their ability to effectively manage and cope with their headaches. The theories make specific predictions about stress, coping, beliefs, and cognitive appraisal, thereby providing appropriate constructs within the proposed CBSB COPE/HEP intervention to promote change in emotions and behaviors. The consistency of the conceptual frameworks led to intervention effects with clear explanation of casual processes between the intervention and outcomes. Enhanced construct validity of the COPE/HEP intervention led to adequate interpretation of the findings. Therefore, the proposed study will use a CBSB approach to operationalize the two supporting theories. Figure 1 depicts the hypothesized pathway of the COPE-HEP intervention on the proposed behavioral outcomes.

Relationship of the Intervention to Framework(s) and Intervention/Study Variables

The intervention tested for the treatment of CDHs in adolescents was COPE-HEP. COPE is based on Cognitive Theory. COPE focuses on how to (a) turn negative thoughts into positive thoughts, (b) more effectively communicate with others, (c) set goals, (d) manage stress, and (e) problem solve. From Cognitive Theory and Psychological Theory of Stress and Coping, a CBSB program was created that follows the principles of Cognitive Theory and CBT. The COPE/HEP was adapted from Dr. Bernadette Melnyk's seven-session COPE for Teens program. The seven-session COPE is a brief CBSB manualized intervention for mild to moderately depressed and/or anxious adolescents designed to be implemented by healthcare providers in mental health and school-based settings. It has demonstrated efficacy in studies of adolescents with depressive symptoms and anxiety (Lusk & Melnyk, 2011; Melnyk et al., 2009). The COPE/HEP intervention was adapted for delivery with teens who have chronic headaches and mild depressive symptoms in a specialty care setting. The COPE/HEP integrated concepts of COPE and healthy headache lifestyle behaviors (e.g., regular sleep and eating patterns, adequate hydration, limited intake of food triggers, exercise). The overall goal of the COPE/HEP program was to enable adolescents to see how their thoughts about their headaches are

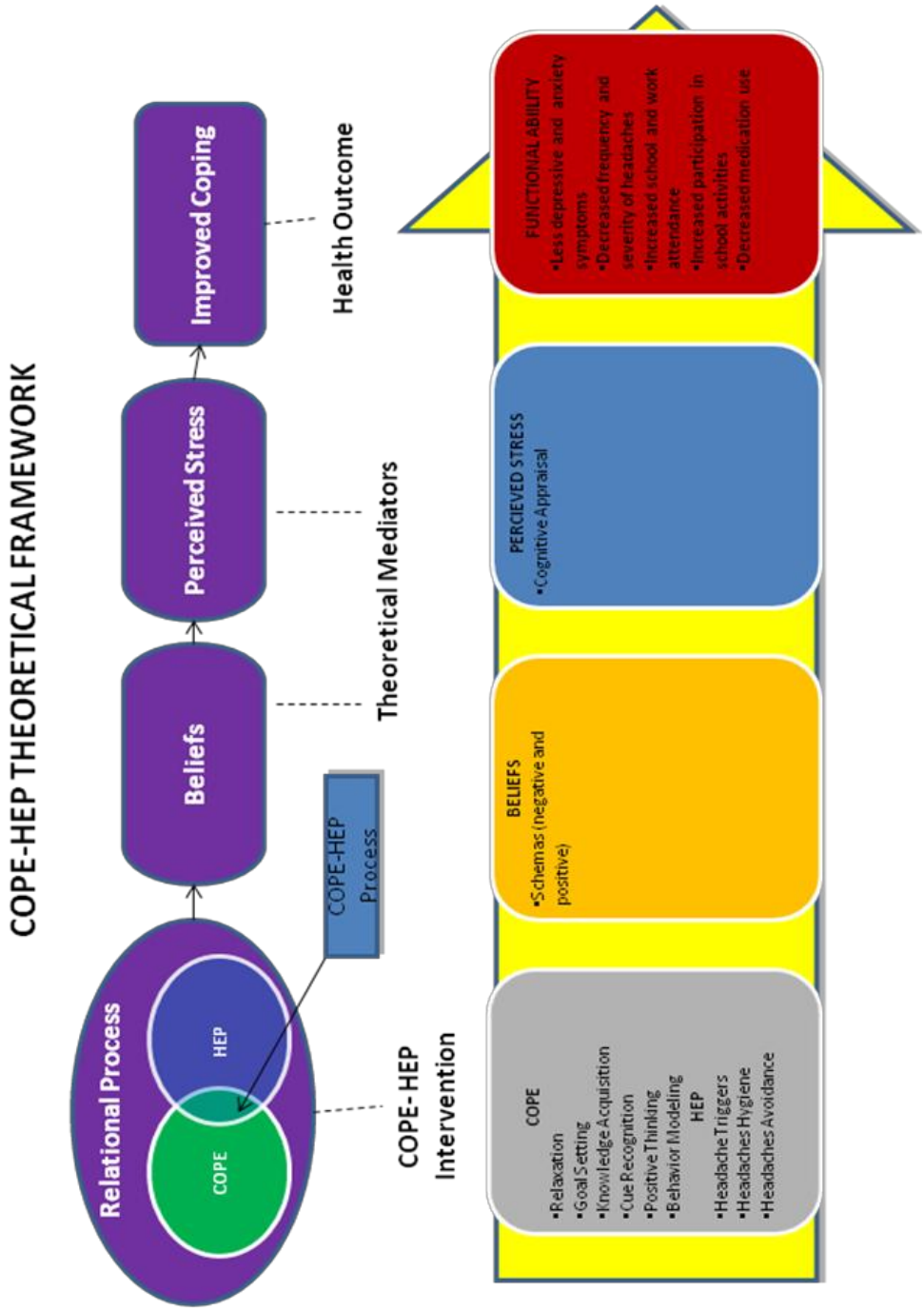


Figure 1. COPE-HEP theoretical framework.

influenced by their cognitive appraisal of their emotions and their lifestyle beliefs and behaviors. A CBSB intervention was proposed to help adolescents recognize that they have control of headache triggers that may predispose, precipitate, or perpetuate their headaches, thereby empowering the teens to take control of their headaches by engaging them in healthy lifestyle behaviors.

Operationalization of the Theoretical Framework

Operationalization of the Psychological Theory of Stress and Coping and Cognitive Theory posit that providing teens with education and strategies on how to manage their everyday life stressors will increase their ability to use problem-focused behaviors and empower them with the perception that they can better manage and control their headaches. Outcomes specific to the Psychological Theory of Stress and Coping include (a) fewer anxiety and depressive symptoms, (b) decreased frequency and severity of headaches, (c) increased school and work attendance and participation, and (d) decreased medication usage. Operationalization of Cognitive Theory posits that changing a teen's belief will change their perception of the ability to manage their headaches. An outcome of Cognitive Theory is change in beliefs about perceived ability to manage headaches, resulting in fewer depressive and anxiety symptoms and increased school attendance and participation in sports and other activities.

Critical Inputs

The objective of the CBSB intervention was to help adolescents identify and change their negative and unrealistic thoughts about their headaches and emotions, which should result in a change in their perception about their ability to handle and manage their headaches. It was hypothesized that the adolescents' beliefs about their headaches would change based on the following intervention components: (a) recognition of how thoughts and feelings and behavior contribute to headaches and ways of thinking; (b) recognition of signs of stress, depression, anxiety, and ineffective coping; (c) an understanding of factors that affect self-esteem and signs of poor and healthy self-esteem; (d) an understanding of the steps to effective problem solving; (e) an understanding of how to deal with emotions in a healthy way, the importance of effective communication, and how to effectively express feelings; and (f) an understanding of how to deal with stressful everyday encounters (e.g., conflict, social demands, peer and outside pressure). The CBSB activities were manualized to insure that they can be reproduced in clinical practice and replicated in other clinical settings.

To promote understanding of how thinking impacts feelings and behavior, the CBSB activity engaged the teens to talk about the meaning of their headaches and how the headache impacts their thinking and behavior. The CBSB intervention promoted self-esteem and healthy emotions through use of positive self-talk. For example, the adolescents in the COPE-HEP group were required to

repeat two positive self-statements to themselves 10 times every morning and every night. Based on expert opinion, positive self-talk is an effective strategy for building self-esteem (Johnson, 2009). The adolescents were also required to repeat verbally healthy headache hygiene measures twice a week. Daily repetition of healthy headache lifestyle measures may increase positive lifestyle behaviors, which may lead to less headache disability.

Understanding of problem solving was enhanced through case examples of effective problem solving using a four-step problem solving process (i.e., identify the problem, identify causes of the problem, identify specific solutions with their pros and cons, and identify the best solution and take action). The teens were asked to identify barriers to obtaining their headache goals and were offered help in problem solving and resolution of the perceived barrier(s).

Mental imagery and emotional regulation (self-control) were emphasized to address stressful encounters. The teens were coached through a mental imagery exercise. The teens were encouraged to practice mental imagery (i.e., imagining oneself relaxing in a calming or peaceful place) every night before going to bed. The teens were given a homework assignment that required them to think about and respond to their own stressful situations (e.g., When you are feeling overwhelmed by your headache, you-----", etc.). In addition, role-play was utilized to foster recognition of stress, depressive and anxiety symptoms, and ineffective coping behaviors.

Mediating Processes

Beliefs/perceived stress. Using these theoretical frameworks, the proposed mediators were adolescents' beliefs and perceived stress. Mediators provide researchers with greater understanding of the process through which interventions work (Melnyk & Fineout-Overholt, 2005) and specify a cause-effect sequence between an intervention and outcome (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003). It has been suggested that an adolescent's beliefs impact their ability to positively respond to their headaches and influences their ability to function (Gladstein & Holden, 1996; Hartmaier, DeMuro-Mercon, Linder, Winner, & Santanello, 2001; Jensen & Rothner, 1995). Adolescent antecedent beliefs were amenable to change through the CBSB COPE/HEP intervention. It was anticipated that cognitive reappraisal in teens would emerge from a cognitive transformation in which the teen change their beliefs about CDHs and recognize their ability to effectively manage them, thereby improving their overall headache outcomes. Furthermore, it was anticipated that problem-focused and adaptive emotion-focused coping behaviors would emerge from the teen's reframing of perceived stressful encounters as challenging, controllable, and manageable. Therefore, it was hypothesized that providing objective information about headaches (healthy headache behaviors, triggers), appropriate medication use, effects of negative thinking on pain, mind/body connection, and combining it with a problem-solving cognitive skills building intervention would

strengthen the adolescent's perception about their ability to manage the headaches.

Expected Outcomes

The seven-session COPE/HEP CBSB intervention described the nature and dose of the intervention needed to obtain the desired outcomes, which were (a) fewer depressive and anxiety symptoms, (b) decreased frequency and severity of headaches, (c) increased school and work attendance, (d) increased participation in social activities, (e) increased overall functioning, (f) decreased medication overuse, and (g) decreased stress response.

Extraneous Factors

In headache interventions based on Cognitive Theory, a factor that might impact how the teen receives the intervention is prior experiences with CDHs. Studies also have shown an association between CDHs and anxiety and depressive symptoms in teens (Tenhunen & Elander, 2005; Wang et al., 2007a). High anxiety and depressive symptoms may influence receipt of the intervention and incorporation and practice of techniques in this population of teens. In addition, the teen's level of attendance and participation in the intervention may limit receipt of the information. Receipt of the intervention is sensitive to the teens' participation in all sessions. Random assignment to the groups helped with controlling extraneous variables (Melnyk & Fineout-Overholt, 2010).

Significance of Research to Policy and Clinical Practice

This study has the potential to drive political initiatives for improving adolescent health and mental health conditions by demonstrating some of the positive health outcomes of using a combined CBSB headache education program in adolescents with CDHs. With suicide being the third cause of death among adolescents in the U.S. (Rosenbaum & Covino, 2005) and seven times more likely in adolescents with CDHs (Cassell, 2007), adequate health insurance coverage for teens to include reimbursement for mental health conditions should be a heightened priority for policy makers. McLaughlin and McLaughlin (2008) postulated that the first step of initiating policy change is identification of the problem. This theory-based study demonstrates an effective non-pharmacological approach to CDHs in adolescents with psychiatric comorbid conditions. Further developing this program would be an advantage to healthcare providers because it would give them tools for reducing other health risks that may be amenable to change through cognitive behavioral interventions and headache education.

Chapter 2

BACKGROUND LITERATURE

This chapter provides an overview of existing intervention literature regarding (a) adolescents with chronic/recurrent headaches, (b) the strengths and limitations of current research in this area, and (c) gaps in current research.

Presentation and Critical Appraisal of Prior Evidence

Over the past decade, there has been extensive research examining prevalence and risk factors among adolescents with CDHs. However, there have been limited studies evaluating psychological interventions designed to promote cognitive and behavioral management of CDHs in adolescents. Understanding the state of the science is critical to determining the gaps in the literature and identifying areas of focus for building nursing science (Sidani & Braden, 1998) and impacting policy change. A systematic literature search was conducted using the terms psychological, behavioral, chronic, recurrent, chronic daily, adolescents, cognitive behavioral, teens, in CINAHL, Medline, PsyInfo, Pub Med, Cochrane Databases from January 1, 1990 to present. The search date was set at this range because the International Headache Society (IHS) described CDHs as a diagnosis in 1988. The search was limited to the English language. Studies were excluded if there were no descriptions of the headache as either chronic daily, chronic, or recurrent. A total of 10 studies were retrieved (Eccleston, Palermo, Williams, Lewandowski, & Morley, 2009; Fichtel & Larsson, 2004; Kröner-Herwig &

Denecke, 2002; Larsson, Carlsson, Fichtel, & Melin, 2005; McGrath & Holahan, 2003; Palermo, Eccleston, Lewandowski, Williams, & Morley, 2010; Palermo, Wilson, Peters, Lewandowski, & Somhegyi, 2009; Trautmann & Kröner-Herwig, 2010; Trautmann, Lackschewitz, & Kröner-Herwig, 2006; Zeltzer et al., 2002). Five randomized controlled trials were obtained: one quasi-experimental and four meta-analyses. The studies focused on the physiological treatment for adolescents and children with chronic daily, chronic, or recurrent headaches.

Sample

Children and adolescent participants' sample sizes ranged from 33 (Zeltzer et al., 2002) to 1,431 (Eccleston et al., 2009). The attrition ranged from 9.7% (Zeltzer et al., 2002) to 40% (Larsson et al., 2005). Two of the studies provided explanation of the attrition (e.g., lack of motivation, complete pain reduction, decrease severity of pain, hospitalization) (Larsson et al., 2005; Zeltzer et al., 2002). Chronic or recurrent headaches were one of the diagnoses for recruitment in all of the studies. Five of the studies examined chronic pain, with headaches representing the majority of the sample (Eccleston et al., 2009; McGrath & Holahan, 2003; Palermo et al., 2009, 2010; Zeltzer et al., 2002). The range of headache representation in these five studies was 46% (Zeltzer et al., 2002) to 74% (Eccleston et al., 2009). Five of the studies were exclusive to recurrent headaches (Fichtel & Larsson, 2004; Kröner-Herwig & Denecke, 2002; Larsson et al., 2005; Trautmann et al., 2006; Trautmann & Kröner-Herwig, 2010).

The definition of chronic or recurrent headaches varied across all studies, with none of the studies using the terminology *chronic daily headaches*. In the two meta-analyses, the definition ranged from ≥ 1 episode per week to ≥ 3 episodes per month. Seven studies did not provide a definition for chronic or recurrent headache. One of the studies did not describe gender of the participants (Eccleston et al., 2009). Of the studies describing gender, females represented 47% (Kröner-Herwig & Denecke, 2002) to 96% (Fichtel & Larsson, 2004) of the participants. Seven of the studies did not describe ethnicity of the participants (Eccleston et al., 2009; Fichtel & Larsson, 2004; Kröner-Herwig & Denecke, 2002; Larsson et al., 2005; Palermo et al., 2010; Trautmann et al., 2006; Trautmann & Kröner-Herwig, 2010). Caucasians represented up to 89% of the subjects in those studies that did report ethnicity (Palermo et al., 2009; Zeltzer et al., 2002). Only two studies investigated adolescents exclusively (Fichtel & Larsson, 2004; Larsson et al., 2005). The remaining studies included both children and adolescents. All studies had inclusion criteria that described headaches as chronic or recurrent. Three studies excluded subjects with comorbid conditions or psychological disorders (Kröner-Herwig & Denecke, 2002; Larsson et al., 2005; Palermo et al., 2009).

Setting

The studies took place in a variety of settings. Two studies occurred in school settings (Fichtel & Larsson, 2004; Larsson et al., 2005). Five studies were

conducted in clinic settings to include hospital-based clinics and community clinics (Kröner-Herwig & Denecke, 2002; Palermo et al., 2009; Trautmann et al., 2006; Trautmann & Kröner-Herwig, 2010; Zeltzer et al., 2002). Two of the meta-analyses included studies that occurred in a combination of settings to include school, clinics, and tertiary care settings (Eccleston et al., 2009; Palermo et al., 2010). One study did not describe the setting (McGrath & Holahan, 2003). Only two studies were conducted exclusively in the U.S. (Palermo et al., 2010; Zeltzer et al., 2002). Two of the studies occurred in Sweden (Fichtel & Larsson, 2004; Larsson et al., 2005) and two occurred in Germany (Kröner-Herwig & Denecke, 2002; Trautmann & Kröner-Herwig, 2010). Two of the meta-analyses included studies from a combination of geographic regions (e.g., Germany, Canada, U.S., Sweden, Netherlands, and Australia). Two of the meta-analyses did not describe the settings of the studies (Eccleston et al., 2009; McGrath & Holahan, 2003).

Recruitment and Retention

Four studies specified recruitment strategies (Eccleston et al., 2009; Fichtel & Larsson, et al., 2005; Kröner-Herwig & Denecke, 2002; Larsson et al., 2005; Palermo et al., 2009; Trautmann & Kröner-Herwig, 2010; Zeltzer et al., 2002); however, no studies specified strategies for retention of subjects. Recruitment strategies varied and included direct advertisements, hospitals, and schools (Eccleston et al., 2009), letters to school nurses and parents (Fichtel & Larsson, 2004), local newspaper advertisements (Kröner-Herwig & Denecke,

2002), information distributed directly to students (Larsson et al., 2005), new patients to multidisciplinary pediatric clinics (Palermo et al., 2009), newspaper and website advertisements (Trautmann & Kröner-Herwig, 2010), and handouts in clinic (Zeltzer et al., 2002).

Intervention Duration

Interventions were delivered at various frequencies and durations. Timing of the intervention sessions was from 15 minutes (Larsson et al., 2005) to 90 minutes (Kröner-Herwig & Denecke, 2002; Palermo et al., 2010). The number of sessions ranged from one to 12 in one of the meta-analysis (Palermo et al., 2010). The majority of the sessions ranged from six to eight weeks, with weekly to biweekly contact. Six studies had post-treatment follow-ups ranging from three months to 12 months, with improvement maintained at the longer duration follow-ups. The rationale for the time points chosen for follow-up assessments by the researchers were not clearly defined.

Treatment Fidelity

The internal validity of a study is dependent upon its fidelity (Stein, Sargent, & Rafaels, 2007). Fidelity of interventions can be assessed by examining intervention design and implementation, interventionists' training, participants' receipt of the intervention, and participants' enactment of the intervention (Bellg et al., 2004; Stein et al., 2007; Whitmer, Sweeney, Slivjak, Sumner, & Barsevick, 2005). A breech in any of these areas negatively impacts

intervention fidelity (Brandt, Davis Kirsch, Marcus Lewis, & Casey, 2004). In this literature review, only four of the studies address implementation fidelity (Fichtel & Larsson, 2004; Larsson et al., 2005; Palermo et al., 2009; Trautmann & Kröner-Herwig, 2010). Only one of the studies used audio taped intervention sessions (Fichtel & Larsson, 2004). In three studies, interventions were delivered using a standardized or manualized approach (Larsson et al., 2005; Palermo et al., 2009; Trautmann & Kröner-Herwig, 2010), which increases the reproducibility of the interventions (Melnyk & Fineout-Overholt, 2010; Stein et al., 2007; Whitmer et al., 2005). Six studies did not address how the intervention was delivered (Eccleston et al., 2009; Kröner-Herwig & Denecke, 2002; McGrath & Holahan, 2003; Palermo et al., 2010; Trautmann et al., 2006; Zeltzer et al., 2002).

Theoretical Perspectives

Theoretical frameworks provide an explanation of how an intervention influences a study's outcomes, and lends to a broader understanding of the interventions that work, for who the interventions worked, and the conditions under which the intervention work, thereby strengthening the cause-effect inferences (Sidani & Braden, 1998). The cause and effect between intervention and outcomes are better understood through mediating variables (Keller, 2008). None of the included studies examined mediating processes. Only one study was designed from a theoretical basis (Palermo et al., 2010). Palermo and colleagues (2010) utilized Social Learning and Cognitive theories. The critical inputs for the

children and teens in this study included (a) education about chronic pain, (b) recognizing stress and negative emotions, (c) deep breathing and relaxation, (d) distraction, (e) cognitive skills, (f) sleep hygiene and lifestyle, (g) staying active, and (h) relapse prevention. The critical inputs in this study were consistent with the theoretical frameworks used to guide the intervention.

Intervention Components

The interventions in the 10 studies included two studies with monotherapy and eight with a combination of multi-component therapies as outlined in Table 1.

Outcome Variables

A variety of outcome variables were evaluated. All studies measured levels of pain. Headache frequency and intensity were measured by self-report measures in four studies (Kröner-Herwig & Denecke, 2002; Larsson et al., 2005; Trautmann et al., 2006; Trautmann & Kröner-Herwig, 2010). Functional ability was measured in three studies (Fichtel & Larsson, 2004; Palermo et al., 2009, 2010). Depressive symptoms were measured in two studies (Palermo et al., 2009; Zeltzer et al., 2002). Zeltzer and colleagues (2002) also measured state trait anxiety. Nine studies used a pre- and post-test design (Eccleston et al., 2009; Fichtel & Larsson, 2004; Kröner-Herwig & Denecke, 2002; Larsson et al., 2005; Palermo et al., 2009, 2010; Trautmann et al., 2006; Trautmann & Kröner-Herwig, 2010; Zeltzer et al., 2002). Six studies described post-treatment follow-ups to

Table 1

Intervention Components

	CBT	Relax-ation	Bio-feedback	Operant Condi-tion	Hyp-nosis	Acu-puncture	Coping Skills	Hypno-therapy
Eccleston et al., 2009	√	√	√		√		√	
Fichtel & Larsson, 2004		√						
Kröner-Herwig & Denecke, 2002	√							
Larsson et al., 2005		√						
McGrath & Holahan, 2003	√	√	√	√				
Palermo et al., 2009	√							
Palermo et al., 2010	√	√	√					√
Trautmann et al., 2006	√	√	√					
Trautmann & Kröner-Herwig, 2010	√	√						
Zeltzer et al., 2002					√	√		

include three months (Palermo et al., 2009, 2010), six months (Fichtel & Larsson, 2004; Kröner-Herwig & Denecke, 2002; Trautmann & Kröner-Herwig, 2010), six to 10 months (Larsson et al., 2005), and six to 12 months (Trautmann et al., 2006). Treatment gains were consistent for up to 12 months in one of the studies (Trautmann et al., 2006).

Major Findings

Across studies, there was report of improvement in headache status (e.g., frequency, severity, disability) after implementation of the interventions regardless of intervention type. As a single intervention component, CBT techniques demonstrated marked improvement in children and adolescents with recurrent headaches (Kröner-Herwig & Denecke, 2002). Several other studies reported improvement in headache intensity and frequency with CBT (Eccleston et al., 2009; Palermo et al., 2009, 2010; Trautmann et al., 2006). The mainstay of the interventions used with chronic or recurrent headaches in these studies included CBT, biofeedback, and relaxation training. Three studies demonstrated positive changes in physical functioning after psychological treatment. In one of the studies examining depression, the researchers did not find significant group differences in participants' depressive symptoms post-treatment (Palermo et al., 2009). Participants' anticipated anxiety declined significantly across treatment sessions in one of the studies (Zeltzer et al., 2002). Zeltzer and colleagues (2002) demonstrated feasibility and acceptability of hypnosis and acupuncture in treating

chronic pain, although the study lacked a control group, which is a design factor necessary ensure that the findings are related to the treatment measures rather than extraneous influences (Kazdin, 2005; Kline, 2009; Melnyk & Fineout-Overholt, 2010; Wang & Bakhai, 2006).

Discussion

Strengths. Several strengths were found across the studies in this review. Most of the interventions were implemented over a period of weeks, which allowed ample time for the participants to learn the skills. The researchers in five of the studies used RCT design, which strengthens internal validity of the studies (Melnyk & Fineout-Overholt, 2010). The majority of the studies included a wait-list control or an active control condition to adequately test the effects of the psychological interventions. Advanced methods (e.g. ANOVA, Regression, etc.) of data analysis were used in most of the studies. The one study that used both a theoretical framework and a manualized intervention showed positive results in the reduction of pain and improvement of functioning in participants.

Limitations. Despite these strengths, there were several limitations to the studies. First and foremost, none of the studies used the accepted criteria for CDHs ($\geq$ 15 headache days per month, $\geq$ 3 consecutive months). Six of the studies focused on interventions in adolescents and children with recurrent headaches, two on chronic headache, and two on chronic pain, including headache. Although the majority of the interventions focused on adolescents and

children with chronic or recurrent headache, there was no consistency in the definitions of these terms. One study defined chronic or recurrent headache as one occurrence of pain per week. The correct headache diagnosis is necessary for effective headache treatment (Gladstein & Mack, 2005; Harpole et al., 2003). Three of the studies excluded subjects with mild depressive and anxiety symptoms, which is a limitation because of the comorbid association of these conditions with headaches. Several of the studies were limited by their small sample size, which limits external validity (Kazdin, 2005; Kline, 2009; Melnyk & Fineout-Overholt, 2010; Wang & Bakhai, 2006).

Another limitation found in the synthesis of these studies is that nine of the studies did not describe a theoretical framework, which is necessary to explain how the interventions worked to improve headaches (Keller, Fleury, Sidani, & Ainsworth, 2009; Sidani & Braden, 1998). According to Sidani and Braden (1998), theoretical frameworks are interrelated assumptions that explain the problem being studied and guide the selection of the outcome variables and the development of the intervention. Measures of intervention fidelity were not consistently described in these studies, thereby weakening internal validity of the studies. In addition, many of the interventions required a therapist specialized in CBT, biofeedback, and relaxation techniques, which may not be feasible in the majority of healthcare settings because of the costs and limited availability of mental health providers.

Outcome variables varied across studies. Headache pain was consistently measured mostly through self-report, which limits internal reliability. The majority of the studies did not measure anxiety and depressive symptoms, which frequently are comorbid psychiatric conditions with CDHs. Interestingly, several of the studies excluded children and adolescents with somatic or psychiatric conditions. The lack of control groups in several of the studies makes it difficult to rely on the findings because of concerns regarding the influence of extraneous variables. Furthermore, eight of the studies combined findings from both children and adolescents, which cause difficulty extrapolating findings that are specific to each group, respectively, especially with small sample sizes. With adolescents having different developmental needs than younger children, studies examining adolescent health issues are necessary for a clearer understanding of the interventions that are effective and acceptable to this population. An additional limitation is that six of the studies did not address implementation fidelity, which limits internal validity of the studies. Although there were several limitations in these interventions studies, the studies added to the science in this field through documentation of reduction in headache disability and improvement in headache outcomes in all studies.

Implications for Clinical Practice and Future Research

This literature review clearly demonstrates that there is no evidence supporting psychological interventions in adolescents with CDHs based on the

Silberstein and colleagues' (1996) criteria (≥ 15 headache days per month, ≥ 3 consecutive months). This body of evidence revealed that there are efficacious interventions for treating non-chronic type headaches. Findings indicated that psychological interventions did improve headache outcome in patients with recurrent or chronic headache as defined by these researchers. These psychological interventions included coping skills training problem solving, biofeedback, relaxation, communication strategies, and education about headaches. Clinicians who work with adolescents with headaches are in ideal positions to assess for CDHs and provide information to patients and families about non-pharmacological strategies for managing pain to include stress reduction and coping activities. Adaptive coping strategies may help reduce stress, which can precipitate and perpetuate headaches. Recognizing when non-pharmacological interventions may be helpful can be empowering to the teens. Clinicians should consistently incorporate these strategies with children and adolescents with headache types described as chronic or recurrent.

Early management of headaches lessens the onset of more chronic type headaches and associative comorbid conditions such as depressive and anxiety symptoms (Galli et al., 2004). Healthcare providers should review headache prevention and treatment with adolescents and their families to ensure developmentally appropriate functioning and to identify opportunities for education and behavior modification interventions. In addition, there is

implication for monitoring comorbidities such as depression, stress, anxiety, and suicide, making appropriate referrals to trained mental health specialists based on patient assessment.

In spite of these findings, questions about the effects of psychological interventions in adolescents with CDHs are still unanswered. The majority of studies evaluated that focused on interventions for chronic or recurrent headache were conducted using relatively small sample sizes. Further intervention studies should include full-scale randomized clinical trials that measure CDHs in adolescents. There also is a need to measure mediating variables so that the explanations of mechanisms through which the interventions work can be determined. Although timing of the interventions was clearly described, further studies should focus on how length and dose of the intervention are needed to produce a clinically significant change. Treatment effects at various doses of the intervention need to be better understood. The study participants in the studies that identified ethnic mix were mostly Caucasians; therefore, future research to examine ethnic and cultural differences in attitude and receipt of psychological interventions are also needed.

Findings from this evidence review support the urgent need for larger theory-based randomized controlled trials with comparison groups for adolescents with CDHs in order to improve their outcomes and functional status.

Extending the Science

The increasing prevalence and comorbid psychiatric conditions associated with CDHs and the continuing challenge of treating this subgroup of headaches in adolescents create an urgent need for efficacious treatment options that can be used by healthcare providers in a variety of settings. Prior studies have demonstrated positive outcomes for children and adolescents mostly with recurrent or chronic ($\geq$ 3 headaches months) headaches. This study may fill a much-needed gap in theory-based intervention research in adolescents with CDHs and mildly to moderately elevated depressive symptoms by examining the acceptability, feasibility, and preliminary effects of a CBSB intervention using a randomized controlled design. Findings of preliminary effects of this theory-based intervention build on the strength of prior studies guided by cognitive and stress and coping theories. This study addresses some of the limitations of prior studies by (a) utilizing a theory-based framework that provides explanation as to how the intervention works; (b) utilizing a randomized controlled design; and (c) identifying CDHs as defined by criteria, which ensures that the findings will be the result of manipulation of study variables rather than from extraneous factors. Randomized controlled designs are the second strongest design for influencing practice changes (Melnyk & Fineout-Overholt, 2010). Furthermore, this study may add to the body of knowledge regarding the prevalence of depressive symptoms in a population of teens who are at increased risk for

comorbid psychiatric conditions (Wang et al., 2007a). Future research must focus on the dose effect of the treatment and the long-term efficacy of the gain.

Chapter 3

METHODOLOGY

This chapter provides an overview of the research design and analytical methods that were conducted to evaluate the acceptability, feasibility, and preliminary effects of a COPE-HEP intervention in adolescents with CDHs. The primary aim of this study was to examine the acceptability and feasibility of a theory-based COPE-HEP intervention in adolescents with CDHs. A second aim was to determine the preliminary effects of a theory-based COPE-HEP intervention in adolescents with CDHs on examining anxiety and depressive symptoms, beliefs, perceived stress, headache disability (*Pediatric Migraine Disability Assessment* [PedMIDAS]), headache frequency, headache pain level, headache duration, medication frequency, and parent perception of pain interference. A final aim was to determine the relationship among study variables in teens with CDHs.

Internal validity in this study was enhanced through use of an experimental design, which increased the likelihood that the changes found in the outcomes are a result of the independent variable and not extraneous factors (Kazdin, 2005; Melnyk & Fineout-Overholt, 2010).

Study Design

A randomized controlled trial pilot study with repeated measures was used. Randomized controlled designs are the most definitive way of

demonstrating intervention effectiveness (Kazdin, 2005). The COPE-HEP intervention group received three 30-minute in-clinic sessions and four 20-minute telephone sessions for a total of seven sessions (see Table 2), while the comparison headache education group received weekly information that focused on basic headache information for adolescents with CDH (see Table 3) utilizing the same number, type, and length of sessions as the treatment group.

Table 2

Timeline of Intervention (COPE/HEP) and Data Collection

Week 1 Time 1 (T1) (Baseline)	Week 2 Time 2 (T2)	Week 3 Time 3 (T3)	Week 4 Time 4 (T4)	Week 5 Time 5 (T5)	Week 6 Time (T6)	Week 7 Time 7 (T7)
On-site Parent-Teen session	Tele-phone contact with teen	On-site Parent-Teen session	Tele-phone contact with teen	Tele-phone contact with teen	Tele-phone contact with teen	On-site Parent-Teen session
Informed Consent Baseline Data Collection 1st COPE/ HEP Inter-vention Session	COPE/ HEP Inter-vention: 2nd Inter-vention Session	COPE/ HEP Inter-vention: 3rd Inter-vention Session Manipu-lation Check	COPE/ HEP Inter-vention: 4th Inter-vention Session	COPE/ HEP Inter-vention: 5th Inter-vention Session Manipu-lation Check	COPE/ HEP 6th Inter-vention Session	COPE/ HEP 7th Inter-vention Session Data Collec-tion
30 minutes	20 minutes	30 minutes	20 minutes	20 minutes	20 minutes	30 minutes

Table 3

Comparison Headache Education Group Weekly Education Content

Week	Focus of Education	Content
1	Lifestyle Triggers of Headaches	Disturbed sleep patterns Fatigue Irregular eating habits Smoking Sudden or intense exertion (sports)
2	Environment Triggers of Headaches	Light (bright sunlight, flashbulbs, fluorescent) Complex visual patterns Odors (perfumes, cigarette smoke) Barometric pressure changes Traveling
3	Medication Triggers of Headaches	Birth control pills Certain diuretics Estrogen replacement therapy Certain anti-asthma medication
4	Hormonal Triggers of Headaches	Menstruation Ovulation Puberty/Menopause
5	Dietary Triggers of Headaches	Alcoholic beverages (beer, red wine) Aged Cheeses Chocolate Excessive Caffeine Food additives (MSG, aspartame)
6	Headache Hygiene Tips	Get regular sleep Eat regular meals Get moderate amounts of routine exercise Drink plenty of water Limit caffeine, alcohol, and other drugs
7	Hydration	Daily water requirements Adverse effects of dehydration

This length of the COPE intervention is consistent with self-reports of decreased anxiety and depressive symptoms in adolescents attending an outpatient community-based mental health facility (Lusk & Melnyk, 2011). In an intervention focusing on headache among teens, Kröner-Herwig & Denecke (2002) demonstrated headache efficacy utilizing seven intervention sessions. Furthermore, Howard, Kopta, Krause, and Orlinsky (1986) determined that six to eight nursing interventions sessions were effective for a establishing a psychotherapy response, although the researchers failed to disclose the focus of the psychotherapy.

Study Contacts

Each group received parallel in-clinic face-to-face visits (Sessions 1, 3, 7) and parallel telephone contact sessions (Sessions 2, 4, 5, 6). All sessions were scheduled weekly at a mutually agreed upon time. The principal investigator (PI) called or texted participants to remind them of their in-clinic and phone appointments. A trained clinic nurse met with the teen and parent at clinic visits one and seven to administer the data collection measures.

Sample

The convenience sample was drawn from adolescents utilizing a pediatric neurology specialty care clinic for care of their headaches. A total of 49 adolescents between ages of 13 and 17 years who utilized the neurology specialty care clinic for assessment and treatment of their headaches were screened over a

period of six months, from September 26, 2011 to March 30, 2012. Of these, a total of 36 met inclusion criteria. Criteria for inclusion included (a) history of headache 15 or more days a month for three or more consecutive months; (b) teens between the ages of 13 and 17 years, inclusive; (c) availability of a custodial guardian or parent who could accompany teen to office visits; (d) parents and teens who spoke and comprehended English; (e) assent by teen; (f) enrollment in high school; and (g) the presence of mild to moderately elevated depressive symptoms. English comprehension and fluency was required because the PI is not bilingual and because the majority of the measures are available in English only. Participants were screened for depression using the Beck Youth Depression Inventory. Only the participants who showed mild to moderately elevated depressive symptoms, with scores ranging from 55 to 69, were enrolled in the study. Participants with less than mild to moderately elevated depressive symptoms were excused from the study regardless of meeting all other study criteria. Other reasons for not meeting inclusion criteria were (a) the presence of a pre-existing mental health disorder, mostly ADHD; (b) inability of parents to comprehend or speak English; and (c) teens not in high school. Six teens were excused from the study because of not having mild to moderately depressive symptoms. Four teens were lost to attrition, thereby leaving 32 teens, 16 in the intervention group and 16 in the comparison headache education group. This sample size is adequate for a pilot study for determining effect sizes in order to

estimate sample size for a future full-scale randomized control study. The means of the treatment and control groups were subtracted and the difference was divided by the pooled standard deviation (Cohen, Cohen, West, & Aiken, 2003) to determine effect sizes. The initial proposal was to recruit 70 adolescents to allow for a 20% attrition rate. Attrition for this study was approximately 11%.

Participants were randomly assigned to the COPE-HEP group or the comparison headache education group immediately after the parent gave informed consent and the teen gave assent. Random assignment ensured equal probability of the participants appearing in either of the groups, thus eliminating threats to internal validity (Kazdin, 2005; Wang & Bakhai, 2006). Equal group sizes are better for power of statistical tests and for conducting several statistical analyses (Kazdin, 2005), although power is not a concern in feasibility studies (Wang & Bakhai, 2006).

Setting

Adolescents and parents/legal guardians for this pilot study were accessed through the Neurology Division of a Level 1 pediatric trauma and major medical and teaching institution in central Phoenix, AZ. This setting was appropriate because a large portion of teens with refractory or CDHs are referred to headache clinics and specialty care centers for headache management (Magnusson, Riess, & Becker, 2004). Annually, there are approximately 740 adolescent clinic visits at this facility for headaches diagnosed as CDHs or one of its subtypes. The

neurology division provides comprehensive specialty care for pediatric patients from birth to 21 years of age with disorders involving the nervous system.

The participants were introduced to the intervention in the clinic setting by the PI. Subsequently, the intervention took place in the both the clinic and via telephone sessions. In the clinic setting, participants and their parents were provided a quiet, private examination room during the intervention. The teens chose the location of their telephone sessions. Subject burden was reduced by a combination of in-clinic and telephone sessions (Kline, 2009). A feasibility assessment of a telephone-administered behavioral intervention for teens with non-chronic headaches demonstrated positive evaluations by the teens (Cottrell, Drew, Gibson, Holroyd, & O'Donnell, 2007).

Heights, weights, head circumferences, and vital signs (pulse, respiration, blood pressure) were measured by medical assistants upon check-in as these measures are routinely obtained at all clinic visits. Heights were obtained using a Scale Tronix. Weights were obtained using a Seca Scale. Blood pressures were obtained using a Dinemap. The anthropometric measurements were obtained consistently between the adolescents at each visit, using the respective equipment devices. Free parking was provided. A bus schedule was provided to participants without a motor vehicle.

Recruitment and Retention

The PI presented the study to the neurologist and office staff at a monthly staff meeting. Primary care physicians (PCPs) in the surrounding communities were mailed a flyer informing them of the study. The PCPs referred teens suspected of having CDHs to the neurologist for confirmation of diagnosis. Neurologists, PCPs, nurses, and medical assistants recruited participants for the study. Parents and teens were told about the research study by the recruiters. In addition, they were given a flyer that explained the study's background, purpose, specific aims, inclusion and exclusion criteria, procedures, and time commitment. The parents and teens were told that there was no cost to participating in the study, refusal to participate would not impact their teens' care, and that they had the right to withdraw from the study at any time without having their child's care impacted. Interested participants were asked to provide their contact information for eligibility screening. Parents' questions about the study, its informed consent/assent procedures, and HIPPA guidelines were answered by the PI. Informed consent was obtained from parents who were willing and eligible to participate. In addition, assent was obtained from the teens who were eligible to participate.

The PI utilized multiple retention strategies in order to maintain the teens' interest in the study. In addition to personal contact with the teens in the office setting, the PI utilized text messaging and telephone as modes of communication.

Text messaging is an adequate and preferred method of communicating with adolescents in this digital era (Strom & Strom, 2009). To facilitate continued interest and participation in the study, the number of sessions, type of sessions (telephone or clinic), and time commitment of the study were clearly outlined and communicated at the onset of the study. At the completion of each intervention session, the remaining anticipated time commitment was communicated with each participant, respectively. Additional recruitment activities included weekly text messages and phone calls one to two days prior to the schedule session reminding participants of the date and time of their next session. If a teen missed a session, they were sent a text message asking to reschedule. Participants were rewarded with either a $10 gift certificate from a department store or food outlet upon completion of Session 5. Adolescents from both the COPE/HEP and comparison headache education groups completing all seven sessions were entered into a drawing for an iPod. In order to minimize comparison headache education group dropout, additional incentives ($10 gift certificates) were offered to this group at Session 3 and at Session 7. Incentives were offered as a measure of appreciation with a secondary effect of maximizing participation and minimizing attrition during the course of the study (Rice & Broome, 2004).

Procedure

A manualized protocol for the intervention was developed to standardize the procedure for the delivery of the intervention. The intervention manual and

the study protocol were reviewed by the Institutional Review Boards of Phoenix Children's Hospital and Arizona State University. The study began after approval from both review boards. The manualized protocol facilitated the maintenance of consistency of the intervention (Whitmer et al., 2005). The interventionist followed strict adherence to the COPE-HEP intervention protocol. Data collection began at the initial visit (T1) upon receipt of the consent and assent forms. An assistant, who is an experienced neurology nurse, well trained in headache education, delivered the comparison headache education intervention. The PI reviewed the comparison headache education group manual with the assistant prior to start of the COPE-HEP program. In addition, the PI met with the assistant weekly to answer any questions she had about the week's session. The assistant completed the Collaborative Institutional Training Initiative (CITI) course, which outlines the conduct of research and protection of human subjects. Tables 2 and 4 outline the components of the data collection process.

The testing procedures and data collection times were consistent for both the COPE-HEP and comparison headache education groups. Participants were randomly assigned to either the COPE-HEP or comparison headache education group using a computer generated table of random numbers. All data were collected in the neurology clinic. Data collection at T1 and T7 was standardized. Data were collected by a clinic nurse trained in study purpose and data collection protocol, with no knowledge of the study's condition (experiment or comparison).

Table 4

Measures for Data Collection with Adolescents with CDH

Aim	Construct	Instrument	Data Collection	Parent or Teen	Time Involvement
	Demographics	Demographic Questionnaire	T(1) Baseline	Teen/ Parent	10 minutes
2,3	Depressive Symptoms	BYD-II	T1, T7	Teen	10 minutes
2,3	Anxiety	BAI-Y	T1, T7	Teen	10 minutes
2,3	Headache Disability	PedMIDAS	T1, T7	Teen	10 minutes
2,3	Headache Severity	Wong Baker FACES Pain Scale	T1, T7	Teen	3 minutes
2,3	Headache Frequency	Headache Diary	T1, T7	Teen	3 minutes
2,3	Beliefs of Teens with CDH	Teen Personal Beliefs Scale	T1, T7	Teen	5 minutes
2,3	Perceived Stress	Perceived Stress Scale	T1, T7	Teen	10 minutes
1	Intervention Fidelity (Process)	Task/Time/ Method report	T1-T7		
1	Adherence	Workbook	T2-T7	Teen	Vary
1	Adherence	Attendance Roster	T1-T7		
1	Receipt of Intervention – Learning	Manipulation Check	T3, T5	Teen	10 minutes
2,3	Parent Perception of Pain Disability	Parent Percep-tion of Pain Interference	T1, T7	Parent	10 minutes
1	Satisfaction with/Accepta-bility of the Intervention	Exit Interview	T7	Teen/ Parent	5 minutes

The nurse completed the required CITI course. The nurse obtained the pre- and post-measures for both groups.

Data were logged into a SPSS-19 database directly from the assessment instruments. The study information was used only for the purposes of the study, was not be shared, and will be destroyed after five years. Each teen/parent team was assigned an identification number to ensure confidentiality. A master list that linked names and identification numbers was stored separately from the data in a locked secure office and was destroyed upon completion of the study.

Intervention Protocol

COPE-HEP took place at mutually agreed upon times with the participants. Sessions 1, 3, and 7 were conducted exclusively in the clinic setting in a private room with the teen in the presence of the parent or legal guardian. Sessions 2, 4, 5, and 6 were delivered by telephone. The environment for the telephone sessions was chosen by the teens and included a variety of settings. The interventions were targeted to be delivered one week apart. The clinic sessions were designed to be 30 minutes each, while the telephone sessions were designed to be 20 minutes each. The number of sessions chosen was consistent with prior sessions that showed efficacy in teens with depressive symptoms using the COPE intervention (Lusk & Melnyk, 2011). A benefit of the combined telephone-clinic format is that it allowed the adolescents some autonomy in selecting the environment in which they received the intervention. In addition,

the telephone format limited possible diffusion of the intervention to the control group because it decreased the opportunity for subject-to-subject contact.

After completion of the baseline measures at Session 1, the PI delivered the first COPE-HEP intervention. At the first meeting, participants were given COPE-HEP manuals and were provided an overview of the COPE-HEP intervention. Participants were asked to complete the weekly homework assignments. The PI called or texted participants to remind them of their appointments and about their homework. Sessions 1 thorough 7 of the intervention program were designed to be delivered one week apart, although in this study, spacing between sessions ranged from one to six weeks. The time for completing the seven sessions ranged from seven to 14 weeks.

Intervention Condition (Independent Variable)

COPE-HEP is based on the COPE for Teens seven-session brief CBSB manualized intervention program for mildly to moderately depressed teens designed to be implemented by healthcare providers in primary care and school-based settings (Lusk & Melnyk, 2011). The COPE for Teens intervention uses concepts and behavioral skills from Cognitive Behavioral Theory, which has been supported as efficacious with adolescents, especially those with depression (Lewinsohn & Clarke, 1999). The COPE for Teens seven-session program focuses on (a) the thinking, feeling, behaving triangle; (b) how to turn negative thoughts into positive thoughts; (c) how to more effectively communicate with

others; (d) how to set goals; (e) stress management; and (f) problem-solving strategies (Lusk & Melnyk, 2011). Homework assignments, an important part of CBSB, are provided in the COPE program to accompany six of the seven sessions' modules. The seven-session CBSB COPE for Teens program was pilot tested in a community-based mental health facility and was found to reduce depressive and anxiety symptoms in middle and late adolescents (Lusk & Melnyk). The intervention was also tested as part of a 15-session COPE Healthy Lifestyle Teen program in two high school classes in the southwestern region of the United States and demonstrated a decrease in anxiety and depressive symptoms from baseline to follow-up (Melnyk et al., 2009). The COPE for Teens intervention was adapted for delivery with teens who have chronic headaches and mild to moderately elevated depressive symptoms in a specialty care setting. The adapted COPE-HEP contained educational information about headache hygiene that was specific to adolescents with chronic headaches. The information was integrated into the program at Sessions 1, 2, and 7. Because it was shown to have preliminary efficacy, the COPE-HEP program could potentially be used in other clinical settings to manage CDH. The program and activities were manualized to insure that they could be reproduced in clinical practice and replicated in other research studies.

Session 1 of COPE-HEP. Session 1 (a teen-parent in-clinic session) focused on explaining how thoughts about the headaches affect how adolescents

respond to their headaches (i.e., the thinking, feeling, behaving triangle). Headache hygiene and contextual factors that predispose perpetuate, and precipitate headaches (i.e., exposure to triggers, medication use/overuse, dietary and sleep habits, smoke exposure, etc.) were discussed as well as to how to revert negative thoughts into positive ones. The teens were given homework (i.e., workbook activities) to complete prior to the next session to assist with putting the educational information into practice.

Session 2 of COPE-HEP. Session 2 (a teen telephone session) reinforced concepts of headache hygiene and how the teens were managing the headaches. Factors that affect self-esteem and signs of poor and healthy self-esteem were addressed. Concepts were reinforced through use of case examples. Positive self-talk was used as a strategy for building self-esteem. The teens were required to create two positive self-statements and say the positive statements 10 times every morning and every night as a part of their homework assignment.

Session 3 of COPE-HEP. Session 3 (a teen-parent in-clinic session) focused on stress and coping, with special emphasis on how to identify signs of stress, depression, and anxiety. The session also addressed healthy and unhealthy coping strategies used in response to headaches. The headache diaries were reviewed. Positive coping strategies for dealing with headaches (i.e., exercise, positive self-talk, use of music and relaxation techniques) were emphasized. The homework assignment for the next week was given at the end of the session. The

teens were asked to set a short-term headache goal for the following week and perform relaxation techniques (i.e., progressive relaxation, abdominal breathing). Logs were provided for documentation and monitoring of the goal.

Session 4 of COPE-HEP. Session 4 (a telephone session with teen) addressed barriers to the teens' obtaining their headache goals. The focus was how to solve problems using the four-step problem solving process (i.e., identify the problem, identify causes of the problem, specify possible solutions with their pros and cons, and identify the best solution and take action). Case scenarios were discussed. For homework, the teens were asked to identify barriers they were encountering in reaching their headache goals and were offered help in problem solving the perceived barriers.

Session 5 of COPE-HEP. Session 5 (a telephone session with teen) focused on how to deal with emotions in healthy ways and the importance of effective communication (e.g., how to effectively express feelings, how to get and ask for help). Mental imagery and emotion regulation (self-control) were introduced as additional strategies for headache management. The teens were encouraged to practice mental imagery (i.e., imagining themselves in a relaxing calming or peaceful place) every night before going to bed. The teens were asked to write down their strongest headache triggers with a plan of how they would respond to or avoid these triggers.

Session 6 of COPE-HEP. Session 6 (a telephone session with teen) focused on how to deal with stressful everyday encounters (e.g., conflict, work and school demands, peer and outside pressure). The teens were asked to complete homework that required them to think about and respond to situations that measure personality and effective communication (e.g., when you are hurt and disagree with another person, when you are feeling overwhelmed by your headaches, etc.).

Session 7 of COPE-HEP. Session 7 (a teen-parent in-clinic session) was a review of the important concepts covered in each session of the program. The teens were given the opportunity to ask questions and receive further assistance in overcoming any struggles they were encountering in effectively managing the headaches. The teens shared their perception of the progress they had made because of the headache education and COPE-HEP program. The teens were asked to continue to practice the skills they learned throughout the program and the parents were asked to continue to encourage and support their adolescent in their efforts. There was not a homework assignment for this session.

Intervention Feasibility Measures

Attendance log. An attendance log was maintained for each participant in order to record attendance and determine at which point a participant chose not to continue in study. Documentation was made of the number of sessions each participant attended, the length of time of each sessions, and the length of time

between sessions. If a teen missed a session, the content for that session was covered at the next session. The teens were asked to complete homework assignments each week of the intervention. The homework assignment reflected what was taught in each intervention session. A review of homework assignments occurred weekly at the start of each intervention session. Frequency and quality of each teen's work was monitored. A record was maintained regarding the number of homework assignments completed by each participant and the spacing between the assignments. Adherence to the intervention was documented by attendance at each of the session and measured by the teen's completion of homework. Adherence to the intervention protocol ensured that the intervention would not drift from the established protocol (Whitmer et al., 2005).

Attrition log. An attrition log was kept of participants leaving the study and included date and reason for leaving. Attrition information is valuable because it provides the researcher with information about what was acceptable or unacceptable about the intervention, leading to modification of the intervention for future studies (Sidani & Braden, 1998). Expressed reasoning for leaving or dropping from the study included (a) sessions interfering with sports (n = 1); (b) headaches too severe to participate (n = 1); (c) unable to get back for clinic sessions because of parent's work (n = 1); and (d) loss of interest in the study (n = 1). Attrition rate was based on the total number of eligible participants who provided consent, completed the pre-test data collection measures, and dropped or

withdrew from the study prior to completing Session 7 of the intervention and T2 of the data collection. Of the 36 participants enrolled in the study, four participants dropped or withdrew from the study before completing Session 7 or T2. This attrition accounted for approximately 11% of the total participants. The attrition rate for children and adolescents with chronic or recurrent headache presented in the literature review for this study ranged from 9.7% to 40%. A log was kept of the number of participants approached about the study who refused to participate and the number who agreed to participate. Forty-nine participants were approached about the study, with seven refusing to participate in the study.

Intervention Acceptability Measures

Information about the acceptability of the COPE-HEP intervention was obtained from teen and parent exit questionnaires. The extent to which participants adhere to or remain in an intervention program depends on their level of acceptance of the intervention (Kazdin, 2005).

Teens were asked the following questions regarding their experiences with the program:

1. Was the format of the program acceptable to you? (If no, why was not acceptable?)

2. Was the intervention helpful to you? (If yes or no, how was it helpful or not helpful?)

3. What improvements to the program would you recommend?

4. How could your participation have been made easier for you?

5. Would you recommend the program to a friend with headaches? (If yes or no, describe why.)

Questions to parents about the program included:

1. Was the format of the program acceptable to you? (If no, why?)

2. Was the intervention helpful to your teen? (If yes, how was it helpful; if no, why was it not helpful?)

3. What do you think made the biggest improvement in your teen's headaches?

4. How could your participation have been made easier for you?

5. Would you recommend the program to a friend who has a teen with headaches? (If yes or no, why?)

These measures were collected at the completion of the final data collection (Session 7).

Intervention Fidelity

Delivery of the intervention. Intervention fidelity is the degree to which the delivery of the intervention adheres to the outlined protocol (Keller et al., 2009; Sidani & Braden, 1998; Stein et al., 2007). Monitoring fidelity of the intervention is essential for being able to explain the results obtained and to ensure internal validity of the study (Keller et al., 2009; Whitmer et al., 2005). To insure fidelity, the PI used a manualized notebook that detailed the training plan

for each session. The manualized notebook assured the sessions were standardized and delivered in the same order (Melnyk & Fineout-Overholt, 2010). The PI was responsible for the documentation in the fidelity log. The documentation was used to evaluate fidelity of the intervention. Documentation included (a) time spent on the task, (b) outline of materials used to support the interventions, (c) methods for delivering the intervention, and (d) tasks accomplished in each session. All sessions were audiotaped. A random sample of 30% of the sessions was listened to by the research assistant (RA) in order to assure that the protocol was being followed as designed. The gold standard for testing treatment fidelity is evaluation of audio or audiovisual tapes for prescribed interventionists' behaviors (Stein et al., 2007). The ongoing assessment of audiotaped intervention provides feedback to the interventionist and minimizes the shifts in the research protocol over time, therefore maximizing the integrity of the intervention (Whitmer et al., 2005).

Receipt of intervention/manipulation check. The teens were asked to complete 10 multiple choice knowledge questions covering concepts discussed during previous sessions after Sessions 3 and 5. If the intervention had been implemented with high fidelity and teens understood the information given, it was expected that the teens would answer at least 80% of the questions correctly, which would indicate that they processed the information they received (Melnyk, Alpert-Gillis, Hensel, Cable-Billing, & Rubenstein, 1997; Melnyk & Fineout-

Overholt, 2010). The RA reviewed the data as the questionnaires were turned in at the end of the sessions and asked participants if they intentionally missed a question or response if not answered (Melnyk et al., 2007).

Timing and dose of intervention. The intervention was delivered in seven sessions. The dose of the intervention delivered to participants included when the adolescents completed all seven sessions and documenting the length of each session.

Comparison Headache Education Group

The comparison headache education group did not receive any specific education related to the COPE-HEP intervention (e.g., cognitive appraisal, beliefs, stress, coping, self-esteem, positive self-talk, effective communication, problem solving, etc.). Comparison headache education participants received basic headache hygiene information adapted from the American Headache Society (see Table 3 and Appendix E).

Like the COPE-HEP program, the comparison headache education and activities were manualized so that this program could also be reproduced in clinical practice and replicated in other research studies.

Session 1 of comparison headache education. Session 1 (an adolescent-parent in-clinic session) provided an overview of everyday behaviors that may trigger headaches. Risk factors for headaches were discussed to include disturbed sleep pattern, fatigue, irregular eating patterns, smoking, and sudden or intense

exertion. The adolescents were given homework that required them to complete a headache diary based on information from a scenario.

Session 2 of comparison headache education. Session 2 (a telephone session with adolescent) addressed environmental triggers of headaches. Environmental triggers of headaches were reviewed through use of questions during the session and through use of multiple choice questions and fill in the blank statements in the homework activities.

Session 3 of comparison headache education. Session 3 (an adolescent-parent in-clinic session) focused on medication triggers for headaches. The sessions addressed categories of medications that trigger headaches to include birth control pills, hormone replacement, diuretics, and anti-asthma medications. The etiology of rebound headaches was reviewed. For homework, the adolescents were asked to google search hormonal triggers of headaches. They also were asked to identify what medications help their headaches the most and what medications help their headaches the least.

Session 4 of comparison headache education. Session 4 (a telephone session with adolescent) addressed hormonal triggers of headaches. The focus was on the impact of menstruation, ovulation, puberty, and menopause on headaches. For homework, the adolescents were given multiple choice responses related to hormonal triggers of headaches. In addition, they were asked to write down foods that they thought were triggers for their headaches.

Session 5 of comparison headache education. Session 5 (a telephone session with adolescent) provided an overview of dietary triggers of headaches. Triggers reviewed included alcoholic beverages, tyramine (aged cheese), chocolate, excessive caffeine, and food additives (MSG, nitrite, and aspartame). The adolescents were asked to keep a daily log of the time they went to bed, fell asleep, and woke for a five-day period as part of their homework assignment. They were also asked to complete multiple-choice questions about food triggers for headaches.

Session 6 of comparison headache education. Session 6 (a telephone session with adolescent) focused on headache management tips. An overview was provided of things that the adolescents could do to decrease their headaches. The importance of diet adjustments, regular sleep patterns, moderate and routine exercise, and avoidance of alcohol, aspartame, and food additives were discussed. The homework required that the adolescent keep a daily count of his or her water intake for five days. A scenario and multiple-choice questions were used to reinforce the concepts of healthy eating and adequate hydration.

Session 7 of comparison headache education. Session 7 (an adolescent-parent in-clinic session) provided an overview of the importance of hydration in relation to headaches. The adolescents were engaged in discussion about hydration and dehydration. Ways to keep the body hydrated were shared with the adolescents. There was not a homework assignment for this session.

Variables and Measures

Table 4 summarizes the instruments and the times at which each measure was administered. The table also includes the time involvement for each measure and the person responsible for completing the respective measure.

Participants were screened for the risk of mild to moderately elevated depressive symptoms using the *Beck Youth Depression Inventory-II Scale* (Beck, Steer, & Brown, 1996). A T score of 55 to 69 indicated mild to moderate depression. Any adolescent responding "sometimes" or "always" to questions 4 and 20, which indicate an increased risk for suicide on the Beck Youth Depression Inventory, was screened immediately by the PI to assess suicide risk and referred to an emergency facility or community health center as needed.

The teen demographic questionnaire was completed by the teen and provided the following teen specific demographic information: (a) age, (b) gender, (c) race/ethnicity, (d) highest education, (e) perceived family and social support, (f) school and community involvement, (g) work history, and (h) stressful life events.

The parent demographic questionnaire was used to collect baseline demographic data about the parent(s) to include (a) age, (b) gender, (c) race/ethnicity, (d) marital status, (e) family structure, (f) highest level of education, (g) perceived social support, (h) community and social involvement, (i) history of or presence of mental health disorders, (j) history of mental illness,

(k) chronic illness, (l) whether their child has ever been diagnosed with a mental health disorder, and (m) whether their child has history of a chronic or debilitating illness.

Measure of Mediating Effects

Teens' beliefs were measured using the *Healthy Lifestyle Beliefs Scale*, which is a 16-item instrument that was adapted from other belief scales used by Dr. Bernadette Melnyk in prior studies (Melnyk, 1994; Melnyk et al., 1997). Melnyk (1995), in an original work, developed a scale to examine the mediating effects of beliefs of parents caring for a child newly admitted a hospital intensive care unit. She later adapted this scale to measure beliefs of teens regarding healthy lifestyle behaviors (Melnyk et al., 2006c, 2007). The *Teens Personal Beliefs Scale* examines teens' beliefs about leading a healthy lifestyle that include nutrition and physical activity and ability to handle stress and cope with various stressors. Subjects rate their responses on a 5-point Likert scale that ranges from strongly disagree (1) to strongly agree (5). The possible range of the total scores is 10 to 50. Higher scores on the scale indicate stronger beliefs about the ability to lead a healthy lifestyle. Face validity was established with 10 teens. Eight adolescent health specialists established content validity on the healthy lifestyle scale. Cronbach's alpha for this scale has exceeded 0.85 in prior studies (Melnyk et al., 2006c). For this study, the *Teens Personal Beliefs Scale* was modified and two headache specific questions were added to this scale, including, "I am

knowledgeable about how to handle my headaches," and "I am sure I will do what I need to do to help my headaches," making the scale for this study an 18-item scale.

Perceived stress was measured using the *Perceived Stress Scale* (PSS), which is a 14-item scale that describes the degree to which situations in one's life are appraised as stressful. Each item is rated on a 4-point Likert scale assessing frequency and occurrence of stressful feelings and thoughts during past month. Subjects rate their responses from never (0) to very often (4). Reliability of the PSS was established in two community samples of college students (N = 332, N = 114, N = 64). Coefficients alpha reliability for the PSS was .84, .85, and .86 in each of the three samples. Test retest reliability was .85 (Cohen, Kamarck, & Mermelstein, 1983).

Measures of Outcome Variables

Headache disability was assessed using the PedMIDAS, a 6-item questionnaire that assesses headache disability in children and adolescents (mean age 13.0 $\pm$ 3.3 years) (Hershey et al., 2001b). The items report an estimation of the number of full or partial days of school missed in the past three months due to headache and the days of school attended, but with reduced functioning. Frequency ratings also are made of the days the child was unable to fully participate in activities such as chores, homework, sports, or play. PedMIDAS was developed using a total of 441 children (mean age 13.0 $\pm$ 3.3) with a clinical

diagnosis of migraine. The Cronbach's alpha coefficient value was 0.78. Test-retest reliability was 0.80 ten to 21 days after the initial questionnaire (mean 14.4 $\pm$ 2.1 days). The PedMIDAS showed a small to moderate positive correlation with the headache parameters, which included duration (r= .21), frequency (r= .62), and intensity (0.27) (Hershey et al., 2001b). The following are the grades and scores of the empirically driven grading system: Grade I (little to no disability), 0-10; Grade II (mild disability), 11-30; Grade III (moderate disability), 31-50; and Grade IV (severe disability), >50. According to Hershey et al. (2004), higher grades indicated more headache disability and corresponded with greater use of prophylactic treatment.

Depressive and anxiety symptoms were measured using the anxiety and depression subscales of the *Beck Youth Inventory* (2nd edition; BYI-II), which is a 100-item instrument for youth seven to 18 years of age (Beck, Beck, & Jolly, 2005). The BYI-II is used extensively in research and clinical settings, with well-established validity, reliability, and normative data (Beck et al., 2005; Steer, Ball, Ranien, & Beck, 1999). The BYI-II measures five constructs, including (a) depressive symptoms, (b) anxiety symptoms, (c) anger, (d) disruptive behavior, and (e) self-concept. Each of the subscales of the BYI-II contains 20 statements about thoughts, feelings, and behaviors pertaining to emotional and social impairment. The BYI-II has demonstrated good reliability with Cronbach's alpha coefficients ranging from .86 to .96, indicating high internal consistency for

children ages seven and above and adolescents. Test-retest reliability ranged from .74 to .93 for all age groups and genders on all scales. Validity was established through significant correlation among scales within normative groups and by correlations with other instruments measuring similar characteristics (Beck et al., 2005). The BYD-II and BAI-Y subscales were used in this study. In the original study, validation of scores on the BYD-II and BAI-Y revealed a high estimate of internal consistency. Cronbach's alpha was above .90 for the BYD-II and above.85 for the BAI-Y (Beck et al., 2001). The depression subscale was used as the screening tool and outcome measure of depressive symptoms and the anxiety subscale of the BYI-II was used to tap adolescents' state anxiety level. Higher T scores correlate with higher distress levels in the youth. T scores between 55-59 are considered mildly elevated, scores between 60 and 69 are considered as moderately elevated, and scores 70 and greater are considered extremely elevated.

The participants maintained a headache diary for documentation of headache frequency and severity. Severity was measured using the *Wong Baker FACES Pain Scale* (a 10-point numerical rating scale with response options ranging from 0 (no pain) to 10 (hurts worst). This measure is a self-report faces scale for measurement of acute pain in children and adolescents ages three to 18 years. Reliability and validity was established with 118 children in three age groups (3-7 years, 8-12 years, 13-18 years). Concurrent validity with other pain measures (i.e., word graphic and numerical scales) was established at .67 to .73

(Keck, Gerkensmeyer, Joyce, & Schade, 1996). Test-retest reliability ranged from 0.63 to 0.94 (Keck et al., 1996). Frequency of headaches was measured using a Likert-type scale with eight response options ranging from less than one time per week to daily. Participants reported the name and frequency of medication used for headache management. Teens registered the duration of the headache in hours. Evidence suggests that for children ages seven and older, the headache diary is a valid and reliable measure of the perception of pain regardless of sex and health status (Abu-Saad, 1984; McGrath, 1987).

The *Parent Perception of Pain Interference* (PPPI) assessed parents' perception of how the headaches interfere with the teens' daily activities. The PPPI is an 11-item instrument that asks parents to rate (from 0 to 6) how much their child's or adolescent's pain typically interferes with family relationships and daily functioning, such as doing chores, attending school, and participating in and enjoying recreational activities. The scores range from 0 (no interference) to 6 (extreme interference). In a sample of 90 adults, reliability ranged from 0.70 to 0.90. Construct validity was established by correlating patient scores on scales from WHYMPI subscales, which included the PPPI, with nine scales with similar characteristics to include the following: (a) the Present Pain Scale; (b) Pain Rating Index Scale; (c) Beck Depression Inventory; (d) the Depression Adjective Checklist; (e) Marital Adjustment Scale; (f) the State-Trait Anxiety Inventory-State Form; (g) the Multidimensional Health Locus of Control Scale; and

(h) Internal, Powerful Others, and Chance Subscales. The correlation of these scales with PPPI ranged from 0.49 to 0.85 (Kerns, Turk, & Rudy, 1985).

An exit questionnaire was used to collect information about the feasibility and acceptability of the intervention and to inform the next study in this program of research. Teens and parents were asked the following questions:

1. Was the format of the program acceptable to you? If no, why wasn't it acceptable?

2. Was the intervention helpful to you? If yes, how was it helpful? If no, why was it not helpful?

3. What do you think made the biggest improvement in your headaches?

4. How could participation have been made easier for you?

5. Would you recommend the program to a friend who has a teen with headaches?

The researcher administered the exit evaluations after all other measurements had been completed.

Data Management

Coded identification numbers were assigned to all data collection forms and were recorded in a master codebook. Coded data collection forms were reviewed for missing data immediately upon completion. Throughout the data collection process, the RA reviewed measures for missing data and clarified with the participant if they intentionally skipped or missed an item. Participants were

allowed to complete any missing questions or indicate that they would prefer not to answer. Code 999 was used for missing data. Participants' names were not written on the study measures. Participant questionnaire data were linked by use of codes.

Patient information and data collection measures were stored in a locked cabinet in the PI's office. The master list linking the participants' ID number to the participants' identifying information was be kept in a separate, locked filing cabinet and only was accessible to the PI. Access to electronic data was restricted to the PI. The data were protected by computer virus and hacking protection, password protection for systems and files, and frequent backup and archiving of information. Data were entered into SPSS 19.0 and checked against raw data for accuracy. The data were rechecked and any inconsistencies were assessed and rectified as compared to the respective data collection instruments. Federally regulated HIPAA guidelines were followed.

The Beck Youth Depression Inventory was scored immediately after completion by the teen. Teens that were identified as having increased risk for suicide or exemplifying severe depressive symptoms were referred to an emergency department or mental health facility for psychiatric services. Teens exemplifying imminent risk for suicide were escorted to the emergency department. Responses of *sometimes*, *often*, or *always* on questions 4 (I wish I

were dead) and 20 (I think my life is bad) indicated an increased risk for suicide. A score of 70 or above indicated a risk for severe depression.

Data Analysis

Data analysis began with a review of data to get a better understanding of the data (Cohen et al., 2003; Maxwell & Delaney 2004). An analysis was performed examining the descriptive statistics (i.e., means, SDs, frequencies, skewness, and distribution). In addition, Cronbach's alphas were run on all scales to determine their internal consistency reliability.

Analysis for research question 1. Feasibility and acceptability of the COPE/HEP program were evaluated by review and descriptive analyses of feasibility and acceptability questions in the program evaluation and the fidelity/homework logs. The intervention was considered feasible if at least six out of the seven sessions were attended by 80% of the subjects. The sessions occurred weekly. The intervention was considered acceptable if 80% or more of subjects respond positively to the questions in the program evaluation (Melnyk et al., 2007; Melnyk & Fineout-Overholt, 2010). The length of time to complete the intervention was monitored to determine the feasibility of a seven-consecutive week intervention in adolescents with CDHs in a specialty care setting. Completed homework was an indication of adherence to the COPE-HEP and acceptability of the COPE-HEP intervention with teens in this setting.

Analysis plan for research question 2. Descriptive statistics, pre- and post-test data for outcome variables (anxiety, depression, PedMIDAS, headache frequency, headache pain level, headache duration, medication frequency, and parent perception of pain interference) were computed. Effect sizes on the variables were calculated by subtracting the mean of the comparison headache education group from the mean of COPE-HEP intervention group divided by the pooled standard deviation. Preliminary efficacy of the COPE-HEP intervention was evaluated by the comparison of baseline to post-test measures using paired t-tests. Between group differences were measured using independent t-tests. Due to small sample size, the alpha was set at .10 instead of .05 to avoid making Type 2 errors (Maxwell & Delaney, 2004; Wang & Bakhai, 2006).

Analysis plan for research question 3. The Pearson's product-moment correlation (Pearson r) was used to estimate the association between the continuous variables. In order to explore mediation, positive correlations between the COPE/HEP and mediating variables and the outcome variables must exist. Because of the small sample size, the evaluation of correlation coefficients was a more appropriate method than regression analyses (Cohen et al., 2003) to explore mediation.

Additional Analytical Strategies

Seven participants refused to participate after learning of the study's requirements. Baseline data were not obtained from these participants; therefore

it cannot be discerned whether these participants would have met study criteria or if they were different in any way from those adolescents who consented to participate. Given this, recruitment statistics could not be determined. Participant withdrawal from the COPE/HEP intervention was noted and attrition rate was calculated. All participants who met criteria after baseline screening were willing to participate. Participants who dropped out of the study were compared to those who completed the study. This analysis examined whether or not there were characteristic differences in participants who completed the study and those who did not.

Chapter 4

RESULTS

The primary purpose of this pilot study was to test the feasibility, acceptability and preliminary effects of a cognitive-behavioral skills building (CBSB) intervention (COPE-HEP) for adolescents who suffer from chronic daily headaches (CDHs) and mild to moderately elevated depressive symptoms. The COPE-HEP adolescents were compared to a comparison headache education group of adolescents on their beliefs about their ability to lead a healthy lifestyle and to better manage their headaches, perceived stress, anxiety, depression, headache disability, headache frequency, headache pain level, headache duration, medication frequency, and parent perception of pain interference. Relationships among variables also were assessed. A total of 49 participants were recruited into the study. Thirty-six met inclusion criteria and were randomly assigned to either the COPE-HEP or comparison headache education groups. Thirty-two participants completed the study. Participants who were lost to attrition (N = 4, 11.0%) were included in the baseline analysis and compared to participants who completed the study. No demographics were collected on subjects that refused to participate (N = 7) and subjects who did not meet the criteria of mild to moderately depressive symptoms (N = 6).

Independent t-tests and Chi-Square tests were performed to determine the comparability of the two groups at baseline on demographic variables and other

characteristics of the groups including age, ethnicity, gender, education, hours worked, grade level, activity change, support system, parent and family history of mental health, parent and family history of chronic headaches, body mass index (BMI), and BMI percentile. In addition, Pearson Product Moment correlations were used to examine the relationship among selected demographic characteristics and outcome variables.

Psychometrics

Internal consistency reliability determines the consistency to which an instrument measures what it was intended to measure (Kline, 2009). A Cronbach's alpha of .70 or greater is needed for adequate reliability (Kline, 2009). Internal consistency reliability of measures was examined in this study. The Cronbach's alphas are presented in Table 5.

Table 5

Cronbach Alphas of Study Measures

Scale	Number of Items	Cronbach's Alphas Baseline	Cronbach's Alphas Post-Intervention
Beliefs	18	.86	.91
Perceived Stress	14	.54	.58
Anxiety	20	.88	.85
Depression	20	.57	.75
PedMIDAS	6	.73	.61
PPPI	11	.92	.96

Two specific questions that indicated an increased risk for suicide on the Beck Depression Inventory were examined using frequencies, percentages, and cumulative percentages. Responses of "*sometimes," "often," or "always"* on questions 4 (I wish I were dead) and 20 (I think my life is bad) indicated an increase risk for suicide. Table 6 describes the findings.

Table 6

Frequencies, Percentage, Valid Percentage, and Cumulative Percentages of Items Indicating Increased Risk for Suicide on Beck Youth Depression Inventory

Item	Rating	Frequency	%	Valid %	Cumulative %
4. I wish I were dead.	Never	23	4.7	63.9	63.9
	Sometimes	11	2.2	30.6	94.4
	Often	1	.2	2.8	97.2
	Always	1	.2	2.8	100.0
20. I think my life is bad.	Never	26	5.3	72.2	72.2
	Sometimes	8	1.6	22.2	84.4
	Often	2	.4	5.6	100.0
	Always	0	0	0	0

Based on these findings, two participants were escorted to the emergency department because they indicated imminent risk for suicide. Fourteen participants with mild to moderate depressive symptoms (8 = COPE-HEP, 6 =

comparison headache education group) were referred to behavioral health because they indicated an increase risk for suicide. The adolescents were referred to in-house psychiatric services for immediate assessment as per hospital policy.

Description of Participants

Adolescent demographics. The adolescents ranged in age from 13 to 17 years, with a mean age of 14.97 (SD = 1.13) years. The majority of the participants were females (n = 27; 75%) who were enrolled in high school. Approximately 70 % (n = 25) of the participants were in grades 9 and 10. A substantial number of the adolescents were Hispanic (n = 14; 43.75%).

There were some differences on demographic variables and the other specified characteristics between the groups at baseline (see Table 6). The comparison headache education group had slightly lower BMIs and BMI percentiles compared to the COPE-HEP group. There was 62% and 81% representation of females in the comparison headache education and COPE-HEP groups, respectively. Representation of males in the comparison headache education group (n = 6; 38%) was twice as that of males in the COPE-HEP group (n = 3; 19%). Two (12.5%) participants in the COPE-HEP group reported that they were employed and worked between 10 to 19 hours per week. Twenty-five percent of participants in the comparison headache education group reported working one to nine hours weekly (n = 4). Eighty-one percent (n = 13) of participants in the COPE-HEP group reported a perception of receiving adequate

support with their headaches, while approximately 94% (n = 15) participants in the comparison headache education group perceived that they got adequate support from family, school, and work to assist them in dealing with their headaches. Approximately 44% (n = 7) of participants in the comparison headache education group and 19% (n = 3) in the COPE-HEP group were in 9th grade.

Parent demographics. The mean age of the parents was 42.4 (SD = 6.65) years, with an age range of 32 to 56 years. Only 11% (n = 4) of the parents or guardians were male. Fifty percent of the parents were married, with 17% (N = 6) in their second marriage. Fifty-six percent (n = 9) of the parents in both groups reported a current stressful event. Parents in the COPE-HEP group reported the following stressful events: money problems, multiple residential moves, both parents remarried, teen moving away from friends, multiple family deaths, loss of home, financial adjustments, and sick family member. Likewise, parents in the comparison headache education group reported stressful events to include family starting new business, adolescent attending a new school, financial problems, unemployment, adolescent being bullied at school, death of grandparents, exchange students living with family, single parent, parent with stressful job, death of family dog, and adolescent being emotionally hurt by friends. Additional demographic characteristics of the adolescents and parents in each group are summarized in Tables 7 and 8.

Table 7

Demographic Characteristics of Teen Respondents (N = 36)

Demographics	COPE-HEP (N-16) M, SD	Comparison (N-16) M, SD
Mean Age (yrs)	15.38, 0.96	14.8, 1.17
Mean BMI	23.01, 3.90	23.4, 6.70
BMI Percentile/BMI	64.84/ 29.99	63.09/ 27.04
	N (%)	N (%)
Gender		
Male	3 (18.8)	6 (38)
Female	13 (81.2)	10 (62)
Ethnicity		
White	5 (31)	5 (31)
Black	4 (25)	1 (6.3)
American Indian/Alaskan Native	1 (6.3)	1 (6.3)
Asian/Pacific Islander	0 (0)	1 (6.3)
Hispanic	6 (37.5)	8 (50)
Hours Worked per Week		
0 hours	14 (87.5)	12 (75)
1-9 hours	0 (0)	4 (25)
10-19 hours	2 (12.5)	0 (0)
Grade Level		
9th Grade	3 (18.8)	7 (43.8)
10th Grade	7 (43.8)	4 (25)
11th Grade	5 (31.3)	5 (31.3)
12th Grade	1 (6.3)	0 (0)
Support with Headache		
Yes	13 (81.3)	15 (93.8)
Change with Activity		
Yes	10 (62.5)	8 (50)

Table 8

Demographic Characteristics of Parent Respondents (N = 16)

Demographics	COPE-HEP (N = 16) N (%)	Comparison (N = 16) N (%)
Marital Status		
Married	8 (50)	9 (56.3)
Never Married	1 (6.3)	3 (18.8)
Separated, Widowed	1 (6.3)	0 (0)
Divorced	2 (12.5)	2 (12.5)
2nd Marriage	4 (25)	2 (12.5)
Years of School Completed		
Did not finish high school	1 (6.3)	2 (12.5)
Finished high school/GED	3 (18.8)	2 (12.5)
Some college or training	8 (50)	9 (56.3)
Finished college	4 (25)	2 (12.5)
Master's degree or PhD	0 (0)	1 (6.3)
Learning Problem		
Yes	1 (6.3)	1 (6.3)
Parent Mental Health Problem		
Yes	8 (50)	11 (68.8)
Adequate Support System		
Yes	9 (56.3)	12 (75)
Family hx Chronic Headaches		
Yes	12 (75)	10 (62.5)
Family Member Mental Health Issues	5 (31.3)	6 (37.5)
Parent w/Chronic Headaches		
Yes	10 (62.5)	8 (50)
Stressful Events		
Yes	9 (56.3)	9 (56.3)

Research Question 1 and Results

Is a theory-driven COPE/HEP intervention program (with emphasis on coping, beliefs, cognition, and cognitive restructuring) for use with adolescents ages 13 to 17 years with chronic daily headaches and mild to moderately elevated depressive symptoms, feasible and acceptable to adolescents?

Measures of acceptability of the COPE-HEP program were at 80% or higher positive response rate to questions on the Parent and Teen Exit Questionnaires (i.e., Was the format of the program helpful? Was the intervention helpful to you? Was the intervention helpful to your teen?, etc.). Fifteen of the adolescents who completed the COPE-HEP program rated it as helpful (94%). One adolescent commented that, by attending the program, she learned new ways to cope with her migraines. Another adolescent responded that the program helped him to control his anger and cope with his headaches. Other positive comments expressed were:

- "The program helped me to talk about what I was doing to make my headaches happen."
- "The program helped me to better deal with problems or situations in my life."
- "The program taught me more about my migraines and how to deal with them and some triggers I can avoid."
- "It helped me learn new ways of dealing with stress."

- "It helped me to deal with stress better, which will greatly help me."
- "It helped me realize what things can trigger my headaches."

Eighty-eight percent (n = 14) of the parents rated the COPE-HEP as helpful. Some of the parents' comments about how the program was helpful to their adolescents include:

- "She has learned her triggers and how that there are things she can do to lower her headaches."
- "Helped her to calm herself."
- "Very educational for how to cope with stress in life."
- "The program got her to stop and think about her own thought processes and be more active."
- "It showed her ways to cope with everyday stress."
- "M. now speaks more about her problems and is now more participative in math by speaking out."

One parent-adolescent dyad rated the COPE-HEP intervention as not helpful. This particular adolescent responded, "For me, they didn't go away." The parent stated, "She still has headaches." A second parent rated the intervention as not helpful and shared the following comment, "Unfortunately, she thought it was more of a chore than a positive impact on her." However, the adolescent of this dyad rated the intervention as helpful and commented that the intervention, "Told me to be happy."

Both adolescents and parents found the COPE-HEP program and the length of the program highly acceptable. Eighty-eight percent (n = 14) of parents responded that the intervention was helpful to their adolescent while all parents stated that they would recommend the program to a friend who had an adolescent with headaches. All parents found the format of the COPE-HEP highly acceptable. The majority of parents (97%) expressed interest in having their teen attend a program to help his or her headaches. All adolescents would recommend the program to a peer with chronic headaches. Fifty-seven percent of parents indicated a willingness to bring their adolescent to the clinic at least twice weekly to attend a program that could help him or her cope with his or her chronic headaches.

When asked, "How was the intervention helpful for your teen?" and "How was the intervention helpful to you?" the overall theme of the comments from parents and adolescents reflected positive ways to cope with and manage stress, better ways to manage headaches, self-regulation, relaxation, and knowledge of headache triggers and headache hygiene measures. All of these represent content in the COPE-HEP Intervention. In regards to ease of participation in the program, 56% (n = 9) of both parents and adolescents responded that participation in the intervention was easy. Two parents commented that the program would be easier to attend if it was offered closer to their homes. One parent with an engineering background suggested the use of a flow chart to provide a general overview of the

program. Over half (n = 9; 56%) of the adolescents did not recommend any improvement to the COPE-HEP program. Suggested improvements from a few of the adolescents included: (a) don't repeat the same things, (b) more biofeedback, (c) longer sessions, and (d) a few more sessions in person. Fifteen of the adolescents indicated that the number and length of sessions were adequate, while one adolescent thought that the program had too many sessions. One adolescent expressed a desire for longer sessions on the Exit Questionnaire but rated the length and number of sessions as adequate.

Measures of the feasibility of the COPE-HEP were the attrition rate, the level of participants' attendance for the COPE-HEP intervention sessions, and completion of homework assignments. Of the original 36 participants who were randomized to the COPE-HEP and comparison headache education groups, 4 participants (11%) (2 comparison and 2 COPE-HEP) dropped from the study. Attrition was computed as the percentage of total number of participants who provided consent compared to those that completed the post-intervention assessment measures. A comparison was made of the attrition between the COPE-HEP (n = 2) and comparison headache education (n = 2) groups. Participants who dropped from the COPE-HEP reported the following factors influencing their withdrawal: (a) headaches too severe to participate, and (b) loss of interest. Participants who dropped from the comparison headache education group reported the following reasons: (a) unable to get to clinic visits, and

(b) interference with sports. Three of the participants withdrew after Session 1 (1 COPE-HEP, 2 comparison), and one withdrew after Session 3 (COPE-HEP). There was no systematicity to the attrition pattern. Participants who completed the study attended all the sessions, thereby contributing to 100% participation the COPE-HEP group.

Table 9 presents the participants' homework completion by weekly sessions. Overall, the average completion rate of the homework was 79%. The adolescents were asked to complete missed homework and be prepared to discuss the homework at the next session. For homework sessions that were consistently missed, the PI and assistant reviewed the homework with the adolescent at the beginning of the session and reiterated to the adolescent the importance of doing homework prior to the session. Completion of homework assignments ranged from two to six assignments by the end of the program with six (37.5%) of the participants completing all homework assignments.

Table 9

COPE-HEP Homework Weekly Completion Rate – Teen (N = 16)

Week		Number	Percent
1	Yes	12	75.0
2	Yes	14	87.5
3	Yes	13	81.3
4	Yes	13	81.3
5	Yes	11	68.8
6	Yes	13	81.3

Table 10 describes the statistics for adolescents completing five or more homework assignments as compared to those completing four or less homework assignments in the COPE-HEP group. COPE-HEP adolescents with good homework completion (5 or more session) had a statistically significant difference in beliefs (M = 76.36, SD = 6.99) compared to adolescents with poor homework completion (4 or less sessions) (M = 67.00, SD = 10.84, t(14) = 2.10, p = .06). A statistically significant difference was found in perceived stress in adolescents with good homework completion (M = 32.36, SD = 4.00) compared to adolescents with poor homework completion (M = 27.20, SD = 5.72, t(14) = 2.10, p = .05). A statistically significant difference was demonstrated in headache duration in adolescents with good homework completion (M = 4.27, SD = 2.05)

compared to adolescents with poor homework completion (M = 2.20, SD = .84, t(14) = 2.87, p = .01). Medication frequency was statistically different in adolescents with good homework completion (M = 2.42, SD = 1.25) compared to adolescents with poor homework (M = 4.00, SD = .001, t(10) = -4.22, p = .002). Adolescents with good homework completion had lower depression (M = 51.65, SD = 7.13) than the poor homework group (M = 51.80 SD = 6.22, t(14) = -.04, p = .97), less headache frequency (M = 2.82, SD = 2.09) than the poor homework group (M = 3.60, SD = 2.40, t(14) = -.66, p = .52), lower pain level (M = 6.18, SD = 2.44) than the poor homework group (M = 6.80, SD = 1.10, t(14) = -.53, p = .60) and less parent perception of pain interference (M = 31.73, SD = 17.59) than the poor homework group (M = 41.80, SD = 19.52, t(14) = -1.03, p = .32), although not statistically significant. The good homework group had higher anxiety, higher perceived stress and higher headache disability, although not statistically significant.

Table 10

Effects of Homework Completion on Outcome Variables – COPE-HEP Group

Variable	Mean	SD	Cohen's D	CI Lower	CI Upper	t	df	p
Beliefs								
Good Homework	76.36	6.99	1.02	1.50	17.22	2.10	14	.06
Poor Homework	67.00	10.84						
Perceived Stress								
Good Homework	32.36	4.00	1.04	.83	9.50	2.10	14	.05
Poor Homework	27.20	5.72						
Anxiety								
Good Homework	50.36	8.00	.36	-4.57	9.70	.63	14	.54
Poor Homework	50.80	6.10						
Depression								
Good Homework	51.64	7.13	-.02	6.70	6.38	-.04	14	.97
Poor Homework	51.80	6.22						
PedMIDAS								
Good Homework	44.55	33.24	.43	-10.07	50.36	1.17	14	.26
Poor Homework	24.40	27.65						
Headache Frequency								
Good Homework	2.82	2.09	-.35	-2.86	1.29	-.66	14	.52
Poor Homework	3.60	2.40						
Headache Duration								
Good Homework	4.27	2.05	1.32	.80	3.35	2.87	14	.01
Poor Homework	2.20	.84						
Headache Pain Level								
Good Homework	6.18	2.44	-.33	-2.18	.94	-.53	14	.60
Poor Homework	6.80	1.10						
Medication Freq								
Good Homework	2.45	1.21	-1.81	-2.21	-.88	-4.22	10	.002
Poor Homework	4.00	.001						
PPPI								
Good Homework	31.73	17.59	-.54	-29.38	9.24	-1.03	14	.32
Poor Homework	41.80	19.52						

PedMIDAS = Headache Disability
PPPI = Parent Perception of Pain Interference

The intervention was designed to be delivered in seven consecutive weeks. Delivery of the intervention within this timeframe was very challenging. Completion of the COPE-HEP intervention for this group of adolescents ranged from seven weeks to 14 weeks with a mean of 8.94 (SD = 2.35) weeks. Tables 11 and 12 illustrate the number and frequencies of weeks to complete the COPE-HEP intervention and the comparison headache education group intervention, respectively. The comparison headache education group ranged from seven to 20 weeks with a mean of 10.56 (SD = 4.21) weeks for completion. All parent-adolescent teams that missed an appointment were called immediately and the sessions were rescheduled. This process continued until all sessions were completed. Fifteen appointments were missed and rescheduled for the COPE-HEP group, with 31 sessions missed and rescheduled for the comparison headache education group.

Table 11

Length of Time to Complete COPE-HEP Intervention

Number of Weeks	Frequency	Percent
7	8	50.0
8	1	6.0
10	3	19.0
11	1	6.0
12	2	13.0
14	1	6.0
Total	16	100.0

Table 12

Length of Time to Complete Comparison Headache Education

Number of Weeks	Frequency	Percent
7	6	37.5
8	1	6.0
9	1	6.0
10	2	12.5
12	3	19.0
16	1	6.0
18	1	6.0
20	1	6.0
Total	16	100.0

Numerous reasons were given for rescheduling sessions. Several were related to conflict with work, school, or other social activities. One adolescent rescheduled because she was participating in a car wash for her aunt who was murdered. A second adolescent rescheduled because she was admitted to the hospital for severe abdominal pain. An additional adolescent rescheduled because his grandfather died and the family was traveling to California to make funeral arrangements. Several sessions required rescheduling due to the parent and adolescent forgetting the scheduled clinic visits or telephone sessions in spite of the reminder call or text the day prior. On two occurrences, one participant needed to reschedule because her COPE-HEP manual was in her father's car and the car was at father's place of employment.

Overall, one half of the adolescents in the COPE-HEP group completed the intervention in seven weeks and 75% (N = 12) finished the intervention within 10 weeks. Approximately 38% (n = 6) of adolescents in the comparison headache education group completed their education in seven weeks with approximately 62% (n = 10) completing their sessions by Week 10.

The COPE-HEP in-clinic intervention sessions were designed to be delivered in 30-minutes and the telephone sessions were designed to be delivered in 20-minutes. It was difficult to complete the clinic sessions within the specified length of time because of questions and interruptions from the parents and siblings during the sessions. The average COPE-HEP clinic sessions ranged from 35 to 50 minutes. The COPE-HEP telephone sessions went well over 20 minutes. The telephone session extensions were due to the various reasons to include adolescents putting the researcher 'on hold' for other immediate priorities, being distracted by family members and/or friends, and asking to be called back at a later time after having started the session. During the telephone sessions, there was competition with environmental noises to include a second phone in the home ringing, dogs barking, and background conversation of people in the participant's selected environment. There were also additional distractions. One participant received the COPE-HEP intervention while on vacation, riding in the car with his mother in New Mexico over the Thanksgiving holiday. A second participant

received her intervention while in route with her family to northern Arizona for a family ski vacation during the Christmas break.

Monitoring of homework activities for each telephone session was based on an honor system with the adolescents since there was no way of verifying that the homework was completed at the time of the telephone sessions. The homework was reviewed at the beginning of each session. For the telephone sessions, the adolescents verbalized to the researcher whether or not the homework was completed. The responses from the majority of the adolescents who verbalized that the homework was completed were rapid and spontaneous suggesting that the homework was completed prior to the telephone sessions. Notebooks were reviewed in the office setting to validate completion of homework during those visits.

Intervention fidelity.

Delivery of the intervention. A Fidelity Monitoring Log was used as a guide to ensure that the intervention was delivered as outlined per protocol. There were no deviations from the protocol during the implementation of the intervention. All classes were taught consistently with the intervention manual. Thirty percent of the audiotaped sessions were reviewed by a clinic nurse and demonstrated that the intervention was delivered per protocol.

Receipt of the intervention. Manipulation checks were performed to assess how the adolescents processed the information they received.

Manipulation checks were only performed for the COPE-HEP group. Questionnaires were administered to COPE-HEP participants at Sessions 3 and 5 to ascertain this information. Approximately 94 % (n = 15) of the adolescents answered 80% or more of the questions correctly on both Manipulation Checks, which is an indicator that the intervention was adequately received and processed. The mean score on Manipulation Check 1 was 92.5 (SD = 10.65) and 90.0 (SD = 8.94) on Manipulation Check 2. One adolescent scored less than 80% on Manipulation Check 1 and one adolescent scored less than 80% on Manipulation Check 2 indicating that they had not fully process the information, thereby, not engaging in the treatment or benefit. The interventionist reviewed all missed questions with the participants upon their completion of the manipulation checks.

Research Question 2 and Results

What are the preliminary effects of the COPE-HEP intervention on adolescents who have chronic daily headaches and mild to moderately elevated depressive symptoms compared to the comparison headache education group?

The preliminary effects of the seven-week COPE-HEP on chronic daily headaches in adolescents were examined by evaluating the adolescents' anxiety, depression, beliefs, perceived stress, headache disability (PedMIDAS), headache frequency, headache pain level, medication frequency, and the parents' perception of pain interference compared with a comparison headache education group. Table 13 illustrates the preliminary findings of the descriptive and inferential

statistics of study variables from pre-intervention to post-intervention for both groups. COPE-HEP adolescents' ratings of anxiety decreased from pre-intervention (M = 59.23; SD = 9.57) to post-intervention (M = 52.56; SD = 7.36, t(15) = 3.45, p = .004). A similar decrease occurred in the comparison headache education group from baseline (M = 50.94; SD = 8.31) to post-treatment (M = 47.38; SD = 6.10), t(15) = 1.923, p = .08). The change in anxiety scores was greater for the COPE-HEP group (d = - .78) than the comparison headache education group (d = -.49). Ratings of depression decreased significantly from pre-intervention to post-intervention in both the COPE-HEP and comparison headache education groups, with Cohen's d effective sizes of 1.46 and 1.53, respectively. Similarly, weekly ratings of headache frequency decreased from pre- to post- in both groups (COPE-HEP baseline: M = 5.13, SD = 1.41, COPE-HEP post-treatment: M = 3.06, SD = 2.14, t(15) = 4.31, p = .001; comparison headache education baseline: M = 4.81, SD = 1.42, comparison headache education post-treatment: M = 3.19, SD = 2.07, t(15) = 4.10, p = .001). The Cohen's d for headache frequency in the COPE-HEP group was 1.14 and .91 in the comparison headache education group; however, the COPE-HEP group demonstrated the larger change.

On average, participants in the comparison headache education group experienced significantly less pain at post-intervention (M = 5.63, SD = 2.34) than at baseline (M = 7.00, SD = 2.07, t(15) = 2.42, p = .03). Mean changes in

pain level were not statistically significant in the COPE-HEP from baseline (M = 6.9, SD = 1.93) to post-intervention (M = 6.38, SD = 2.09, t(15) = 1.00, p = .33, d = -.25). COPE-HEP adolescents' ratings of headache duration decreased significantly with treatment (baseline: M = 4.75, SD = 1.44 to post-treatment M = 3.63, SD = 2.00, t(15) = 2.76, p = .01, d = -.64). A similar decrease in headache duration was demonstrated in the comparison headache education group.

Participants in the COPE-HEP ratings of beliefs about their ability to lead a healthy lifestyle and to better manage their headaches increased significantly from baseline (M = 68.25, SD = 10.31) to post-treatment (M = 73.44, SD = 9.17, t(15) = -2.21, p = .04). Ratings of beliefs in the comparison headache education group did not demonstrate a significant mean change from baseline to post-treatment. Parent perception of pain interference essentially remained the same in both groups.

At baseline, mean differences were examined in participants between the two groups (COPE-HEP and comparison headache education). Table 14 illustrates the findings of the analysis of the similarities and differences between participants in the two groups at baseline. The COPE-HEP and comparison headache education groups were not significantly different in the following variables: beliefs, perceived stress, headache disability, headache frequency, headache duration, pain level, medication frequency, and parent perception of pain interference. On average, comparison headache education group adolescents

experienced higher beliefs (M=72.75, SD = 7.59) than COPE-HEP adolescents (M = 68.25, SD = 10.31). This difference was not significant t(30) = 2.62, p = .22; however it did represent a large effect size, d = .93. COPE-HEP adolescents perceived stress (M = 31.06, SD = 6.43) was higher than comparison headache education group adolescents (M = 29.38, SD = 3.78), although this difference was not significant t(30) = .91, p = .37, d = .32. COPE-HEP adolescents experienced a greater headache disability (M = 56.13, SD = 51.61) than comparison headache education group adolescents (M = 53.18, SD = 56.04 t(30) = .12, p = .90). COPE-HEP adolescents had more frequent headaches (M = 5.13, SD = 1.41) than comparison headache education group (M = 4.18, SD = 1.42, t(30) = .62, p = .54, d = .23). Headaches lasted longer among COPE-HEP adolescents (M = 4.75, SD = 1.44) than comparison headache education group (M = 4.31, SD = 1.54). These findings were not significant t(30) = .83, p = .41, d = .30. The intensity of pain was slightly greater in the comparison headache group (M = 7.00, SD = 2.01) than COPE-HEP adolescents (M = 6.88, SD = 1.93); although, these differences were not significant t(30) = .18, p = .86, d = .06. COPE-HEP adolescents used slightly more medications (M = 3.31, SD = 1.01) than comparison headache education group adolescents t(30) = 1.26, p .22, d = .44, although these differences were not significantly different. On average, COPE-HEP parents demonstrated a slightly higher perception of pain interference (M = 41.88, SD = 13.24) than comparison headache education group adolescents (M = 37.63, SD = 13.29, t(30) = .91).

An ANCOVA was performed examining both post-test anxiety and post-test depression, controlling for anxiety and depression at baseline. Controlling for baseline differences in anxiety, there was no statistically significant difference in post-test anxiety, $F(1, 30) = .02$, $p = .89$. In addition, there was no statistically significant difference in post-test depression, when controlling for baseline differences in depression, $F(1, 30) = .48$, $p = .50$.

Table 15 depicts the descriptive and inferential statistics from the analysis of the degree of change between groups at post-intervention. There were no significant effects between groups for beliefs, perceived stress, depression, headache disability (PedMIDAS), headache frequency, headache pain level, medication frequency, and parent perception of pain interference (PPPI). At post-test, COPE-HEP adolescents experienced greater anxiety ($M = 52.52$ $SD = 7.37$) than comparison headache education group adolescents ($M = 47.38$, $SD = 6.10$, $t(30) = 2.17$, $p = .04$), with medium to large effect size, $d = .77$. There was a statistically significant effect between groups for headache duration (COPE-HEP: $M = 3.63$, $SD = 2.00$; comparison headache education: $M = 2.44$, $SD = 1.59$, $t(30) = 1.86$, $p = .07$, $d = .66$. Effect sizes were determined in order to calculate power for a future larger RCT.

Table 18 describes the effects of mild to moderate depressive symptoms on study variables. When examining the effects of mild versus moderate depressive symptoms on outcome variables, a statistically significance difference

was found in the beliefs of adolescents with mild depressive symptoms (M = 76.42, SD = 7.99) compared to adolescents with moderate depressive symptoms (M = 68.13, SD = 13.62, $t(30) = 2.12$, $p = .04$, $d = .74$)

Research Question 3 and Results

What are the relationships among demographic (change in adolescent's activity level, adequate support) and study variables (i.e., anxiety, depression, beliefs, perceived stress, headache disability, headache frequency, headache severity, and parent perception of pain interference in adolescents with chronic daily headaches)?

Comparisons were performed between groups and within groups. A correlation within group was conducted to detect if an association was present in both groups or specific to one group. This would provide information on sources of potential bias.

When examining correlations of the entire sample at baseline (see Table 16), beliefs demonstrated a small to moderate positive association with perceived adequate support($r = .33$, $p<.05$) and a moderate negative association with depression ($r = -.40$, $p<.05$). A small to moderate positive association was found between perceived stress and medication frequency ($r = .37$, $p<.05$). A moderate positive correlation was found with perceived stress and anxiety ($r = .41$, $p<.05$). Small to moderate positive correlations were seen among anxiety and medication frequency ($r = .40$, $p<.05$) and depression ($r = .34$, $p<.01$). PedMIDAS (headache

disability) correlated positively with parent perception of pain interference (r = .34, p<.05) and headache frequency (r = .33, p<.05). Headache pain level demonstrated a positive small correlation with changes in the adolescents' activity level.

When examining the associations among variables at baseline by groups (see Table 17), beliefs in the COPE-HEP group demonstrated a moderate to strong positive significant correlation with adequate perceived support for headaches from family, school, or work (r = .61, p< .05) and a moderate to strong negative significant correlation with headache frequency (r = .55, p<.05). A moderate to strong positive correlation was found between perceived stress and anxiety (r = .54, p<.05) in the COPE-HEP group. Anxiety demonstrated a moderate to strong positive significant correlation with depression (r = .68, p<.01) and activity change (r = .54, p<.05) in the comparison headache education group. There was a moderate to strong positive significant correlation between depression and pain severity (r = .51, p<.05) in the comparison headache education group, with higher levels of depression associated with higher pain scores. There were no significant correlations of these variables (anxiety and depression; depression and pain level) among the COPE-HEP group. BMI in the COPE-HEP demonstrated a negative significant correlation with headache disability (r = -.54*, p < .05). BMI percentile in the COPE-HEP group also

demonstrated a negative significant correlation with headache disability (r = -.61*, p = .01).

At post-intervention (see Table 19), a moderate positive correlation was found between perceived stress and pain level (r = .37, p < .05), perceived stress and headache duration (r = .44, p < .05) and perceived stress and anxiety (r = .40, p < .05). Anxiety demonstrated a moderate positive correlation with pain level (r = .41. p < .05) and with depression (r = .42, p < .05). There was a moderate positive correlation between depression and medication frequency (r = .36, p < .05). A strong positive correlation was found between headache disability and headache duration (r = .67, p < .01) and between headache disability and headache frequency (r= .50, p < .01). There was a moderate positive correlation between headache disability and PPPI (r = .48, p < .01). Beliefs, perception of adequate support, gender, BMI, and BMI percentile did not correlate with any of the outcome variables.

Table 13

Preliminary Effects of Intervention Within Groups (n = 32)

Variable	Mean T0	SD T0	Mean T1	SD T1	Cohen's D	Mean Diff	t	df	p
Anxiety									
Comparison	50.94	8.31	47.38	6.10	-.488+	3.56	1.92	15	.07
COPE-HEP	59.25	9.57	52.56	7.36	-.784++	6.69	3.45	15	.01
Depression									
Comparison	57.56	3.35	49.69	6.46	-1.529+++	7.88	4.83	15	.01
COPE-HEP	60.00	4.51	51.69	6.65	-1.457+++	8.31	5.71	15	.01
Beliefs									
Comparison	72.25	7.60	75.25	11.23	.313+	-3.00	-1.41	15	.18
COPE-HEP	68.25	10.31	73.44	9.17	.532++	-5.19	-2.21	15	.04
Perceived Stress									
Comparison	29.38	3.78	28.44	6.13	-.185+	.94	0.76	15	.46
COPE-HEP	31.06	6.43	30.75	5.05	-.054+	.31	0.23	15	.82
PedMIDAS									
Comparison	53.81	56.04	30.88	30.02	-.510++	22.94	2.18	15	.05
COPE-HEP	56.13	51.62	38.25	32.21	-.416+	17.88	1.90	15	.08
Headache Frequency									
Comparison	4.81	1.42	3.19	2.07	-.913++	1.63	4.10	15	.01
COPE-HEP	5.13	1.41	3.06	2.14	-1.141+++	2.06	4.31	15	.01
Headache Pain Level									
Comparison	7.00	2.07	5.63	2.34	-.620++	1.38	2.42	15	.03
COPE-HEP	6.88	1.93	6.38	2.09	-.248+	.50	1.00	15	.33
Headache Duration									
Comparison	4.31	1.54	2.44	1.60	-1.191+++	1.88	4.39	15	.01
COPE-HEP	4.75	1.44	3.63	2.00	-.641++	1.13	2.76	15	.01
Medication Freq									
Comparison	2.88	.96	2.31	1.35	-.487+	.56	2.18	15	.05
COPE-HEP	3.31	1.01	2.94	1.24	-.327+	.38	1.00	15	.33
PPPI									
Comparison	37.63	13.30	32.94	16.49	-.313+	4.69	1.15	15	.27
COPE-HEP	41.88	13.24	34.88	18.20	-.44+	7.00	1.57	15	.14

Note. + = small effect size
++ = medium effect size
+++ = large effect size
PedMIDAS = Headache Disability
PPPI = Parent Perception of Pain Interference

Table 14

Differences Between Groups at Baseline

Variable	Mean T0	SD T0	Cohen's D	Mean Diff	CI Low	CI Upper	t	df	p
Beliefs									
COPE-HEP	68.25	10.31	-.44	-4.00	-9.43	1.43	-1.25	30	.22
Comparison	72.25	7.59							
Perceived Stress									
COPE-HEP	31.06	6.43	.32	1.67	-1.50	4.88	.91	30	.37
Comparison	29.38	3.78							
Anxiety									
COPE-HEP	59.25	9.57	.93	8.31	2.93	13.69	2.62	30	.01
Comparison	50.94	8.31							
Depression									
COPE-HEP	60.00	4.52	.61	2.44	.05	4.82	1.74	30	.09
Comparison	57.56	3.34							
PedMIDAS									
COPE-HEP	56.13	51.62	.05	2.31	-30.12	34.64	.12	30	.90
Comparison	53.18	56.04							
Headache Frequency									
COPE-HEP	5.13	1.41	.23	.31	-.54	1.16	.62	30	.54
Comparison	4.18	1.42							
Headache Duration									
COPE-HEP	4.75	1.44	.30	.44	-.46	1.33	.83	30	.41
Comparison	4.31	1.54							

Table 14, continued.

Variable	Mean T0	SD T0	Cohen's D	Mean Diff	CI Low	CI Upper	t	df	p
Headache Pain Level									
COPE-HEP	6.88	1.93	-.06	-.13	-1.32	1.07	-.18	30	.86
Comparison	7.00	2.01							
Medication Freq									
COPE-HEP	3.31	1.01	.44	.44	-.15	1.03	1.26	30	.22
Comparison	2.88	.96							
PPPI									
COPE-HEP	41.88	13.24	.32	4.25	-3.71	12.21	.91	30	.37
Comparison	37.63	13.29							

Table 15

Means, Standard Deviations, Cohen's d, , and T-values Between Groups at Baseline (n = 32)

Variable	Mean	SD	Cohen's D	Mean Diff	CI Low	CI Upper	t	df	p
Beliefs									
COPE-HEP	68.25	10.31	-.440	-4.00	-9.43	1.43	-1.25	30	.220
Comparison	72.25	7.59							
Perceived Stress									
COPE-HEP	31.06	6.43	.320	1.67	-1.50	4.88	.91	30	.370
Comparison	29.38	3.78							
Anxiety									
COPE-HEP	59.25	9.57	.930	8.31	2.93	13.69	2.62	30	.010*
Comparison	50.94	8.31							
Depression									
COPE-HEP	60.00	4.52	.610	2.44	.05	4.82	1.74	30	.090**
Comparison	57.56	3.34							
PED MIDAS									
COPE-HEP	56.13	51.62	.050	2.31	-30.12	34.64	.12	30	.900
Comparison	53.18	56.04							
Headache Frequency									
COPE-HEP	5.13	1.41	.230	.31	-.54	1.16	.62	30	.540
Comparison	4.18	1.42							
Headache Duration									
COPE-HEP	4.75	1.44	.300	.44	-.46	1.33	.83	30	.410
Comparison	4.31	1.54							

Table 15, continued.

Variable	Mean	SD	Cohen's D	Mean Diff	CI Low	CI Upper	t	df	p
Comparison	7.00	2.01							
Medication Freq									
COPE-HEP	3.31	1.01	.440	.44	-.15	1.03	1.26	30	.220
Comparison	2.88	.96							
PPPI									
COPE-HEP	41.88	13.24	.320	4.25	-3.71	12.21	.91	30	.370
Comparison	37.63	13.29							

*.05 level of significance (2-tailed), **.10 significance level (2-tailed)

Table 16

Correlation Matrix of Sample at Baseline T(0)

	Adequate Support	Activity Change	PPPI	Med Freq	Pain Level	Headache Duration	Headache Frequency	Ped-MIDAS	Depression	Anxiety	Per-ceived Stress	Beliefs
Beliefs COPE-HEP Comparison	.33*	-.12	-.21	-.25	-.02	.14	-.30	-.16	-.40*	-.20	-.07	--
Perceived Stress COPE-HEP Comparison	.08	-.09	-.11	.37*	.17	-.32	-.18	.12	-.07	.41*	--	
Anxiety COPE-HEP Comparison	-.02	.35*	.12	.40*	.20	.12	.19	.12	.34*	--		
Depression COPE-HEP Comparison	-.12	.17	.27	.24	.16	.23	.07	.20	--			
PedMIDAS COPE-HEP Comparison	.02	.19	.34*	-.09	.21	.28	.33*	--				
Headache Frequency COPE-HEP Comparison	-.01	.10	.20	.02	.28	.05	--					
Headache Pain Level COPE-HEP Comparison	.01	.39*	.13	-.08	-.04	--						
Headache Duration COPE-HEP Comparison	.16	-.30	.06	-.03	--							

Table 16, continued.

	Adequate Support	Activity Change	PPPI	Med Freq	Pain Level	Headache Duration	Headache Frequency	Ped-MIDAS	Depression	Anxiety	Per-ceived Stress	Beliefs
Medication Frequency	.14	.19	.06	--								
COPE-HEP Comparison												
PPPI	.13	.33	--									
COPE-HEP Comparison												
Activity Change	-.14	--										
COPE-HEP Comparison												
Adequate Support	--											
COPE-HEP Comparison												

Note. * Correlation is significant at the 0.05 level (2-tailed)
* Correlation is significant at the .01 level (2-tailed)
PedMIDAS = Headache Disability
PPPI = Parent Perception of Pain Interference

Table 17

Correlations Among Study Variables by Groups at Baseline

	Activity Change	Ade-quate Support	PPPI	Med Freq	Pain Level	Head-ache Dura-tion	Head-ache Fre-quency	Ped-MIDAS	Depres-sion	Anxiety	Per-ceived Stress	Beliefs	BMI %	BMI
BMI														
COPE-HEP	.15	-.33	-.09	.43	.21	-.07	-.29	-.54*	-.31	-.13	-.22	.40	.95*	--
Comparison	.39	.25	.15	-.09	.34	.25	.08	.16	.38	-.02	.12	.17	.73**	
BMI %														
COPE-HEP	.17	-.30	-.21	.48	.04	-.03	-.36	-.61*	-.32	-.15	-.19	.45	--	
Comparison	.45	.28	-.02	-.39	.41	.13	.07	.07	.41	-.07	-.29	.16		
Beliefs														
COPE-HEP	-.41	.62*	-.35	.01	-.15	-.03	-.55*	-.45	-.38	-.09	.07			
Comparison	.22	-.13	.08	-.40	-.03	-.05	-.00	.20	-.37	-.47	.31	--		
Perceived Stress														
COPE-HEP	-.32	.24	-.02	.28	-.53*	.32	-.06	.21	-.08	.54*				
Comparison	.07	-.26	-.40	.66**	-.14	.09	-.10	.20	.04	.25	--			
Anxiety														
COPE-HEP	.20	.08	.15	.48	.06	.10	.17	.32	.12					
Comparison	.54*	.13	.09	.42	.34	.29	.23	-.01	.68**	--				
Depression														
COPE-HEP	.21	-.18	.26	.10	.08	.01	.03	.35						
Comparison	.33	.13	.13	.27	.51*	.07	-.20	-.17	--					
PedMIDAS														
COPE-HEP	.16	-.11	.44	-.13	.23	.27	.26							
Comparison	.48	.21	.32	-.04	.34	-.05	.42	--						
Headache Frequency														
COPE-HEP	-.24	-.19	.20	-.08	.06	.28								
Comparison	.23	.34	.23	-.12	.07	.52*	--							

Table 17, continued.

	Activity Change	Ade-quate Support	PPPI	Med Freq	Pain Level	Head-ache Dura-tion	Head-ache Fre-quency	Ped-MIDAS	Depres-sion	Anxiety	Per-ceived Stress	Beliefs	BMI %	BMI
Headache Duration														
COPE-HEP	-.42	.37	.18	.15	-.06									
Comparison	-.04	.05	-.10	-.06	.04	--								
Pain Level														
COPE-HEP	.36	-.12	.16	-.08										
Comparison	.50*	.13	.11	-.14	--									
Medication Freq														
COPE-HEP	.246	.32	-.05											
Comparison	.001	-.04	-.02	--										
PPPI														
COPE-HEP	.35	-.14												
Comparison	.32	.68**	--											
Adequate Support														
COPE-HEP	-.37													
Comparison	.26	--												
Activity Change														
COPE-HEP	--													
Comparison														

* Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)
PedMIDAS = Headache Disability
PPPI = Parent Perception of Pain Interference

Table 18

Effects of Mild Versus Moderate Depression on Study Variables

Variable	Mean	SD	Cohen's D	CI Lower	CI Upper	t	df	p
Beliefs								
Mild Depress	76.42	7.99	.74	1.64	14.95	2.12	30	.04
Moderate Depress	68.13	13.62						
Perceived Stress								
Mild Depress	30.08	5.27	.32	1.98	5.89	.85	30	.41
Moderate Depress	28.13	6.83						
Anxiety								
Mild Depress	48.75	6.50	-1.06	-9.68	-.07	-1.72	30	.10
Moderate Depress	56.63	8.21						
PedMIDAS								
Mild Depress	38.96	33.38	.66	-3.45	38.62	1.42	30	.17
Moderate Depress	21.38	17.05						
Headache Frequency								
Mild Depress	3.25	2.13	.24	-.95	1.95	.58	30	.56
Moderate Depress	2.75	1.98						
Headache Duration								
Mild Depress	3.00	1.91	-.07	-1.45	1.20	-.16	12	.87
Moderate Depress	3.13	1.89						
Headache Pain Level								
Mild Depress	5.92	2.39	-.16	-1.89	1.22	-.36	30	.72
Moderate Depress	6.25	1.67						
Medication Frequency								
Mild Depress	2.54	1.38	-.27	-1.25	.59	-.62	30	.54
Moderate Depress	2.88	1.13						

Table 18,
continued.

Variable	Mean	SD	Cohen's D	CI Lower	CI Upper	t	df	p
PPPI								
Mild Depress	33.42	16.19	-.11	-14.00	10.08	-.28	30	.78
ModerateDepress	35.38	20.78						

PedMIDAS = Headache Disability
PPPI = Parent Perception of Pain Interference

Table 19

Correlation Matrix of Sample at Post-Intervention

	Adeq. Support	Gender	BMI %	BMI	PPPI	Med. Fre-quency	Pain Level	Head-ache Dura-tion	Head-ache Fre-quency	Ped-MIDAS	Depres-sion	Anxiety	Stress	Beliefs
Beliefs	-.02	-.03	.17	-.06	-.27	-.26	-.14	-.07	-.14	-.12	-.43	-.07	-.12	
Perceived Stress	.15	-.09	.01	.08	.09	.24	.37*	.44*	.09	.27	.26	.40*		
Anxiety	-.19	.05	.22	.15	.23	.03	.41*	.28	-.17	.01	.42*			
Depression	-.29	.05	-.08	.06	-.02	.36*	.17	.29	-.30	-.04	_			
PED MIDAS	.18	-.14	-.35	-.25	.48**	.07	.19	.67**	.50**	_				
Headache Frequency	.01	-.24	-.20	-.18	.34	.10	.15	.21	_					
Headache Duration	-.02	.16	-.15	-.07	.33	.21	.26	_						
Headache Pain Level	.12	-.19	.29	.30	.23	.24	_							
Medication Frequency	.10	-.03	-.26	-.01	.16	_								
PPPI	.32	.23	-.19	-.14	_									
BMI	.02	-.24	.78**	_										
BMI Percentile	-.06	-.21	_											
Gender	-.04	_												
Adequate Support	_													

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)
PedMIDAS = headache disability
BMI = Body Mass Index
PPPI = Parent Perception of Pain Interference

Chapter 5

DISCUSSION

This chapter presents an interpretation of the findings from this study. The primary aims of this study were to pilot test the feasibility, acceptability, and preliminary effects of a COPE-HEP theory-based intervention with adolescents who suffer from CDHs with mild to moderately elevated depressive symptoms and to examine the relationships among study variables. The anticipated effects of the COPE-HEP intervention were decreases in anxiety, depression, headache disability, headache frequency, headache pain level, headache duration, medication frequency, and parent perception of pain interference. Personal beliefs and perceived stress were theorized as the processes that mediated the effects of the intervention. In addition, internal consistency of the measures used for this population was assessed. The study's strengths and limitations, theoretical implications, and implications for clinical practice and research are discussed.

Acceptability and Feasibility

Acceptability. Overall, adolescents and parents who participated in the COPE-HEP intervention reported that they were satisfied with the intervention. They indicated that the program was helpful and relatively easy to attend as evidenced by the teen and parent program evaluation questionnaires and interventionist notes. The teens' comments reflected tenets of the COPE-HEP (e.g., cue recognition, positive thinking, identification and awareness of stressors, recognition of unhealthy lifestyle habits, knowledge of headache triggers and

headache hygiene measures) and an understanding of the connection among their thoughts, emotions, and behavior.

Parents expressed similar themes as to how the intervention was helpful. When asked about the ease of participation in the program, the overall theme from both parents and adolescents was that participation was easy. All parents and teens would highly recommend the program to others.

Several parents reported that they could see changes in their teens' behavior while in the program. For example, a parent in the COPE-HEP group commented that her teen was taking ownership of her headaches and not feeling like a victim since participating in the program. Several parents from both groups expressed that their teens seem to have better control of their headaches after participating in the program. In addition parents among both groups reported that their teens were better controlling their headaches by avoiding food they recognized as triggers, not skipping meals, not consuming large amounts of caffeine, and drinking more water. Comments from parents in the COPE-HEP group reflected that the adolescents were using learned relaxation measures such as relaxation, mediation, staying in the moment, and positive self-talk to cope with their more severe headaches.

Two parents requested that the PI continue sessions with their teens after completion of the seven-session program. One parent whose teen was in the COPE-HEP group expressed that her son was in better control of his aggression since being in the program and was concern that her son may relapse after his COPE-HEP therapy ended. Another parent in the COPE-HEP group commented

that she would have benefited from this type program when she was a teen struggling with headaches.

Feasibility. Teens' attendance, homework completion, and the fidelity monitoring log assessed the program's feasibility. Feasibility makes an important determination as to the appropriateness of an intervention for future efficacy testing (Bowen et al., 2009). In response to feasibility, the interventionist's notes reflect several comments from adolescents verbalizing that there were too many questionnaires. Several requests were made by the adolescents to take the questionnaires home and mail back to the clinic. There were only four comments about the number of sessions (e.g., too many sessions, fewer onsite meetings, sessions closer to home) and homework (e.g., less homework) in the program evaluations. These documented responses and those described in interventionist field notes indicated that the probability of participant burden. Bradburn (1977) described subject burden as a subjective phenomenon that is influenced by (a) interview or program length, (b) subject or participant requirements, (c) the degree of sensitivity of the questions being asked, (d) the associated stress the questions may create, and (e) the frequency of participation in the program. Studies have shown that participant response rates and research participation is maximized when the number and frequency of request for information is reduced (Sharp & Frankel, 1983). Participants in this study rated the length and number of sessions as adequate; however, there is a degree of discrepancy in their subjective responses and the objective rating (e.g., average number of weeks needed to complete seven sessions, number of missed and rescheduled sessions).

The adolescents may have been more responsive to the homework if there was less content and less repetition of the content per teens' comments to the interventionist and from the information extrapolated from the questionnaires. The addition of a Headache Education Program (HEP) to an already established COPE Program may explain some of the homework burden. In addition to the homework requirements for COPE, the teens had headache specific activities to perform (e.g., headache diary, food diary, headache hygiene monitoring log, etc.). Modifying and streamlining the homework may decrease burden for this group of adolescents. Findings from this study demonstrated that adolescents completing five or more homework sessions had higher beliefs, lower frequency of headaches, lower medication use, and less parent perception of pain interference than adolescents completing four or less homework sessions. Studies support that compliance with homework assignments improves the outcomes of psychotherapy (Burns & Spangler, 2001; Person, Burns, & Perloff, 1988).

The attrition rate was 11%. This was less than the attrition rate in reviewed research studies (see Appendix A). The weekly participation rate was a major concern. Breaks between sessions ranged from one to six weeks. The biggest gaps in sessions were between the telephone and clinic sessions. When exploring the reasons for missed sessions, many were due to parents not being able to leave work and conflict with the teens' schedules (e.g., practice for an extracurricular activity, after school tutoring or homework help, severe headache). The teen who had a six-week break between her sessions consistently reported that she was unable to engage in the session because of severe headache. A few

adolescents forgot about their sessions, in spite of the reminder text message the evening prior to the session. One parent suggested an email reminder about the sessions. A combination of email, text messaging, and telephone calls may improve participant attendance.

The issue of parents' reluctance to leave work to bring the teen to clinic sessions is reflective of the current economy. Based on the interventionist's field notes, parents preferred clinic sessions in that they could reinforce the intervention at home but were hesitant to take so much time off from work for fear of losing their jobs. The interventionist offered work excuses; however, parents reported a sense of insecurity with not being physically present at work given the current jobless rate and the demand for jobs by the unemployed. Providing five telephone sessions and two in-clinic sessions (one for pretest and one for post-test) may lessen this burden, although the telephone delivery of the intervention was not without challenges. On average, it was difficult to maintain the participants' full attention during telephone sessions due to various environmental distractions. Future trials should focus on the delivery of the intervention via technology. For example, a Skype© delivered intervention may add more structure to the delivery process, increase the teen's concentration, and decrease opportunity for distraction in that the teen would more likely be sitting at his or her computer with focus on the interventionist for the entire session. Many studies have documented the advantages of highly interactive multimedia and individualized methods for delivery of health-related knowledge in children and adolescents (Bradlyn, Beale, & Kato, 2003; Connelly, Rapoff, Thompson, &

Connelly, 2006; Dragone, Bush, Jones, Bearison, & Kamai, 2002; Hicks, von Baeyer, & McGrath, 2006; Lecheler, 2001; Velleman, Stallard, & Richardson, 2010). Examples given include the Internet (Lecheler, 2001) and CD-ROM (Dragone et al., 2002). Lecheler (2001) reported a high level of participation and satisfaction among children and adolescents following a long-term standardized Internet-based asthma education program. Results of Dragone and colleagues' (2002) study supported an increased feeling of control and a high level of satisfaction with the intervention when received by CD-ROM. From a developmental perspective, a computer-based model for delivery of the COPE-HEP psycho-educational intervention may allow the adolescent more autonomy in selecting when to engage the intervention and may improve outcomes, although further research is needed to substantiate this claim.

Fidelity. Delivery of the COPE-HEP was evaluated by compliance to the weekly fidelity logs of session content and audiotaping of the course sessions over the length of the intervention. The intervention content was delivered consistently throughout the seven-session program; however, at times, the 20 and 30-minute sessions did not allow adequate time to thoroughly address the participants' questions. Future studies should focus on the combined COPE for Teens and Headache Education Program , the dose of the combined intervention needed for effect, and the number and length of sessions needed to produce and sustain the effect. In addition, the redundancy of the content in the COPE-HEP intervention needs to be modified per participants' feedback.

Receipt of the intervention. Participants in the COPE-HEP were asked to report changes in their thoughts, emotions, and behaviors at Sessions 3 and 5 to indicate how much the information gained in the training helped to improve their feelings, thoughts, behaviors, and headache management. The majority of participants indicated benefit from the intervention, while one participant at each time point did not fully process or apply the intervention. This particular participant missed several sessions because of severe headache and had breaks between sessions up to six weeks. The extended gap between sessions and the chronicity of this teen's headaches may have played a role in her receipt of the intervention. The extent to which participants adhere to an intervention impacts their receipt of the intervention and ultimately the efficacy of the intervention (Rains, Penzein, & Lipchik, 2006).

Preliminary Effects of COPE-HEP on Study Variables

Effects of COPE-HEP on anxiety. The preliminary effect of the COPE-HEP on anxiety was examined by evaluating the teen's level of anxiety from pre-intervention to post-intervention using a two-tailed paired sample t-test. Adolescents in the COPE-HEP group demonstrated a decrease in anxiety mean scores over time. The decrease was statistically significant with a medium to large effect size of .78 (see Table 11). The medium to large effect reveals that the intervention was successful in reducing anxiety in this population. The comparison headache education group intervention had a small positive effect on anxiety scores from baseline to post-treatment indicating that the information they received did not have as great of an effect on their anxiety as did the COPE-HEP

intervention. This finding is important because it demonstrates a promising and effective treatment for anxiety in adolescents with CDHs and mild to moderately elevated depressive symptoms. Anxiety has been found to be a risk factor for headache chronification (Smitherman, Penzien, & Maizels, 2008). Based on this finding, effective treatment of the adolescents' anxiety would potentially decrease the frequency and duration of their headaches, which are contributing factors to chronicity.

Effects of COPE-HEP on depression. Evaluating the teens' level of depression from pre-intervention to post-intervention assessed the preliminary effect of COPE-HEP on depression. Both the COPE-HEP and the comparison headache education groups demonstrated significant decreases in their depression mean scores, with large effect sizes of 1.46 and 1.53, respectively. Studies in the literature support a positive response to depression in comparison programs. Griffiths, Christensen, Jorm, Evans, and Groves (2004) found similar responses in an intervention group and a comparison headache education group in a randomized controlled trial that examined the effect of web-based depression literacy and cognitive behavior therapy in adults. Both groups demonstrated reduced personal stigma immediate at post-intervention, however with small effect. When benchmarked against CBT, usual care of depressed youth in a community health clinic performed equally as well as a comparison group (Weersing & Weisz, 2002).

The lack of a significant change in depression between the groups may be related to the time period of the participants' depressive symptoms and of their

CDHs symptoms. Adolescents with new onset CDHs are likely to respond differently to the intervention than adolescents with long-term histories of CDHs. In addition, the response of depressive symptomology to intervention in adolescents with relatively new CDHs symptoms would likely be different from that of adolescents with long-standing CDHs. Additionally, the decrease in depressive symptoms in both groups may have occurred because adolescents receiving the COPE-HEP and comparison headache education interventions both received seven contacts with a supportive individual over time. The attention and motivational encouragement received from these contacts alone may have decreased depressive symptoms. Further research is needed to explore the impact of this intervention on depression in adolescents with short-duration and long-duration CDHs, the impact of COPE-HEP on psychiatric comorbidities between these groups, and the long-term sustainability of the COPE-HEP intervention compared to a comparison group.

Effects of COPE-HEP on headache disability. Overall PedMIDAS scores from baseline to post-intervention determined the preliminary effects of the COPE-HEP on headache disability. Interestingly, significant decreases were demonstrated in the teens' mean scores in both groups after the interventions, with a small effect size for the COPE-HEP intervention and a medium effect size for the comparison headache education group. These findings suggest that the adolescents in both the COPE-HEP group and the comparison headache education group experienced improvement in their functional ability after completing their respective programs.

Effects of COPE-HEP on headache frequency. An examination of the preliminary effects of COPE-HEP on headache frequency from pre- to post-intervention revealed a significant decrease in headache frequency for both groups. The COPE-HEP group demonstrated a larger mean change (2.06) with a large effect size (1.14) in comparison to the comparison headache education group that demonstrated a smaller mean change (1.63), with a slightly smaller effect size (-.91). This finding supports that COPE-HEP had a larger impact on headache frequency, although the change in headache frequency was not exclusive to the COPE-HEP intervention group. Given this finding, future programs incorporating interventions that promote cognitive and lifestyle modifications are needed because the long term sustainability of the COPE-HEP and comparison headache education interventions is not known and it is evident that adolescents in both treatment arms of this study experienced less headache related disability after participating in the program.

Effects of COP-HEP on headache severity. In regards to headache severity, teens in the COPE-HEP group did not report a decrease in their level of pain after the intervention, while teens in the comparison headache education group demonstrated a significant decrease in their pain level. This finding may be related to the fact that these teens also demonstrated a decrease in overall headache disability. These findings suggest that changes in headache severity may be related to basic headache education rather than the CBSB intervention in this group of teens. Craddock and Ray (2011) posit that individually tailored education regarding life style modifications (e.g., eating patterns, sleep habits,

hydration, headache triggers) can decrease headache frequency and severity and ultimately prevent chronic daily headaches.

Effects of COPE-HEP on headache duration. The preliminary efficacy of the COPE-HEP on headache duration was established by use of a Headache Diary. Both the COPE-HEP and comparison headache education group had significantly lower scores on headache duration over time. These findings would suggest that a behavioral change occurred in adolescents in both groups that attributed to a decrease in headache duration.

Effects of COPE-HEP on medication frequency and parent perception of pain interference. The preliminary effects of COPE-HEP on medication frequency were established through use of a Headache Diary. Small effect sizes for both groups were seen in this study. The comparison headache education group experienced a significant mean change from baseline to post-treatment. There were no significant effects of COPE-HEP or education on parent perception of pain interference. This finding is interesting given the parents' ratings of improvement in their adolescents' ability to better manage their headaches after participating in the program and given the adolescents' ratings of decrease headache disability after completing the program. A lack of change in the parents' ratings of pain interference may be influenced by a number of factors. For example, there was not a daily monitoring log to track the adolescents' activity at home, and the assessment of this measure was based on parent recall over the course of several weeks. An additional factor may be that the

adolescents' decrease participation in home chores and other home activities may not have been because of headaches.

Effect of Mild Versus Moderate Depression on Study Variables

Table 18 describes the effects of mild versus moderate depression on study variables. When examining the effects of adolescents with mild depressive symptoms compared to adolescents with moderate depressive symptoms on study variables, a statistically significant difference was found between the groups in beliefs. Adolescents with mild depression demonstrated higher beliefs than adolescents with moderate depression. This finding is important because it supports the premise that positive schemas (beliefs) are associated with less depressogenic thinking.

Correlations of Baseline Measures for COPE-HEP/Comparison Groups

At baseline in the COPE-HEP group, higher beliefs were significantly correlated with higher perceived support and lower headache frequency. Higher perceived stress was significantly correlated with lower pain level and increased anxiety. This finding is not reliable in that the Perceived Stress scale demonstrated low internal consistency reliability. Higher headache disability was correlated with lower BMI and BMI percentile. Hershey and colleagues (2009) reported a correlation between higher headache disability and higher BMI and BMI percentile. The findings from this study may be due to the small sample size. To the extent justified by the significant correlation coefficients, an adolescent with higher beliefs also may have a higher perception of adequate support and less frequent headaches. In the comparison headache education

group, higher levels of depression were significantly correlated with higher pain scores. Guidetti and colleagues posit that headache chronicity increase in the presence of psychiatric comorbidities.

Correlations of Post-Intervention Measures for Entire Sample

At post-intervention higher perceived stress was significantly correlated with higher pain and higher anxiety. Several researchers have found that children with more frequent and severe headaches experience more stress than children with less frequent and less severe headaches (Bandell-Hoekstra et al., 2002; Bjorling, 2009; Fearon & Hotopf, 2001). Anxiety was associated with higher pain level and higher depression. This result was not surprising because anxiety and depression have been found to be comorbid disorders among adolescents with CDH (Pearlman, 2007; Wang et al., 2007b). Higher depression correlated with higher medication use. Schrader posits that both depression and anxiety increase susceptibility to medication use.

Theoretical Mediating Variables: Beliefs and Perceived Stress

Beliefs and perceived stress were proposed as the mechanisms through which the outcomes would be positively influenced. Mediation suggests an association between variables (Baronowski et al., 2003). Assessing correlations among study variables is the first step to testing mediation.(Baronowski, 2006). An understanding of the mediators of an intervention will enhance understanding of the effects of the intervention on behavioral outcomes (Baumen, Sallis, & Dzeweltowski, 2002). The adolescent's beliefs and perceived stress may mediate their anxiety, depression, headache disability, headache frequency, headache

severity, headache duration, and medication frequency. Findings revealed that the COPE-HEP intervention increased beliefs; although, beliefs did not correlate with any of the outcome variables. The COPE-HEP intervention did not decrease perceived stress; although, perceived stress demonstrated significant correlations with pain level, headache duration, and anxiety at post-intervention. These findings suggest that beliefs and perceived stress are not likely to have mediating influences on the outcomes of the intervention. There was an insufficient sample size to adequately test for mediation in this study. Therefore, these variables should be re-examined in a larger RCT exploring mediation.

Factors Potentially Affecting Outcomes

The weekly sessions may have been the motivation for the teens to make immediate changes to lifestyle and dietary patterns. A second factor that may account for the positive outcomes in both intervention groups may simply be the attention that the participants in both groups received. In addition, both groups received information that was specific to their health problem. The gender mix in the intervention groups may have impacted outcome. The COPE-HEP group was comprised mostly of females. Hershey and colleagues (2009) found that female gender influenced headache disability outcome. An additional influencing factor may be the level of perceived support among the groups. The fact that adolescents in the COPE-HEP perceived less support from family, school and work compared to comparison headache education group may have impacted their response to the intervention. Molarius and colleagues (2008) found that poor social support was associated with increased headache disorder.

The lack of reliability of the Perceived Stress Scale and the Beck Youth Depression Inventory may have affected outcomes. In addition, small sample size and self-report may have influenced some of the findings in this study (e.g. higher perceived stress with lower pain level and higher mean scores in perceived stress, anxiety, headache duration, and headache disability in adolescents with good homework completion (n = 11) compared to adolescents with poor homework completion (n = 5). A final factor may be diffusion of treatment in that manipulation checks were not performed in the comparison headache education group to monitor for cross-over of content and adherence to protocol and homework completion.

Strengths. Overall strengths of the COPE-HEP intervention included: (a) a significant decrease in anxiety over time compared to the comparison headache education group; (b) increased beliefs over time; (c) delivery of the program with high fidelity; (d) low attrition rate compared to prior studies; (e) overwhelming acceptability of the program by parents and teens; (f) use of a randomized controlled trial design, with treatment and control groups; and (g) use of a theory-based manualized intervention.

Limitations. There were several limitations to the study. Some of the survey methods relied on self-report, which raised concern about the reliability of the data (Weinhardt, Forsyth, Carey, Jaworski, & Durant, 1998). The sample was a homogenous sample of teens with CDHs and mild to moderate depressive symptoms; therefore may not be generalizable to teens with CDHs without these comorbid conditions. The findings may not be generalizable to teens with other

headache types. In addition, the sample represented teens referred to a specialty care clinic and may not be representative of teens with CDHs with mild to moderate depressive symptoms being treated in primary care or other non-specialty care settings. The small sample size may limit the ability to detect statistically significant results (Type-II error) (Maxwell & Delaney, 2004). The convenience sample limits generalizability of the results (Wang & Bakhai, 2006). Other limitations included: (a) rigid inclusion criteria (i.e., teens with mild to moderately elevated depressive symptoms), which may have excluded other teens with CDHs who may have benefited from this intervention; (b) lack of control for changes in anti-migraine medications during the intervention; (c) two scales demonstrating Cronbach's alphas less than .70 (i.e., Beck Youth Depression and Perceived Stress), which indicate that the response pattern was inconsistent as participants did not answer similarly on these scales; (d) possible participant burden due to the number of assessment measures, number of clinic sessions, and amount of homework; (e) predominantly female sample, which limits generalizability to male gender, and (f) findings isolated to adolescents in a specialty care setting in one geographic region of the United States.

Summary

Overall, both the COPE-HEP and comparison headache education interventions produced positive outcomes on many of the examined variables. The COPE-HEP intervention demonstrated the greatest impact on the participants' level of anxiety, which is important because anxiety is a comorbidity of CDHs. A large-scale study is needed to focus on the impact of COPE-HEP on

anxiety level in all adolescents with CDHs. Adolescents in the COPE-HEP group also demonstrated positive changes in depression, headache disability, and headache frequency. The comparison headache education group demonstrated positive changes in anxiety, depression, headache disability, headache frequency, headache pain level, headache duration, and medication frequency. Participants in both groups received education about sleep and eating patterns, adequate fluid intake, identification and avoidance of triggers (dietary and environmental). Sun-Edelstein and Mauskof (2009) posit that a reduction in migraine frequency and severity can be attributed to lifestyle modifications. In a pilot study, adequate hydration supported a decrease in headache frequency and severity (Spigt et al., 2005).

An interesting finding is the large number of adolescents indicating an increased risk for suicide. In this study, approximately 44% of adolescents expressed suicide ideation. In their study of 121 adolescents with CDHs, Wang and colleagues (2007) found that 47% of the adolescents had one or greater psychiatric comorbidities to include major depression, panic disorder, and suicide. These researchers conducted in-person psychiatric interviews to assess depressive and anxiety disorders and suicide based on the MINI-International Neuropsychiatric Interview-Kid (Mini-Kid). Findings from Wang and colleagues' (2007) study suggest the need for future studies to evaluate the consistency of a self-report measure compared to a structured-interview as a measure of suicide in adolescents with CDHs.

Implications for Theory

Cognitive Theory posits that behavior is impacted by a person's thoughts and emotions. Beliefs are formed by a person's negative or positive life experiences (schemas). A thorough understanding of the schema that drives behavior is vital to fully understanding the effects of an intervention on behavioral outcomes. For example, an adolescent with a negative schema would more likely receive an intervention differently than one with positive schema. Psychological Theory of Stress and Coping posits that stress is a result of a transactional process between a person and the environment and the degree to which stress is handled is based on the person's appraisal of the encounter as either positive, controllable, challenging or irrelevant (primary appraisal). This appraisal is followed by a secondary appraisal, which is an assessment a person's coping resources or options as to what to do about the situation (Lazarus & Folkman, 1984). The theoretical framework for the intervention predicted that COPE-HEP would decrease anxiety, depression, headache disability, headache frequency, headache severity, headache duration, medication frequency, and parent perception of pain interference. Using Cognitive Theory as a guide to better understand how the intervention worked in adolescents with CDHs and mild to moderate depressive symptoms in a specialty care setting was partially supported in this study. The findings suggest that this population of adolescents experienced depression and decreased functioning due to their primary and secondary appraisal in addition to an increase in their beliefs, which correlated with headache frequency and perceived adequate support. The findings support that the teens' reappraisal of

their ability to manage their headaches (stressful encounter) impacted their overall headache outcomes. This finding supports the Psychological Theory of Stress and Coping as the framework for understanding CDHs in this group of adolescents. Larazus and Folkman (1984) described cognitive appraisal as the mental process by which people assess the following two factors: (a) the impact of demands on their overall well-being, and (b) the availability of resources to meet the demand of their stressors. It can be conceptualized that the adolescents' inability to effectively manage their CDHs threatened their overall well-being thereby causing functional disability as well as anxiety and depressive symptoms, which was triggered by their health condition. Providing these adolescents with resources to meet the demands of their headache resulted in improved behavior. In this study, headache education seemed to have an empowering effect on adolescents in both groups, resulting in improved outcomes. The findings also demonstrate tenets of Cognitive Theory. Cognitive Theory predicts that the intervention would increase the adolescents' beliefs thereby decreasing their level of anxiety and depression. Adolescents in the COPE-HEP group experienced increased beliefs and lower levels of anxiety and depression after completing the COPE-HEP program. The theory does not predict the dose of the intervention needed to sustain the change. Therefore, future research is needed to test the dose effect of the CBSB intervention at longer intervals following completion of the program. Future research is also needed to better inform of the role of schemas on overall behavioral and psychiatric outcomes in this population.

Implications for Future Research and Clinical Practice

Cognitive Theory and Psychological Theory of Stress and Coping provided the theoretical underpinnings for this COPE-HEP intervention. The utilization of CBSB techniques was included in the COPE-HEP intervention content. The goal of the CBSB intervention was to increase the functional capacity of adolescents with CDHs and decrease their level of anxiety and depression. Mean changes were found in these variables. Further exploration of the COPE-HEP should target CDHs in all adolescents without depressive symptoms because these teens may also benefit from treatment aimed at improving functional performance (cognitive, emotional, and physical). It is vital that clinicians and researchers continue to create and implement evidenced-based interventions for adolescents with CDHs and their families in order to bridge the gap in current literature.

The findings from this study support use of a combined COPE-HEP intervention in adolescents with CDHs. The high rate of expressed ideas of suicide in this study supports the need for clinicians to implement COPE-HEP when working with this population of adolescents because evidence supports that both COPE-HEP and headache education are effective for lessening depressive symptoms. Findings also indicate that adolescents with CDH should be consistently screened for depression and suicide ideation and be given evidence-based treatment including CBT or CBSB, if found to have elevated depressive symptoms.

Unlike adolescents in the comparison headache education program, adolescents in the COPE-HEP program demonstrated a significant change in beliefs. This finding is promising for this intervention because the premise of the COPE-HEP intervention is changing the adolescents' cognition, emotions, and behavior in order to change their cognitive appraisal of the world. Beck (1964) posits that a person's beliefs result from active schema. The fact that adolescents in the COPE-HEP group experienced changes in beliefs suggest positive schema in this group of teens. Positive schemas suggest an increase positive feeling about self. Self-esteem is critical to an adolescents' overall psychosocial well-being (Cast & Burke, 2002). In addition, self-esteem is an important antecedent to the development of healthy headache management behaviors. Adult studies have found that self-esteem mediates headaches through depression (Silberstein et al., 1995).

Given these findings, clinicians are encouraged to deliver the COPE-HEP program to adolescents with CDHs. By incorporating CBSB techniques into their teaching, clinicians can help adolescents see how their thoughts about their headaches are impacted by their cognitive appraisal of their emotions and their lifestyle beliefs. In essence, CBSB techniques will help adolescents recognize that they have control of triggers or measures that may predispose them to headaches and precipitate or perpetuate their headaches, thereby empowering them to improve healthy lifestyle behaviors and take control of their headaches.

Conclusion

This study demonstrated that a theory-based CBSB intervention is acceptable to adolescents with CDHs in a specialty care clinic. Findings indicate that some modification is needed to the intervention. To address the feasibility issue, late afternoon or evening sessions should be incorporated to allow parents and adolescents more flexibility. In addition, the program should be offered at the hospitals' satellite clinics, which are geographically located north, east, and west of metropolitan Phoenix. Furthermore, to address the difficulties with telephone delivery, a Web-based interactive program (Skype©) should be incorporated for the home sessions in that technology based programs have demonstrated efficacy with children and adolescents with health-related conditions (Connelly et al., 2006; Velleman et al., 2010). Additional modifications in the timing of post-intervention assessments should be considered.

The COPE-HEP focused on cue recognition, positive thinking, positive self-talk, role modeling, communication, stress management, and relaxation, in addition to headache triggers and headache hygiene or maintenance measures. Overwhelmingly, the majority of the adolescents in this study positively embraced the both the COPE-HEP intervention and the comparison headache education. Clinically significant results with medium to large effect sizes were demonstrated for the adolescents' anxiety, depression, beliefs, headache frequency, and headache duration in both the COPE-HEP and comparison headache education groups. The lack of significant changes in these variables in the COPE-HEP group alone may indicate that more time is need from baseline to post-test for the adolescents to demonstrate significant changes in these outcomes.

In addition, this finding may indicate a need for thorough pre-screening and monitoring for history or time duration of CDHs and depressive symptoms in this population. Furthermore, the failure of the COPE-HEP to demonstrate statistically significant changes in the treatment group alone may be related to the small sample size and low power of this study and also infusion of treatment between groups. Smitherman and colleagues (2008) postulated that a combination of low power and small sample size may mask clinically significant differences in therapy outcomes.

A longer full-scale RCT is needed to determine both the short- and long-term effects of the program. Performing assessments at different time points post-intervention is important for determining the long-term effects of the intervention (Baum & Forehand, 1981). Assessing long-term effect of the intervention of the COPE-HEP would potentially eliminate motivation and attention as factors for the change in this population of adolescents. Manipulation checks would be incorporated in both treatment arms to control for diffusion of treatment and receipt of the intervention (Waltz, Addis, Koerner, & Jacobson, 1993). Based on feedback from these participants, the intervention would be delivered in six sessions and the length of sessions would be extended to allow for adequate discussion of content. Several studies have found intervention effects between six to eight weeks (Hannan, Rapee, & Hudson, 2000; Johnson & Ridley, 1992; Lin et al., 2003).

Future research is needed to test the acceptability and feasibility of a modified COPE-HEP intervention. Further studies also are needed to assess

whether the modified COPE-HEP would produce additional health gains for adolescents with CDHs and to also assess the cost-effectiveness of a technology-based COPE-HEP program using a larger sample. Since both groups demonstrated effects among several of the outcome variables and both groups received headache education, a future study incorporating a three-group design, to include standard of care for headaches, COPE plus HEP, and HEP only, is an important next step to better understanding the effects of the interventions on the outcome variables in adolescents with CDHs.

Continued utilization and implementation of strategies learned in COPE-HEP has the potential to improve the adolescent's overall functional ability given that all participants in this study described both programs as helpful. Further assessment of the challenges in mode of delivery, homework compliance, and compliance to the seven-week intervention timeframe are key areas for further refinement of the intervention. Given that the majority of participants in this study were females, further research with a more gender-diverse group would expand the generalizability about treatment effects to both genders. In this study, recruiters and families were informed of the criteria for enrollment in an information packet they were given or sent regarding the study. To eliminate the potential for bias in future studies, recruiting physicians, nurses, staff, and interested families would be blinded to depression as an inclusion criteria. These explorations will enhance the body of knowledge regarding the COPE-HEP intervention in this population of adolescents, thus adding to nursing science.

REFERENCES

Abu-Saad, H. (1984). Assessing children's responses to pain. *Pain, 19*(2), 163-171. doi:10.1016/0304-3959(84)90836-4

Adams, G. R. (2000). *Adolescent development: The essential readings*. Malden, MA: Blackwell.

American Academy of Pediatrics. (2000). Improving the implementation of State Children's Health Insurance Programs for Adolescents: Report on an invitational conference sponsored by the American Academy of Pediatrics, Section on Adolescent Health. *Pediatrics, 105*(4), 906-912.

Arean, P. A., & Cook, B. L. (2002). Psychotherapy and combined psychotherapy/pharmacology inn late life depression. *Biological Psychiatry, 52*(3), 293-303.

Arndorfer, R. E., & Allen, K. D. (2001). Extending the efficacy of a thermal biofeedback treatment package to the management of tension-type headaches in children. *Headache, 41*(2), 183-192.

Bacon, E., Milne, D. L., Sheikh, A. I., & Freeston, M. H. (2009). Positive experiences in caregivers: An exploratory case series. *Behavioural and Cognitive Psychotherapy, 37*(1), 95-114.

Bandell-Hoekstra, I. E., Abu-Saad, H. H., Passchier, J., Frederiks, C. M., Feron, F. J., & Knipschild, P. (2002). Coping and quality of life in relation to headache in Dutch school children. *European Journal of Pain, 6, 315-321*.

Bandura, A. (1977). Self-efficacy: Towards a unifying theory of behavioral change. *Psychological Review, 84*, 191-215.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Upper Saddle River, NJ: Prentice-Hall.

Baranowski, T., Cullen, K. W., Nicklas, T., Thompson, D., & Baranowski, J. (2003). Are current health behavioral change models helpful in guiding prevention of weight gain efforts? *Obesity, 11*, 23S-43S.

Baranowski, T., & Jago, R. (2005). Understanding the mechanisms of change in children's physical activity programs. *Exercise and Sports Sciences Reviews, 33*(4), 163-168.

Baum, C. G., & Forehand, R. (1981). Long-term follow-up assessment of parent training by use of multiple outcome measures. *Behavior Therapy, 12*(5), 643-652.

Baumen, A. E., Sallis, J. F., & Dzewaltowski, D. A. (2002). Toward a better understanding of the influence of physical activity: the role of determinants, correlates, casual variables, mediators, and confounders. *American Journal of Preventive Medicine, 23*(2), Suppl. 1, 5-14.

Beck, A. T. (1963). Thinking and depression: I. Idiosyncratic content and cognitive distortions. *Archives of General Psychiatry, 9*, 324-333.

Beck, A. T. (1964). Thinking and depression: II. Theory and therapy. *Archives of General Psychiatry, 10*, 561-571.

Beck, A. T. (1970). *Depression: Clinical, experimental, and theoretical aspects*. Philadelphia, PA: University of Pennsylvania Press. (Original work published 1967)

Beck, A. T. (1979). *Cognitive therapy of depression*. New York, NY: Guilford Press.

Beck, A. T., & Mahoney, M. J. (1979). Schools of "thought." *American Psychologist, 34*(1), 93-98. doi:10.1037/0003-066X.34.1.93.b

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual of Beck depression inventory-II*. San Antonio, TX: Psychological Corporation.

Beck, J., Beck, A., & Jolly, J. (2001). *Beck youth inventories of emotional and social impairment manual*. San Antonio, TX: Psychological Corporation.

Beck, J. S. (1995). *Cognitive therapy: Basics and beyond*. New York, NY: Guilford Press.

Beck, J. S., Beck, A. T., & Jolly, J. B. (2005). *Beck youth inventories (BYI-II): Beck depression inventory for youth* (2nd ed.). San Antonio, TX: Pearson Assessment.

Bellg, A. J., Borrelli, B., Resnick, B., Hecht, J., Minnicucci, D. S., Ory, M., et al. (2004). Enhancing fidelity in health behavior change studies: Best practice and recommendations from the NIH behavior change consortium. *Health Psychology, 23*, 443-451.

Bell-Hoekstra, I. E. N. G., Abu-Saad, H. H., Passchier, J., Frederiks, C., Feron, F. J. M., & Knipschild, P. (2002). Coping and quality of life in relation to

headache in Dutch schoolchildren. *European Journal of Pain, 6*(4), 315-321.

Björling, E. A. (2009). The momentary relationship between stress and headaches in adolescent girls. *Headache: The Journal of Head and Face Pain, 49*(8), 1186-1197.

Blanchard, E. B., Peters, M. L., Hermann, C., Turner, S. M., Buckley, T. C., Barton, K., et al. (1997). Direction of temperature control in the thermal biofeedback treatment of vascular headache. *Applied Psychophysiology & Biofeedback, 22*(4), 227-245.

Blau, J. N. (2005). Water deprivation: A new migraine precipitant. *Headache: The Journal of Head and Face Pain, 45*(6), 757-759.

Boardman, H. F., Thomas, E., Millson, D. S., & Croft, P. (2005). Psychological, sleep, lifestyle, and comorbid associations with headache. *Headache: The Journal of Head and Face Pain, 45*(6), 657-669.

Bowen, D. J., Kreuter, M., Spring, B., Cofta-Woerpel, L., Linnan, L., Weiner, D., . . . Fernandez, M. (2009). How we design feasibility studies. *American Journal of Preventive Medicine, 36*(5), 452-457.

Bradburn, N. (1977). *Respondent burden: A test of some common assumptions*. Paper presented at the Second Biennial Conference, Health Survey Research Methods. Washington, DC: U.S. Government Printing Office.

Bradlyn, A. S., Beale, I. L., & Kato, P. M. (2003). Psycho-education interventions with pediatric cancer patients: Part 1. Patient information and knowledge. *Journal of Child and Family Studies, 12*, 257-277.

Brandt, P. A., Davis Kirsch, S., Marcus Lewis, F., & Casey, S. M. (2004). Assessing the strength and integrity of an intervention. *Oncology Nursing Forum, 31*(4), 833-837.

Brent, D. A., Holder, D., Kolko, D., Birmaher, B., Baugher, M., Roth, C., . . . Johnson, B. A. (1997). A clinical psychotherapy trial for adolescent depression comparing cognitive, family, and supportive therapy. *Archives of General Psychiatry, 54*(9), 877-885. doi:10.1001/archpsyc.1997.01830210125017

Bruni, O., Fabrizi, P., Ottaviano, S., Cortesi, F., Giannotti, F., & Guidetti, V. (1997). Prevalence of sleep disorders in childhood and adolescence with headache. *Cephalalgia, 17*(4), 492.

Burns, D. D., & Spangler, D. L. (2001). Does psychotherapy homework lead to improvements in depression in cognitive-behavioral therapy or does improvement lead to increased homework compliance? *Journal of Consulting and Clinical Psychology, 69*, 1079-1083.

Buse, D. (2011, August 3). The role of adherence and triggers in headache management. *American Headache Society*. Retrieved from http://www.AmericanHeadacheSociety.org

Bussell, V. A. (2005). Coping with adjunctant chemotherapy for breast cancer: Interrelations for problem- and emotion-focused coping and control. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 65(9-B), 4893.

Butler, A. C., Chapman, J. E., Forman, E. M., & Beck, A. T. (2006). The empirical status of cognitive-behavioral therapy: A review of meta-analyses. *Clinical Psychology Review, 26*(1), 17-31.

Campbell, L. A., Kirkpatrick, S. E., Berry, C. C. & Lamberti, J. J. (1995). Preparing children with congenital heart disease for cardiac surgery. *Journal of Pediatric Psychology, 20*(3), 313-328.

Cassels, C. (2007). Migraine with aura increases suicide risk in adolescents. *Neurology, 68*, 1468-1473.

Cast, A. D., & Burke, P. J. (2002). A theory of self-esteem. *Social Forces, 80*(3), 1041-1068.

Chan, B. T., & Ovens, H. J. (2004). Chronic migranuers: An important subgroup of patients who visit emergency departments frequently. *Annuals of Emergency Medicine, 43*, 238-242.

Chow, J. C-C., Jaffee, K., & Snowden, L. (2003). Racial/ethnic disparities in the use of mental health services in poverty areas. *American Journal of Public Health, 93*(5), 792-797.

Clark, D. A., Beck, A. T., & Alford, B. A. (1999). *Scientific foundations of cognitive theory and therapy of depression*. Hoboken, NJ: Wiley.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Erlbaum.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385-396.

Committee on Adolescence and Committee on Health Financing. (2009). Policy statement: Underinsurance of adolescents: Recommendations for improved coverage of preventive, reproductive, and behavioral health care services. *Pediatrics, 123*(1), 191-196.

Compas, B. E. (1987). Coping with stress during childhood and adolescence. *Psychological Bulletin, 101*(3), 393-403.

Compas, B. E., Malcarne, V. L., & Fondacaro, K. M. (1988). Coping with stressful events in older children and young adolescents. *Journal of Consulting and Clinical Psychology, 56*(3), 405.

Compas, B. E., Wagner, B. M., Slavin, L. A., & Vannatta, K. (1986). A prospective study of life events, social support, and psychological symptomatology during the transition from high school to college. *American Journal of Community Psychology, 14*(3), 241-257.

Compton, S. N., March, J. S., Brent, D., Albano, A. M., Weersing, R. P., & Curry, J. P. (2004). Cognitive-behavioral psychotherapy for anxiety and depressive disorders in children and adolescents: An evidence-based medicine review. *Journal of the American Academy of Child & Adolescent Psychiatry, 43*(8), 930-959.

Conn, V. S., Rantz, M. J., Wipke-Tevis, D. D., & Maas, M. L. (2001). Designing effective nursing interventions. *Research in Nursing & Health, 24*(5), 433-442.

Connelly, M., Rapoff, M. A., Thompson, N., & Connelly, W. (2006). Headstrong: A pilot study of a CD-ROM intervention for recurrent pediatric headache. *Journal of Pediatric Psychology, 31*(7), 737-747.

Cook, M., Gerkovich, M., Hoffman, S., McClernon, F., & O'Connell, K. (1996). Effects of smoking and telic/paratelic dominance on the contingent negative variation (CNV). *International Journal of Psychophysiology, 23*(1-2), 101-110.

Cottrell, C., Drew, J., Gibson, J., Holroyd, K., & O'Donnell, F. (2007). Feasibility assessment of telephone-administered behavioral treatment for adolescent migraine. *Headache: The Journal of Head and Face Pain, 47*(9), 1293-1302.

Craddock, L., & Ray, L. (2012). Pediatric migraine teaching for families. *Journal for Specialist in Pediatric Nursing, 17*(2), 98-107.

Crockett, L. J., & Peterson, A. C. (1993). Adolescent development: Health risks and opportunities for health promotion. In S. E. Millstein, A. C. Peterson, & E. O. Nightingale (Eds.), *Promoting the health of adolescents: New directions for the twenty-first century* (pp. 3-37). New York, NY: Oxford University Press.

Cuvellier, J., Couttenier, F., Joriot-Chekaf, S., & Vallée, L. (2008). Chronic daily headache in French children and adolescents. *Pediatric Neurology, 38*(2), 93-98. doi:10.1016/j.pediatrneurol.2007.10.001

Del Bene, E. (1982). Multiple aspects of headache risk in children. *Advances in Neurology, 33*, 187-198.

DeLongis, A., Coyne, J. C., Dakof, G., Folkman, S., & Lazarus, R. S. (1982). Relationship of daily hassles, uplifts, and major life events to health status. *Health Psychology, 1*(2), 119-136.

Denniston, C., Roth, D., & Gilroy, F. (1992). Dysphoria and body image among college women. *International Journal of Eating Disorders, 12*, 449-452.

Devonport, T. J., & Lane, A. M. (2009). Reflecting on the delivery of a longitudinal coping intervention amongst junior national netball players. *Journal of Sports Science and Medicine, 8*(2), 169-178.

Diener, H. C., & Limmroth, V. (2004). Medication overuse headache: A worldwide problem. *Lancet, 3*, 475-483.

Dodick, D. W. (2006). Clinical practice: Chronic daily headache. *New England Journal of Medicine, 354*(2), 158-165.

Dooley, J. M., Gordon, K., & Wood, E. (2005). Self-reported headache frequency in Canadian adolescents: Validation and follow-up. *Headache: The Journal of Head and Face Pain, 45*(2), 127-131.

Dragone, M. A., Bush, P. J., Jones, J. K., Bearison, D. J., & Kamani, S. (2002). Development and evaluation of an interactive CD-ROM for children with leukemia and their families. *Patient Education and Counseling, 46*, 297-307.

Dugdale, J. R., Eklund, R. C., & Gordon, S. (2002). Expected and unexpected stressors in major international competition: Appraisal, coping, and performance. *The Sport Psychologist, 16*, 20-33.

Eaton, D. K., Kann, L., Kinchen, S., Flint, K. H., Hawkins, J., Harris, W.A., ... Wechsler, H. (2012). Youth risk behavior surveillance--United States 2011. *Mortality Weekly and Monthly Report,* 61(4), 1-162.

Ebata, A. T., & Moos, R. H. (1994). Personal, situational, and contextual correlates of coping in adolescence. *Journal of Research on Adolescence, 4*(1), 99-125.

Eccleston, C., Jordan, A. L., & Crombez, G. (2004). The impact of chronic pain on adolescents: A review of previously used measures. *Journal of Pediatric Psychology, 31*(7), 684-697.

Eccleston, C., & Malleson, P. (2003). Managing chronic pain in children and adolescents. *BMJ, 326*(7404), 1408-1409. doi:10.1136/bmj.326.7404.1408

Eccleston, C., Palermo, T. M., Williams, A. C., Lewandowski, A., & Morley, S. (2009). Psychological therapies for management of chronic and recurrent pain in children and adolescents. *Cochrane Database Systematic Review,* CD003968.

Eccleston, C., Wastell, S., Crombez, G., & Jordan, A. (2008). Adolescent social development and chronic pain. *European Journal of Pain, 12*(6), 765-774.

Edmeads, J., & Mackell, J. A. (2002). The economic impact of migraine: An analysis of direct and indirect costs. *Headache: The Journal of Head & Face Pain, 42*(6), 501-509. doi:10.1046/j.1526-4610.2002.04262.x

Ekman, P. (1994). Emotion regulation: A theme in search of definition. *Monographs of the Society for Research in Child Development, 59*, 25-52.

Elixhauser, A., Machlin, S. R., Zodet, M. W., Chevarley, F. M., Patel, N., McCormick, M. C., et al. (2002). Health care for children and youth in the United States: 2001 annual report on access, utilization, quality, and expenditures. *Ambulatory Pediatrics, 2*(6), 419-437.

Ellis, A., & Dryden, W. (2007). *The practice of rational emotive behavior therapy* (2nd ed.). New York, NY: Springer. (Original work published 1997)

Erikson, E. H. (1968). *Identity: Youth and crisis*. New York, NY: Norton.

Fearon, P., & Hotopf, M. (2001). Relation between headache in childhood and physical and psychiatric symptoms in adulthood: National birth cohort study. *British Medical Journal, 322*(7295), 1145-1150.

Fichtel, Å., & Larsson, B. (2002). Psychosocial impact of headache and comorbidity with other pains among Swedish school adolescents. *Headache: The Journal of Head & Face Pain, 42*(8), 766-775. doi:10.1046/j.1526-4610.2002.02178.x

Fichtel, Å., & Larsson, B. (2004). Relaxation treatment administered by school nurses to adolescents with recurrent headache. *Headache, 44*, 545-554.

Flippen, C. (2001). Pearls and pitfalls of headaches. *Seminars in Neurology, 21*, 371-376.

Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior, 21*(3), 219-239.

Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., DeLongis, A., & Gruen, R. J. (1986). Dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *Journal of Personality and Social Psychology, 50*(5), 992-1003. doi:10.1037/0022-3514.50.5.992

Frydenberg, E., & Lewis, R. (1999). Academic and general well-being. *Australian Journal of Guidance and Counseling, 9*(1), 19-36.

Frydenberg, E., & Lewis, R. (2000). Teaching coping to adolescents: When and to whom? *American Educational Research Journal, 37*(3), 727-745.

Frydenberg, E., & Lewis, R. (2004). Adolescents least able to cope: How do they respond to their stresses? *British Journal of Guidance & Counseling, 32*(1), 25-37.

Galli, F., Patron, L., Russo, P., Bruni, O., Strambi, L., & Guidetti, V. (2004). Chronic daily headache in childhood and adolescence: Clinical aspects and a 4-year follow-up. *Cephalalgia, 24*(10), 850-858.

Gallo, L. C., & Matthews, K. A. (2003). Understanding the association between socioeconomic status and physical health: Do negative emotions play a role? *Psychological Bulletin, 129*(1), 10-51.

Garcia, C. (2010). Conceptualization and measurement of coping during adolescence: A review of literature. *Journal of Nursing Scholarship, 42*(2), 166-185.

Gecas, V. C. (1982). The self-concept. *Annual Review of Sociology, 8*, 1-33.

Geisthardt, C., & Munsch, J. (1996). Coping with school stress: A comparison of adolescents with and without learning disabilities. *Journal of Learning Disabilities, 29*(3), 287.

Gil, K. M., Anthony, K. K., Carson, J. W., Redding-Lallinger, R., Daeschner, C. W., & Ware, R. E. (2001). Daily coping practice predicts treatment effects in children with sickle cell disease. *Journal of Pediatric Psychology, 26*(3), 163-173.

Gilman, D. K., Palermo, T. M., Kabbouche, M. A., Hershey, A. D., & Powers, S. W. (2007). Primary headache and sleep disturbances in adolescents. *Headache: The Journal of Head & Face Pain, 47*(8), 1189-1194. doi:10.1111/j.1526-4610.2007.00885.x

Gladstein, J., & Holden, E. W. (1996). Chronic daily headache in children and adolescents: A 2-year prospective study. *Headache: The Journal of Head and Face Pain, 36*(6), 349-351.

Gladstein, J., & Mack, K. J. (2005). Chronic daily headache in adolescents. *Pediatric Annals, 34*(6), 472-479.

Gladstone, J., Eross, E., & Dodick, D. (2003). Chronic daily headache: A rational approach to a challenging problem. *Seminars in Neurology, 23*, 265-276.

Gordon, K., Dooley, J., & Wood, E. (2004). Self-reported headache frequency and features associated with frequent headaches in Canadian young adolescents. *Headache: The Journal of Head and Face Pain, 44*(6), 555-561.

Griffiths, C., H., Jorm, A.F., Evans, K., & Groves, C. (2004). Effects of web-based depression literacy and cognitive behavioral therapy intervention on stigmatizing attitudes to depression: Randomized controlled trial. *The British Journal of Psychiatry, 342-349*.

Grave, J., & Blissett, J. (2004). Is cognitive behavior therapy developmentally appropriate for young children? A critical review of the evidence. *Clinical Psychology Review, 24*(4), 399-420.

Groomes, D. A., & Leahy, M. J. (2002). The relationships among the stress appraisal process, coping disposition, and level of acceptance of disability. *Rehabilitation Counseling Bulletin, 46*(1), 14-23.

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*(2), 348-362.

Gross, J. J., & Levenson, R. W. (1997). Hiding feelings: The acute effects of inhibiting negative and positive emotion. *Journal of Abnormal Psychology, 106*(1), 95-103.

Grotevant, H. D. (1987). Toward a process model of identity formation. *Journal of Adolescent Research, 2*, 203-222.

Guidetti, V., Galli, F., Fabrizi, P., Giannantoni, A., Napoli, L., Bruni, O., et al. (1998). Headache and psychiatric comorbidity: Clinical aspects and outcome in an 8-year follow-up study. *Cephalalgia, 18*(7), 455-462.

Hallfors, D. D., Walter, M. W., Ford, C. A., Halper, C. T., Brodsh, P. H., & Iritani, B. (2005). Adolescent depression and suicide risks: Association with sex and drug behavior. *American Journal of Preventive Medicine, 27*(3), 224-231.

Hannan, A. P., Rapee, R. M., & Hudson, J. L. (2000). The prevention of depression in children: A pilot study. *Behavior Change, 17*, 78-83.

Hansell, P. L., Thorn, B. E., Prentice-Dunn, S., & Floyd, D. L. (1998). The relationships of primary appraisals of infertility and other gynecological stressors to coping. *Journal of Clinical Psychology in Medical Settings, 5*(2), 133-145.

Harpole, L. H., Samsa, G. P., Jurgelski, A. E., Shipley, J. L., Bernstein, A., & Matchar, D. B. (2003). Headache management program improves outcome for chronic headache. *Headache: The Journal of Head and Face Pain, 43*(7), 715-724.

Hartmaier, S. L., DeMuro-Mercon, C., Linder, S., Winner, P., & Santanello, N. C. (2001). Development of a brief 24-hour adolescent migraine functioning questionnaire. *Headache: The Journal of Head & Face Pain, 41*(2), 150.

Hawkins, K., Wang, S., & Rupnow, M. (2007). Indirect cost burden of migraine in the United States. *Journal of Occupational and Environmental Medicine, 49*(4), 368-374. doi:10.1097/JOM.0b013e31803b9510

Hawkins, K., Wang, S., & Rupnow, M. (2008). Direct cost burden among insured U.S. employees with migraine. *Headache: The Journal of Head and Face Pain, 48*(4), 553-563.

Headache Classification Committee of the International Headache Society. (1988). Classification and diagnostic criteria for headache disorders, cranial neuralgias and facial pain. *Cephalalgia, 8*(s7), 1-36.

Hering-Hanit, R., & Gadoth, N. (2003). Caffeine-induced headache in children and adolescents. *Cephalalgia, 23*(5), 332-335.

Hermann, C., Kim, M., & Blanchard, E. B. (1995). Behavioral and prophylactic pharmacological intervention studies of pediatric migraine: An exploratory meta-analysis. *Pain, 60*(3), 239-255.

Hershey, A., Powers, S., Bentti, A. L., LeCates, S., & DeGrauw, T. (2001a). Characterization of chronic daily headaches in children in a multidisciplinary headache center. *Neurology, 56*(8), 1032.

Hershey, A., Powers, S., Vockell, A. L. B., LeCates, S., Kabbouche, M., & Maynard, M. (2001b). PedMIDAS: Development of a questionnaire to assess disability of migraines in children. *Neurology, 57*(11), 2034-2039.

Hershey, A. D., Powers, S. W., Nelson, T. D., Kabbouche, M. A., Winner, P., Yonker, M., . . . McClintock, W. (2009). Obesity in the pediatric headache population: A multicenter study. *Headache: The Journal of Head & Face Pain, 49*(2), 170-177. doi:10.1111/j.1526-4610.2008.01232.x

Hershey, A. D., Powers, S. W., Vockell, A.-B., LeCates, S. L., Segers, A., & Kabbouche, M. A. (2004). Development of a patient-based grading scale for PedMIDAS. *Cephalalgia, 24*(10), 844-849. doi:10.1111/j.1468-2982.2004.00757.x

Hicks, C. L., von Baeyer, C. L., & McGrath, P. J. (2006). Online psychological treatment for pediatric recurrent pain: A randomized evaluation. *Journal of Pediatric Psychology, 31*(7), 724-736.

Hillson, J., & Kuiper, N. A. (1994). A stress and coping model of child maltreatment. *Clinical Psychology Review, 14*(4), 261-285.

Holahan, C. J., Moos, R. H., & Schaefer, J. A. (1996). Coping, stress resistance, and growth: Conceptualizing adaptive functioning. In M. Zeidner, & N. S. Endler (Eds.), *Handbook of coping: Theory, research, applications* (pp. 24-43). Oxford, England: Wiley.

Holden, E. W., Gladstein, J., Trulsen, M., & Wall, B. (1994). Chronic daily headache in children and adolescents. *Headache: The Journal of Head and Face Pain, 34*(9), 508-514.

Hollon, S. D., & Kriss, M. R. (1984). Cognitive factors in clinical research and practice. *Clinical Psychology Review, 4*(1), 35-76.

Holroyd, K. A., & Penzien, D. B. (1994). Psychosocial interventions in the management of recurrent headache disorders, I: Overview and effectiveness. *Behavioral Medicine, 20*(2), 53-63.

Holroyd, K. A., Stensland, M., Lipchik, G. L., Hill, K. R., O'Donnell, F. S., & Cordingley, G. (2000). Psychosocial correlates and impact of chronic tension-type headaches. *Headache: The Journal of Head and Face Pain, 40*(1), 3-16.

Howard, K. I., Kopta, S. M., Krause, M. S., & Orlinsky, D. E. (1986). The dose-effect relationship in psychotherapy. *America Psychologist, 41*, 159-164.

Hunfeld, J. A. M., Perquin, C. W., Duivenvoorden, H. J., Hazebroek-Kampschreur, A. A. J. M., Passchier, J., van Suijlekom-Smit, L. W. A., et al. (2001). Chronic pain and its impact on quality of life in adolescents and their families. *Journal of Pediatric Psychology, 26*(3), 145-153.

Hunt, L. (2009). *My turn. Kidscare: Arizona's winning investment*. Retrieved from www.azcentral.com/arizonarepublic/opinions/2009/03/25/20090325/hunt26.html

Ireland, J. L., Boustead, R., & Ireland, C. A. (2005). Coping style and psychological health among adolescent prisoners: A study of young and juvenile offenders. *Journal of Adolescence, 28*(3), 411-423. doi:10.1016/j.adolescence.2004.11.002

Izard, C. E. (1993). Organizational and motivational functions of discrete emotions. In M. Lewis, & J. Haviland (Eds.), *Handbook of emotions*. New York, NY: Guilford Press.

Jensen, V. K., & Rothner, A. D. (1995). Chronic non-progressive headaches in children and adolescents. *Seminars in Pediatric Neurology, 2*(2), 151-158. doi:10.1016/S1071-9091(05)80025-7

Johnson, K. (2009). How to gain self-esteem by increasing positive talk. *Mental Health Matters*. Retrieved from http://www.mental-health-matters.com.

Johnson, W. B., & Ridley, C. (1992). Brief Christian and non-Christian rational-emotive therapy with depressed Christian clients: An exploratory study. *Counseling and Values, 36*(3), 220-229.

Juang, K. D., Wang, S. J., Fuh, J. L., Lu, S. R., & Chen, Y. S. (2004). Association between adolescent CDH and childhood adversity: A community-based study. *Cephalalgia, 24, 54-59*.

Juang, K. D., Wang, S. J., Fuh, J. L., Lu, S. R., & Su, T. P. (2000). Comorbidity of depressive and anxiety disorders in chronic daily headache and its subtypes. *Headache: The Journal of Head and Face Pain, 40*(10), 818-823.

Kazdin, A. E. (2005). *Research design in clinical psychology* (4th ed.). Boston, MA: Allyn & Bacon.

Keck, J. F., Gerkensmeyer, J. E., Joyce, B. A., & Schade, J. G. (1996). Reliability and validity of the faces and word descriptor scales to measure procedural pain. *Journal of Pediatric Nursing, 11*(6), 368-374. doi:10.1016/S0882-5963(96)80081-9

Keller, C. (2008). Special supplement to geriatric nursing: Theory-based interventions for research. *Geriatric Nursing, 30*(2S), 1-3.

Keller, C., Fleury, J., Sidani, S., & Ainsworth, B. (2009). Fidelity to theory in PA intervention research. *Western Journal of Nursing Research, 31*(3), 289.

Kelman, L. (2007). The triggers or precipitants of the acute migraine attack. *Cephalalgia, 27*(5), 394-402.

Kendall, P. C. (1994). Treating anxiety disorders in children: Results of a randomized clinical trial. *Journal of Consulting and Clinical Psychology, 62*(1), 100-110.

Kendall, P. C., Chu, B. C., Pimentel, S., & Choudbury, M. (2000). Treating anxiety disorders in youth. In P. C. Kendall (Ed.), *Child and adolescent therapy: Cognitive-behavioral procedures* (pp. 235-287). New York, NY: Guilford Press.

Keogh, E., & Eccleston, C. (2006). Sex differences in adolescent chronic pain and pain-related coping. *Pain, 123*(3), 275-284.

Kerns, R. D., Turk, D. C., & Rudy, T. E. (1985). The West Haven-Yale multidimensional pain inventory (WHYMPI). *Pain, 23*(4), 345-356. doi:10.1016/0304-3959(85)90004-1

Kline, P. (1999). *The headache of psychological testing* (2nd ed.). London, England: Routledge.

Kline, R. B. (2009). *Becoming a behavioral science researcher: A guide to producing research that matters* . New York, NY: Guilford Press.

Koenig, M. A., Gladstein, J., McCarter, R. J., Hershey, A. D., & Wasiewski, W. (2002). Chronic daily headache in children and adolescents presenting to tertiary headache clinics. *Headache: The Journal of Head and Face Pain, 42*(6), 491-500.

Kröner-Herwig, B. (2011). Psychological treatments for pediatric headache. *Expert Review of Neurotherapeutics, 11*(3), 403-410.

Kröner-Herwig, B., & Denecke, H. (2002). Cognitive-behavioral therapy of pediatric headache: Are there differences in efficacy between a therapist-administered group training and a self-help format? *Journal of Psychosomatic Research, 53*(6), 1107-1114. doi:10.1016/S0022-3999(02)00345-8

Lam, D. (2005). A brief overview of cognitive behavioral techniques. In S. Freeman and A. Freeman (Eds.), *Cognitive behavior therapy in nursing practice* (pp. 29-47). New York, NY: Springer.

Larson, R. W., Moneta, G., Richards, M. H., & Wilson, S. (2002). Continuity, stability, and change in daily emotional experience across adolescence. *Child Development, 73*(4), 1151-1165.

Larsson, B., Carlsson, J., Fichtel, Å., & Melin, L. (2005). Relaxation treatment of adolescent headache sufferers: Results from a school-based replication series. *Headache: The Journal of Head & Face Pain, 45*(6), 692-704. doi:10.1111/j.1526-4610.2005.05138.x

Lazarus, R. S. (1990). Theory-based stress management. *Psychological Inquiry, 1*(1), 3-13.

Lazarus, R. S. (2000). Cognitive-motivational-relational theory of emotion. *Emotions in Sport,* 39-63.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.

Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality, 1*(3), 141-169.

Leahy, R. (1996). *Cognitive therapy: Basic principles and applications*. Northvale, NJ: Jason Aronson.

Lecheler, J. M. (2001). Asthmaschulung durch das Intrnet: Akzeptanz bei Kindern und Jugendichen. *Prevention und Rehabilitation, 13*, 48-56.

Lehrer, P. M., Woolfolk, R. L., & Sime, W. E. (Eds.). (2007). *Principles and practice of stress management*. New York, NY: Guilford Press.

Lewinsohn, P. M., & Clarke, G. N. (1999). Psychosocial treatments for adolescent depression. *Clinical Psychology Review, 19*(3), 329-342. doi:10.1016/S0272-7358(98)00055-5

Lewinsohn, P. M., Clarke, G. N., Hops, H., & Andrews, J. (1990). Cognitive-behavioral treatment for depressed adolescents. *Behavior Therapy, 21*(4), 385-401. doi:10.1016/S0005-7894(05)80353-3

Lewinsohn, P. M., Hops, H., Roberts, R. E., Seeley, J. R., & Andrews, J. A. (1993). Adolescent psychopathology: I. Prevalence and incidence of depression and other DSM-III-R disorders in high school students. *Journal of Abnormal Psychology, 102*(1), 133-144. doi:10.1037/0021-843X.102.1.133

Lewis, D. W. (2002). Migraine headaches in the adolescent. *Adolescent Medicine, 13*(3), 413-432.

Lewis, R., & Frydenberg, E. (2002). Concomitants of failure to cope: What we should teach adolescents about coping. *British Journal of Educational Psychology, 72*(3), 419-431. The Journal of the American Medical Association, 307(23), 2545-2546.

Lin, E. H., Katon, W., Von-Korff, M., Tang, L., Williams, J. W., Jr., Kroenke, K., . . . Unützer, J. (2003). Effect of improving depression care on pain and functional outcomes among older adults with arthritis: A randomized controlled trial. *JAMA, 290*(18), 2428-2429.

Lipchik, G. L., & Nash, J. M. (2002). Cognitive-behavioral issues in the treatment and management of chronic daily headache. *Current Pain and Headache Reports, 6*(6), 473-479.

Lipton, P. B., Manack, A., Ricci, J. A, Chee, E., Turkel, C., & Winner, P. (2011). Prevalence and burden of chronic migraine in adolescents: Results of the chronic daily headache in adolescents study (C-dAS). *Headache, 51*(5), 693-706.

Lopez, J. I., & Rothrock, J. F. (2008). *Headache, pediatric perspective*. Retrieved from http://emedicine.medscape.com.ezproxy1.lib.asu.edu/article/1179166-overview

Lopez, S. J., & Snyder, C. R. (2002). *Handbook of positive psychology*. New York, NY: Oxford University Press.

Lusk, P., & Melnyk, B. M. (2011). The brief cognitive-behavioral COPE intervention for depressed adolescents: Outcomes and feasibility of

delivery in 30-minute outpatient visits. *Journal of the American Psychiatric Nurses Association, 17*(3), 226-236.

Mack, K. J. (2010). Management of chronic daily headache in children. *Expert Review of Neurotherapeutics, 10*(9), 1479-1486.

Mack, K. J., & Gladstein, J. (2008). Management of chronic daily headache in children and adolescents. *Pediatric Drugs, 10*(1), 23-29.

Magnusson, J. E., Riess, C. M., & Becker, W. J. (2004). Effectiveness of a multidisciplinary treatment program for chronic daily headache. *The Canadian Journal of Neurological Sciences, 31*(1), 72-79.

Marlowe, N. (1998). Stressful events, appraisal, coping and recurrent headache. *Journal of Clinical Psychology, 54*, 247-256.

Martyn-Nemeth, P., Penckoter, S., Gulanick, M., Velsor-Friedrick, B., & Bryant, F. B. (2009). The relationships among self-esteem, stress, coping, eating behaviors, and depressive mood in adolescents. *Research in Nursing & Health, 32*, 96-109.

Massey, E. K., Garnefski, N., Gebhardt, W. A., & Van Der Leeden, R. (2009). Daily frustration, cognitive coping and coping efficacy in adolescent headache: A daily diary study. *Headache: The Journal of Head & Face Pain, 49*(8), 1198-1205. doi:10.1111/j.1526-4610.2009.01492.x

Mauss, I. B., Cook, C. L., Cheng, J. Y. J., & Gross, J. J. (2007). Individual differences in cognitive reappraisal: Experiential and physiological responses to an anger provocation. *International Journal of Psychophysiology, 66*(2), 116-124.

Maxwell, S. E., & Delaney, H. D. (2004). *Designing experiments and analyzing data: A model comparison perspective*. Hillsdale, NJ: Lawrence Erlbaum.

Mazzone, L., Vitiello, B., Incorpora, G., & Mazzone, D. (2006). Behavioral and temperamental characteristics of children and adolescents suffering from primary headache. *Cephalalgia, 26*, 194-201.

McGrath, P. A. (1987). The multidimensional assessment and management of recurrent pain syndromes in children. *Behaviour Research and Therapy, 25*(4), 251-262. doi:10.1016/0005-7967(87)90003-9

McGrath, P. A. (2001). Chronic daily headache in children and adolescents. *Current Pain and Headache Reports, 5*(6), 557-566.

McGrath, P. A., & Holahan, A. (2003). Psychological interventions with children and adolescents: Evidence for their effectiveness in treating chronic pain. *Seminars in Pain Medicine, 1*(2), 99-109. doi:10.1016/S1537-5897(03)00008-9

McGrath, P. J., Humphreys, P., Keene, D., Goodman, J. T., Lascelles, M. A., Cunningham, S., et al. (1992). The efficacy and efficiency of a self-administered treatment for adolescent migraine. *Pain, 49*(3), 321-324.

McLaughlin, C. P., & McLaughlin, C. (2008). *Health policy analysis: An interdisciplinary approach*. Sudbury, MA: Jones & Bartlett.

Melnyk, B. M. (1994). Coping with unplanned childhood hospitalization: Effects of informational interventions on mothers and children. *Nursing Research, 43*, 50-54.

Melnyk, B. M. (1995). Coping with unplanned childhood hospitalization: The mediating functions of parental beliefs. *Journal of Pediatric Psychology, 20*(3), 299.

Melnyk, B. M., Alpert-Gillis, L. J., Hensel, P. B., Cable-Billing, R. C., & Rubenstein, J. S. (1997). Helping mothers cope with a critically ill child: A pilot test of the COPE interventions. *Research in Nursing and Health, 20*, 3-14.

Melnyk, B. M., Feinstein, N. F., Alpert-Gillis, L., Fairbanks, E., Crean, H. F., Sinkin, R. A., . . . Gross, S. J. (2006a). Reducing premature infants' length of stay and improving parents' mental health outcomes with the creating opportunities for parent empowerment (COPE) neonatal intensive care unit program: A randomized, controlled trial. *Pediatrics, 118*(5), e1414-1427.

Melnyk, B. M., & Fineout-Overholt, E. (2010). *Evidence-based practice in nursing & healthcare: A guide to best practice*. New York, NY: Lippincott Williams & Wilkins.

Melnyk, B. M., Jacobson, D., Kelly, S., O'Haver, J., Small, L., & Mays, M. (2009). Improving the mental health, healthy lifestyle choices and Hispanic adolescents with the school-based COPE/Healthy lifestyle teen program: A randomized controlled pilot study. *Journal of School Health, 79*(12), 575-584.

Melnyk, B. M., Schapiro, N. A., Sharp, D., & Taylor, D. (2006b). Brief interventions. In *The KySS guide to child and mental health screening*,

early intervention, and healthy promotion (pp. 253-264). Cherry Hills, NJ: National Association of Pediatric Nurse Practitioners.

Melnyk, B. M., Small, L., Morrison-Beedy, D., Strasser, A., Spath, L., Kreipe, R., . . . O'Haver, J. (2007). The COPE healthy lifestyles TEEN program: Feasibility, preliminary efficacy, & lessons learned from an after school group intervention with overweight adolescents. *Journal of Pediatric Health Care*, *21*(5), 315-322. doi:10.1016/j.pedhc.2007.02.009

Melnyk, B. M., Small, L., Morrison-Beedy, D., Strasser, A., Spath, L., Kreipe, R., . . . Van Blankenstein, S. (2006c). Mental health correlates of healthy lifestyle attitudes, beliefs, choices, and behaviors in overweight adolescents. *Journal of Pediatric Health Care, 20*(6), 401-406. doi:10.1016/j.pedhc.2006.03.004

Molarius, A., Tegelberg, A., & Ohrvik, J. (2008). Socioeconomic factors, lifestyle, and headache disorders – A population-based study in Sweden. *Headaches, 48,* 1426-1437.

Moore, A. J., & Shevell, M. (2004). Chronic daily headaches in pediatric neurology practice. *Journal of Child Neurology, 19, 925-929*.

Mueller, L. (2000). Psychologic aspects of chronic headache. *Journal of the American Osteopathic Association, 100*(9_suppl), 14S-21.

Napoli, U., Axia, V., & Battistella, P. A. (2002). Family ecology in children with primary headache. *Journal of Headache Pain, 3*, 149-154.

Nash, J. M., & Thebarge, R. W. (2006). Understanding psychological stress, its biological processes, and impact on primary headache. *Headache: The Journal of Head & Face Pain*, *46*(9), 1377-1386. doi:10.1111/j.1526-4610.2006.00580.x

Nemade, R., Reiss, N. S., & Dombeck, M. (2009). Cognitive theories of major depression – Aaron Beck. *Emergence Health Network*. Available from Info.epmhmr.org

Nisbett, R. E., & Ross, L. (1980). *Human inference: Strategies and shortcomings of social judgment*. Englewood Cliffs, NJ: Prentice-Hall.

Ogden, C. C., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2012). *Prevalence of obesity in the United States, 2009-2010* (National Center for Health Statistics Data Brief, No. 82). Hyattsville, MD: National Center for Health Statistics.

Paiva, T., Farinha, A., Martins, A., Batista, A., & Guilleminault, C. (1997). Chronic headaches and sleep disorders. *Archives of Internal Medicine, 157*(15), 1701-1705.

Pakalnis, A., Butz, C., Splaingard, D., Kring, D., & Fong, J. (2007). Emotional problems and prevalence of medication overuse in pediatric chronic daily headache. *Journal of Child Neurology, 22*(12), 1356-1359.

Pakalnis, A., Greenberg, G., Drake, M. E., & Paolicchi, J. (2001). Pediatric migraine prophylaxis with divalproex. *Journal of Child Neurology, 16*(10), 731-734.

Palermo, T. M. (2000). Impact of recurrent pain on family functioning: A critical review of the literature. *Journal of Development Pediatrics, 21*, 58-69.

Palermo, T. M., & Chambers, C. (2005). Parent and family factors in pediatric chronic pain and disability: An integrative approach. *Pain, 9*, 771-783.

Palermo, T. M., Eccleston, C., Lewandowski, A. S., Williams, A. C., & Morley, S. (2010). Randomized controlled trials of psychological therapies for management of chronic pain in children and adolescents: An update meta-analytic review. *Pain, 148*, 387-397.

Palermo, T. M., Putnam, J., Armstrong, G., & Daily, S. (2007). Adolescent autonomy and family functioning are associated with headache-related disability. *The Clinical Journal of Pain, 23*(5), 458-465.

Palermo, T. M., Wilson, A. C., Peters, M., Lewandowski, A., & Somhegyi, H. (2009). Randomized controlled trial of an Internet-delivered family cognitive-behavioral therapy intervention for children and adolescents with chronic pain. *Pain, 146*, 205-213.

Passchier, J., De Boo, M., Quaak, H., & Brienen, J. (1996). Health-related quality of life of chronic headache patients is predicted by the emotional component of their pain. *Headache: The Journal of Head and Face Pain, 36*(9), 556-560.

Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior, 19*(1), 2-21.

Pearlman, E. (2007). Psychiatric comorbidity in adolescents with chronic daily headache—A call for increased vigilance. *Nature Clinical Practice Neurology, 3*(12), 660-661.

Peden, J. G., & Schuster, R. M. (2004). *Stress and coping in the High Peaks wilderness: An exploratory assessment of visitor experiences*. In: K. Bricker & S. J. Millington (Eds.), Proceedings of the 2004 Northeastern Recreation Research Symposium (General Technical Report NE-326). Newtown Square, PA. Retrieved from http://www.fs.fed.us/ne/newtown_square/publications/technical_reports/pdfs/2005/326papers/peden326.pdf

Persons, J. B., Burns, D. D., & Perloff, J. M. (1988) Predictors of dropout and outcome in cognitive therapy for depressive in a private practice setting. *Cognitive Therapy and Research, 12*, 557-575.

Piaget, J., & Inhelder, B. (1973). *Memory and intelligence*. New York, NY: Basic Books.

Pierce, A. A. G. (1987). Event review in coping process of parous women. *Dissertation Abstracts International, 42*(705B).

Pincus, D. B., & Friedman, A. G. (2004). Improving children's coping with everyday stress: Transporting treatment interventions to the school setting. *Clinical Child and Psychology Review, 7*(4), 223-240.

Powers, S. W., Gilman, D. K., & Hershey, A. D. (2006). Headache and psychological functioning in children and adolescents. *Headache: The Journal of Head & Face Pain, 46*(9), 1404-1415. doi:10.1111/j.1526-4610.2006.00583.x

Prins, P. J., & Ollendick, T. H. (2003). Cognitive changes and enhanced coping: Missing mediational links in cognitive behavior therapy with anxiety-disordered children. *Clinical Child and Family Psychology Review, 6*(2), 87-105.

Rains, J. C., Penzien, D. B., & Lipchik, G. L. (2006). Behavioral facilitation of medical treatment of headache: Implications of noncompliance and strategies for improving adherence. *Headache, 46*(Suppl. 3), S142-S143.

Rains, J. C., Penzien, D. B., McCrory, D. C., & Gray, R. N. (2005). Behavioral headache treatment: History, review of the empirical literature, and methodological critique. *Headache: The Journal of Head and Face Pain, 45*, S92-S109.

Reed, P., & Shearer, N. (2011). *Nursing knowledge and theory innovation: Advancing the science of practice*. New York, NY: Springer.

Reicherts, M., & Pihet, S. (2000). Job newcomers coping with stressful situations: A micro-analysis of adequate coping and well-being. *Swiss Journal of*

Psychology/Schweizerische Zeitschrift Für Psychologie/Revue Suisse De Psychologie, 59(4), 303-316.

Reid, G. J., Gilbert, C. A., & McGrath, P. J. (1998). The pain coping questionnaire: Preliminary validation. *Pain, 76*(1-2), 83-96.

Reeves, C. W., Nicholls, A. R., & McKenna, J. (2009). Stressors and coping strategies among early and middle adolescent premier league academy soccer players: Differences according to age. *Journal of Applied Sport Psychology, 21*, 31-48.

Reynolds, T. (2006). *Adolescent developmental stages*. Retrieved from http://www.associatedcontent.com/article/22647/adolescent _developmental_stages.html

Rhee, H. (2000). Prevalence and predictors of headache in U.S. adolescents. *Headache, 40,* 528-538.

Rice, M., & Broome, M. E. (2004). Incentives for children in research. *Journal of Nursing Scholarship, 36*(2), 167-172.

Richardson, D., Gilbourne, D., & Littlewood, M. (2004). Developing support mechanisms for elite young players in a professional soccer academy: Creative reflections in action research. *European Sport Management Quarterly, 4*, 195-214.

Rollnik, J. D., Karst, M., Fink, M., & Dengler, R. (2001). Coping strategies in episodic and chronic tension-type headache. *Headache: The Journal of Head and Face Pain, 41*(3), 297-302.

Romero, A. J., & Roberts, R. E. (2003). Stress within a bicultural context for adolescents of Mexican descent. *Cultural Diversity and Ethnic Minority Psychology, 9*(2), 171-184.

Romney, D. M. (1994). Cross-validating a causal model relating attributional style, self-esteem, and depression: An heuristic study. *Psychological Reports, 74*(1), 203-207.

Rosenbaum, J. F., & Covino, J. M. (2005). Depression and anxiety in children and adolescents. *Medscape Psychiatry & Mental Health, 10*(2), 1-6.

Rosenbaum, M., Schooler, C., Schoenbach, C., & Rosenberg, R. (1995). Global self-esteem and specific self-esteem. *American Sociological Review, 60*, 141-156.

Sahota, P., & Dexter, J. (1993). Transient recurrent situational insomnia associated with cluster headache. *Sleep: Journal of Sleep Research & Sleep Medicine, 16*(3), 255-257.

Schafer, A. M., Rains, J. C., Penzien, D. B., Groban, L., Smitherman, T. A., & Houle, T. T. (2011). Direct costs of preventive headache treatments: Comparison of behavioral and pharmacologic approaches. *Headache: The Journal of Head and Face Pain, 51*(6), 985-991.

Scher, A., Stewart, W., Ricci, J., & Lipton, R. (2003). Factors associated with the onset and remission of chronic daily headache in a population-based study. *Pain, 106*(1-2), 81-89.

Scher, A. I., Lipton, R. B., & Stewart, W. F. (2003). Habitual snoring as a risk factor for chronic daily headache. *Neurology, 60*(8), 1366-1368.

Scher, A. I., Midgette, L. A., & Lipton, R. B. (2008). Risk factors for headache chronification. *Headache: The Journal of Head and Face Pain, 48*(1), 16-25.

Scher, A. I., Stewart, W. F., Liberman, J., & Lipton, R. B. (1998). Prevalence of frequent headache in a population sample. *Headache: The Journal of Head and Face Pain, 38*(7), 497-506.

Scher, A. I., Stewart, W. F., & Lipton, R. B. (2004). Caffeine as a risk factor for chronic daily headache. *Neurology, 63*(11), 2022-2027.

Schneider, M. E. (2009). Stimulus law to target health IT, primary care: EHR incentives linked to Medicaid volume. *Pediatric News, 43*(3), 1-3.

Schottenfeld, R. (2012, May). *Implementation of new approaches: Behavioral therapy as adjuncts to treatment for pain and opioid dependence*. Paper presented at the NIH Pain Consortium 7th Annual Symposium on Advances in Pain, Bethesda, MD.

Schrader, D. (2012, July 20). Medication overuse headaches: new insight into an old problem. *Clinical Neurology News*. Retrieved from http://www.clinicalneurologynewsnetwork.com/conferenc/aan /Diener_Medication.

Scott, A. G., & Sechrest, L. (1989). Strength of theory and theory of strength. *Evaluation and Program Planning, 12*, 329-336.

Seligman, M. (1980). A learned helplessness point of view. In L. Rehm (Ed.), *Behavior therapy for depression: Present status and future directions*. New York, NY: Academic Press.

Seshia, S. (2004). Chronic daily headache in children and adolescents. *The Canadian Journal of Neurological Sciences,* 31(3), 319-323.

Seshia, S. (2012). Chronic daily headache in children and adolescents. *Current Pain and Headache Reports, 16*, 60-72.

Sharp, L. M., & Frankel, J. (1983). Respondent burden: A test of some common assumptions: *Public Opinion Quarterly, 47*, 36-53.

Sidani, S., & Braden, C. J. (1998). Evaluating nursing interventions: A theory-driven approach. Thousand Oaks, CA: Sage.

Sidani, S., & Sechrest, L. (1999). Putting program theory into operation. *American Journal of Evaluation, 20*(2), 227-238.

Silberstein, S., Lipton, R., & Breslau, N. (1995). Migraine: Association with personality characteristics and psychopathology. *Cephalalgia, 15*(5), 358-369.

Silberstein, S. D., & Lipton, R. B. (1996). Classification of daily or near-daily headaches: Field trial of revised HIS criteria. *Headache, 47*(4), 871-875.

Silberstein, S. D., & Lipton, R. B. (2001). Chronic daily headaches including transformed migraine, CTTH, and medication overuse. In S. D. Silberstein, R. B. Lipton, & D. J. Dalessio (Eds.), *Wolff's headache and other head pain* (7th ed.). Oxford, England: Oxford University Press.

Silberstein, S. D., Lipton, R. B., & Sliwinski, M. (1996). Classification of daily and near-daily headaches. *Neurology, 47*(4), 871-875.

Simons, L. E., Claar, R. L., & Logan, D. L. (2008). Chronic pain in adolescence: Parental responses, adolescent coping, and their impact on adolescent's pain behaviors. *Journal of Pediatric Psychology, 33*(8), 894-904.

Siniatchkin, M., Riabus, M., & Hasenbring, M. (1999). Coping styles of headache sufferers. *Cephalalgia, 19*(3), 165-173.

Skinner, B. F. (1969). *Contingences of re-enforcement a theoretical analysis*. New York, NY: Appleton-Compton-Croft.

Smetana, J. G., Campione-Barr, N., & Metzger, A. (2006). Adolescent development in interpersonal and societal contexts. *Annual Review of Psychology, 57*, 255-284.

Smitherman, T. A., Penzien, D. B., & Maizels, M. (2008). Anxiety disorders and migraine intractability and progression. *Current Pain and Headache Reports, 12*, 224-229.

Snyder, C. R., & Lopez, S. (Eds.). (2001). *Handbook of positive psychology*. New York, NY: Oxford University Press.

Sourander, A., Brunstein, K. A., Ikonen, M., Lindross, J., Lutamo, T., Koskelainen, M., . . . Helenius, H. (2010). Psychosocial risk factors associated with cyber bullying among adolescents: A population-based study. *Archives of General Psychiatry*, 67(7), 720-728.

Spigt, M., Kuijper, E., Schayck, C., Troost, J., Knipschild, P., Linssen, V., et al. (2005). Increasing the daily water intake for the prophylactic treatment of headache: A pilot trial. *European Journal of Neurology, 12*(9), 715-718.

Spittler, K. L. (2008). Chronic daily headache: A challenge for pediatric neurologists and psychiatrists. *Neurology Reviews, 16*(2).

Stanton, A., & Franz, R. (1999). Focusing on emotion: An adaptive coping strategy. In C. R. Snyder (Ed.), *Coping: The psychology of what works* (pp. 70-89). New York, NY: Oxford University Press.

Stanton, B., Kim, N., Galbraith, J., & Parrott, M. (1996). Design issues addressed in published evaluations of adolescent HIV-risk reduction interventions: A review. *Journal of Adolescent Health, 18*(6), 387-396.

Steer, R. A., Ball, R., Ranien, W. F., & Beck, A. J. (1999). Dimensions of the Beck depression inventory-II in clinically depressed outpatients. *Journal of Clinical Psychology, 55*(1), 117-128.

Stein, F. (2001). Occupational stress, relaxation therapies, exercise and biofeedback. *Work: A Journal of Prevention Assessment and Rehabilitation, 17*(3), 235-245.

Stein, K. F., Sargent, J. T., & Rafaels, N. (2007). Intervention research: Establishing fidelity of the independent variable in nursing clinical trials. *Nursing Research, 56*(1), 54.

Stein, R. E., Zitner, L. E., & Jensen, P. S. (2006). Interventions for adolescent depression in primary care. *Pediatrics, 118*(2), 669-682.

Stovner, L., Hagen, K., Jensen, R., Katsarava, Z., Lipton, R., Scher, A., . . . Zwart, J. (2007). The global burden of headache: A documentation of headache prevalence and disability worldwide. *Cephalalgia, 27*(3), 193-210.

Strom, P., & Strom, R. (2009). *Adolescents in the Internet age: A volume in lifespan learning*. Charlotte, NC: Information Age.

Sun-Edelstein, C., & Mauskop, A. (2009). Food and supplements in the management of migraine headaches. *Clinical Journal of Pain, 25*, 446-452.

Tanaka, N., Uji, M., Hiramura, H., Chen, Z., Shikai, N., & Kitamura, T. (2006). Cognitive patterns and depression: Study of a Japanese university student population. *Psychiatry & Clinical Neurosciences, 60*(3), 358-364. doi:10.1111/j.1440-1819.2006.01514.x

Talraska, D., & Zgorzalewicz-Stachowiak, M. (2007). The influence of selected factors on quality of life of children with headaches. *Advances in Medical Science, 52*(Suppl 1), 123-125.

Taylor, S. E., & Aispinwall, L. G. (1996). Mediating and moderating processes in psychological stress: Appraisal, coping, resistance, and vulnerability. In H. B. Kaplan (Ed.), *Psychosocial stress: Perspectives on structure, theory, life-course, and methods* (pp. 71-110). San Diego, CA: Academic Press.

Tenhunen, K., & Elander, J. (2005). A qualitative analysis of psychological processes mediating quality of life impairments in chronic daily headache. *Journal of Health Psychology*, *10*(3), 397-407.

Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. *Monographs of the Society for Research in Child Development, 59*(2/3), 25-52.

Thomsen, A. H., Compas, B. E., Collett, R. B., Stanger, C., Boyer, M. C., & Konik, B. S. (2002). Parent reports of coping and stress responses in children with recurrent abdominal pain. *Journal of Pediatric Psychology, 27*(3), 215-226.

Trautmann, E., & Kröner-Herwig, B. (2010). A randomized controlled trial of Internet-based self-help training for recurrent headache in childhood and adolescence. *Behaviour Research and Therapy, 48*(1), 28-37. doi:10.1016/j.brat.2009.09.004

Trautmann, E., Lackschewitz, H., & Kröner-Herwig, B. (2006). Psychological treatment of recurrent headache in children and adolescents – A meta-

analysis. *Cephalalgia, 26*(12), 1411-1426. doi:10.1111/j.1468-2982.2006.01226.x

Unalp, A., Dirik, E., & Kurul, S. (2006). Prevalence and characteristics of recurrent headaches in Turkish adolescents. *Pediatric Neurology, 34*(2), 110-115. doi:10.1016/j.pediatrneurol.2005.08.001

Vandrame, M., Kaleyias, J., Valencia, I., Legido, A., & Kothare, S. V. (2008). Polysomnographic findings in children with headaches. *Pediatric Neurology, 39*(1), 6-11. doi:10.1016/j.pediatrneurol.2008.03.007

Varricchio, C. G. (1995). Issues to consider when planning cancer control interventions for women. *Women's Health, 5*(2), 64-74.

Velleman, S., Stallard, P., & Richardson, T. (2010). A review and meta-analysis of computerized cognitive behavior therapy for the treatment of pain in children and adolescents. *Child: Care Health and Development, 36*(4), 465-472.

Waltz, J., Addis, M. E., Koerner, K., & Neil, S. (1993). Testing the integrity of a psychotherapy protocol: Assessment of adherence and compliance. *Journal of Consulting and Clinical Psychology, 61*(4), 620-630.

Wang, D., & Bakhai, A. (2006). *Clinical trials: A practical guide to design, analysis, and reporting*. London, England: Remedica Pub Ltd.

Wang, S., Fuh, J., & Lu, S. (2009). Chronic daily headache in adolescents: An 8-year follow-up study. *Neurology, 73*(6), 416-422.

Wang, S., Fuh, J., Lu, S., & Juang, K. (2006). Chronic daily headache in adolescents: Prevalence, impact, and medication overuse. *Neurology, 66*(2), 193-197. doi:10.1212/01.wnl.0000183555.54305.fd

Wang, S., Juang, K., Fuh, J., & Lu, S. (2007a). Psychiatric comorbidity and suicide risk in adolescents with chronic daily headache. *Neurology, 68*(18), 1468-1473. doi:10.1212/01.wnl.0000260607.90634.d6

Wang, S.-J., Fuh, J.-L., Lu, S., & Juang, K.-D. (2007b). Outcomes and predictors of chronic daily headaches in adolescents: A 2-year longitudinal study. *Neurology, 68*(18), 1468-1473.

Weersing, V. R., & Brent, D. A. (2006). Cognitive behavioral therapy for depression in youth. *Child and Adolescent Psychiatric Clinics of North America, 15*(4), 939-957. doi:10.1016/j.chc.2006.05.008

Weersing, R. V., & Weisz, J. R. (2002). Community clinic treatment of depressed youth: Benchmarking usual care against CBT clinical trials. *Journal of Consulting and Clinical Psychology, 70*(2), 299-310.

Weinhardt, L. S., Forsyth, A. D., Carey, M. P., Jaworski, B. C., & Durant, L. E. (1998). Reliability and validity of self-reports measures of HIV-related sexual: Progress since 1990 and recommendations for research and practice. *Archives of Sexual Behavior, 27*(2), 155-180.

Whitmer, K., Sweeney, C., Slivjak, A., Sumner, C., & Barsevick, A. (2005). Strategies for maintaining integrity of a behavioral intervention. *Western Journal of Nursing Research, 27*(3), 338.

Wiendels, N. J., Van Der Geest, M. C. M., Neven, A. K., Ferrari, M. D., & Laan, L. A. E. M. (2005). Chronic daily headache in children and adolescents. *Headache: The Journal of Head & Face Pain, 45*(6), 678-683. doi:10.1111/j.1526-4610.2005.05137.x

Windle, M., & Windle, R. C. (1996). Coping strategies, drinking motives, and stressful life events among middle adolescents: Associations with emotional and behavioral problems and with academic functioning. *Journal of Abnormal Psychology, 105*(4), 551.

Winner, P., & Gladstein, J. (2002). Chronic daily headaches in pediatric practice. *Current Opinion in Neurology, 15*(3), 297-301.

Wong, D., & Baker, C. (1985). *Reference manual for the Wong-Baker FACES pain rating scale*. Retrieved from http://www1.us.elsevierhealth.com /FACES/faces47translations.html

Wood, D. (2003). Effect of child and family poverty on child health in the United States. *Pediatrics, 112*(3), 707-7111.

Yokoyama, M., Yokoyama, T., Funazu, K., Yamashita, T., Kondo, S., Hosoai, H., . . . Nakamura, H. (2009). Associations between headache and stress, alcohol drinking, exercise, sleep, and comorbid health conditions in a Japanese population. *The Journal of Headache and Pain, 10*(3), 177-185.

Zeltzer, L. K., Tsao, J. C. I., Stelling, C., Powers, M., Levy, S., & Waterhouse, M. (2002). A phase I study on the feasibility and acceptability of an acupuncture/hypnosis intervention for chronic pediatric pain. *Journal of Pain and Symptom Management, 24*(4), 437-446. doi:10.1016/S0885-3924(02)00506-7

APPENDIX A

INTERVENTIONS FOR ADOLESCENTS WITH CHRONIC OR RECURRENT HEADACHES

Intervention Studies with Adolescents with Chronic or Recurrent Headaches

Year Author Title Purpose	Design, Intervention & Sample	Measures Used	Major Findings	Strengths & Limitations
2009 Eccleston, Palermo, Williams, Lewnadowski & Morley Psychological Therapies for Management of Chronic and Recurrent Pain in Children and Adolescents Purpose: To assess the effectiveness of psychological therapies for reducing pain, disability, and improving mood in children and adolescents with recurrent, episodic, or persistent pain.	**Design: RCT (Review)** **Sample:** N = 29 studies analyzed (20 studies addressed treatment for headaches). Age = 21 years or less At least 10 participants in each arm post-treatment comparing psychological therapies with placebo. Wait-list received standardized medical care.	**Measures** Pain Intensity, treatment effects on children's physical and emotional functioning, activity limitation (Child Activity Limitations Interview), depressive symptoms, parental response to pain behaviors, treatment acceptability and satisfaction. **Follow up:** Three months to assess maintenance of the effects.	Cognitive behavioral therapy demonstrated a significant reduction in the intensity of pediatric chronic pain. Psychological therapies had no significant impact on depressive symptoms. Psychological therapies (relaxation, hypnosis, coping skills training, biofeedback, CBT) are treatments, which may help with pain and its disabling consequences.	**Strengths** Randomized controlled design emphasizes internal validity thereby providing confidence in the conclusion Parental component Outcome assessment plan included relevant multi-dimensional outcomes. **Limitations** Lack of attention control comparison condition Unable to examine moderators of treatment outcomes. Results not generalizable because of homogeneous group (mostly middle class Caucasians).
2004 Fichtel & Larsson Relaxation Treatment Administered by School Nurses to Adolescents with Recurrent Headache Purpose: To examine 1) the effectiveness of two different forms of relaxation training administered by school nurses to adolescents suffering from recurrent headaches, 2) outcome related to headache diagnosis, 3) predictors of outcome such as coping strategies, functional disability,	**Design:** RCT **Sample:** 11 nurses at 10 schools randomized to one of the two treatments. Total 63 adolescents – ages 13 to 18 years. **Intervention:** 1) Applied Relaxation – Instruction on how to relieve increased muscle tension. Aim was to teach an ambulatory method of relaxation	**Measures** Headache Diary, Functional Disability Inventory, Illness Behavior Encouragement Scale (IBES), The Pain Coping Questionnaire, Treatment Motivation and Credibility **Follow-up:** 6 months	No significance difference found for clinical improvement on total headache activity between the two relaxation approaches and the post hoc group. Adolescents treated with relaxation training improved significantly more than those in the post hoc group on headache symptoms. There was no difference between	**Strengths** Use of audiotaped instructions to standard relaxation instructions. Use of a real world setting to evaluate the effects of relaxation treatment. **Limitations** Small sample size Not theory based Results may not be generalizable to adolescents in the United States. Results may not be generalizable to boys because sample mostly girls. Lower control of the implementation of the treatment procedure because

Year Author Title Purpose	Design, Intervention & Sample	Measures Used	Major Findings	Strengths & Limitations
and 4) maintenance of treatment effects of a 5-6 month assessment. Uppsala and Gavle Sweden	procedures to be applied to everyday life. 2) Relaxation with visualize-tion – no specific instruction on how to relieve increased muscle tension. Aim was to teach general relaxation principles. 3) Post hoc comparison group of 41 untreated subjects (matched on sex, age, and headache diagnosis). Dose of intervention: 6 biweekly sessions.		headache frequency between the relaxation and control groups. Participants treated with relaxation had improvement in headache free days compared to control group. Functional disability and use of positive statements as a coping strategy were the two variables that contributed to reduction of headache activity. Increase functional disability before treatment were related to worse outcomes while more positive self-statements predicted a better outcome. At 6-month, outcomes were well maintained as evidenced by no difference between the groups at 6-month follow-up in post follow-up gain scores.	nurses in multiple settings.

Year Author Title Purpose	Design, Intervention & Sample	Measures Used	Major Findings	Strengths & Limitations
2002 Kröner-Herwig & Denecke Chronic Daily Headache in Children and Adolescent Presenting to Tertiary Headache Clinics. Purpose: To compare the efficacy of cognitive behavioral training in a therapist-administered group format (TG) and a self-help format (SH) for children with recurrent headache.	**Design:** Quasi-experimental Wait List Control Design Age Range = 5 to 18 years **Sample:** N = 77 SH (N = 27) TG (N = 29) **Intervention:** CBT Training in a therapist-administered group format (TG) • Eight 90-minute sessions with groups of five children. Self-help group (SH) • Written materials with Instructions. Wait-list control Dose of Intervention: 8 weekly sessions	**Measures** Headache Diary • Monitor changes in headache intensity, duration, and frequency at 4 weeks pre-therapy; 4 weeks post therapy and 6 months later. Coping strategies. Structured Interview. Psychometrically validated questionnaire that evaluated stress exposure, stress symptoms, and stress coping. Post-treatment questionnaire evaluating the training and its effects. **Follow-up:** 4 weeks post-therapy 6 months	• No significant difference between the 2 conditions were found • In both treatments, headaches decreased markedly from post-training to follow-up (68% to 76% of children reported clinically significant improvements. • Changes in self-concept and ability to cope with stress after training were also positive effects of the intervention. • No difference in utilization of coping strategies found between groups.	**Strengths** • Random assignment to treatment groups therefore less selection bias. • Wait list control design, which addresses some of the ethical concerns, associated with a no treatment control group. • Therapy-based (Self Management). • Manualized training procedure. • Parental component **Limitations** • No follow-up data obtained for control group because children treated after the experimental phase. • Outcome measured only through 6 months. • Long-term effect of intervention not known because outcome measured only through 6 months.

Year Author Title Purpose	Design, Intervention & Sample	Measures Used	Major Findings	Strengths & Limitations
2005 Larsson, Carlsson, Fichtel, & Melin Relaxation Treatment of Adolescent Headache Sufferers: Results From a School-Based Replication Series Purpose: To examine the effectiveness and efficiency of relaxation training provided within school settings, in addition to the effects on various headache features and maintenance of treatment gains at 6 to 10 months follow-up in a school-based replication series. Uppsala and Gavle in Sweden	**Design:** RCT Over a 20 year period, students participated in 7 RCT trials conducted within regular school health service settings **Sample:** N = 288 adolescents Age Range: 10 – 18 years **Intervention:** Different formats of standardized relaxation training processes were contrasted to different attention-control (ATCO) approaches or self-monitoring (SM) of headaches in prospective diary recordings Does of Intervention = 8 sessions	**Measures** Headache History Headache Activity (intensity, , # of headache free days, frequency, duration Clinical Improvement Medication Usage	A therapist administered relaxation approach was superior to self – help or school-nurse administered relaxation training approaches, attention control approaches or self-monitoring Participants with TTHs responded positively to any form of relaxation Participants with frequent migraines responded well only to therapist-administered relaxation School-nurse administered procedures were found to be the most efficient form of relaxation treatment, in particular for adolescents suffering from TTHs Medication usage, total headache activity, number of headache days and peak headache intensity were significantly reduced after relaxation	**Strengths** Multiple RCTs Large sample size Outcome measured at 10-month follow-up. Standardized relaxation training programs Attrition rate during treatment was 3.5% and follow-up assessments 4.8%, increasing validity of the findings. **Limitations** Findings limited to 1 geographic area that may not represent general population Findings limited to school setting and may not be generalizable to other settings. Findings may not be generalizable to teens in the U.S. Therapist administered relaxation training may not be cost-effective in the majority of health care settings. Not theory based. Ninety percent of the participants were girls; therefore, results may not be generalizable to boys.

Year Author Title Purpose	Design, Intervention & Sample	Measures Used	Major Findings	Strengths & Limitations
2010 Palermo, Eccleston, Lewandowski, & Williams Randomized Controlled Trials of Psychological Therapies for Management of Chronic Pain in Children and Adolescents – An Updated Meta-Analytic Review Purpose: To quantify the effects of psychological therapies for the management of chronic pain in youth. United Kingdom	**Design:** Meta-analysis. Systematic Reviews of RCTs **Sample:** N = 25 trials with 1247 participants less than 19 years with persistent, recurrent, or episodic.. **Intervention:** • Relaxation training • Biofeedback • Cognitive behavioral therapy Dose of Intervention = two 90- minute sessions to ten 45-minute sessions over 7 weeks.	**Measures** Pain Intensity, Functional Interference of Disability, Emotional functioning	Treatment gains were well maintained at the 6 to 10-month follow-up Psychological treatments significantly reduced pain intensity in children and adolescents with headaches, and other chronic pain conditions. There was minimal impact of psychological treatment on children pain-related disability and emotional functioning.	**Strengths** Meta analyses RCTs, which strengthens internal validity **Limitations:** Studies involved a range of domain of chronic pain. Not theory based The studies combined findings from children and adolescents, which make it difficult to extrapolate adolescent specific findings. Small number of studies included in review. Most of the RCTs used treatment as usual or wait-list control, which made it challenging to separate treatment from placebo effects. Lack of attention control comparison conditions.

Year Author Title Purpose	Design, Intervention & Sample	Measures Used	Major Findings	Strengths & Limitations
2009 Palermo, Wilson, Peters, Lewandowski, & Somhegyi Randomized controlled trial of an Internet Delivered Family Cognitive Behavioral Intervention for Children and Adolescents with Chronic Pain Purpose: To evaluate a more accessible treatment approach for chronic pediatric pain using an Internet-delivered family CBT intervention.	**Design:** RCT **Sample:** N = 48 subjects between the ages of 11 and 17 years. **Intervention:** Internet Treatment Group Internal online modules including relaxation training, cognitive strategies, parent operant techniques, communication strategies, sleep, and activity interventions. Wait List Control Group who received medical care only. Dose of Intervention: 8 weeks – 30-minute modules, 9 hours per family (4 hours child modules, 4 hour parent modules, 1 hour therapist time).	**Measures** Pain Intensity, Activity Limitations, Online Diary **Follow-up:** 3 months	Significantly greater reduction in activity limitation and pain intensity at post-intervention for Internet group. Effects of the intervention were maintained at 3-months follow-up. Greater clinically improvement in pain was greater for the Internet group then for the wait-list control group. No significant group differences in parental protectiveness or child depressive symptoms post-treatment. All children and parents rated Internet treatment as acceptable The Internet-delivery of family CBT showed efficacy and acceptability for reducing pain and improving function among children and adolescents with pain.	**Strengths** Self-guided Internet intervention with minimal therapist time. Parent component. Inclusion of multi-dimensional outcomes. Continued improvements were demonstrated at the three-month follow-up. High subject participation rate (74%). Very low attrition rate (8%). **Limitations** Small sample size Pilot study Study design did not allow for examination of long-term maintenance of treatment effects. No measure of treatment expectancy or an attention comparison condition. No examination of moderators of treatment outcomes.

Year Author Title Purpose	Design, Intervention & Sample	Measures Used	Major Findings	Strengths & Limitations
2010 Trautmann & Kröner-Herwig A Randomized Controlled Trial of Internet-Based Self-Help Training for Recurrent Headache in Childhood and Adolescence. Purpose: To evaluate the first (German) Internet intervention for children and adolescents with recurrent headaches. Germany	**Design:** RCT with 2 intervention groups (n = 24, n-= 22) and the control group (n = 19) **Sample:** Sixty-five children and adolescents in entire study but only 18 were pediatric headache patients. Mean age 12.7 years (SD=2.2) Three treatment conditions: 1) self-help training, 2) applied relaxation, and 3) an educational intervention. **Intervention:** 6 weeks of training with 6 weekly modules, including homework exercises and e-mail contact to discuss module topics for all participants (e.g. information about mechanisms, symptoms and types of headaches and role of stress) CBT training included education on headache, stress management, coping and stress, cognitive restructuring, self-assurance and problem solving. Applied relaxation training involved	**Measures** Frequency and severity of headaches at 6-month follow-up using a 4-week headache diary. Pain catastrophi-zing Children's Depression Inventory Health-related quality of life Participant's evaluation of training program Demo-graphics and background information Strengths and Difficulties Questionnaire Training Program Evaluation **Follow-up** 6 months post-intervention	**Major Findings** Perceived positive change in their headache in all participants without group differences. The two treatment groups demonstrated better coping with their headaches. Communication over the Internet did not impair the relationship between the participants and their providers. CBT demonstrated better coping with their headaches and reported the highest rate of subjective improvement of headaches. There were no significant deteriorations or improvements of headache variables at the 6-month follow-up suggesting that headaches remained stable. There was improvement of pain catastrophizing for all groups at 6-month follow-up. No marked improvement in depression at post and follow-up assessment for any of the conditions.	**Strengths** RCT Evidence supports that all groups benefit from the Internet-based offer and that an Internet-based self-help training program is acceptable and feasible for children and adolescents. Attrition rate was 5.3%. **Limitations:** Small sample size per group, which may impact differences in effect, sizes between the groups. Degree to which results can be generalized is limited due to participants lost at 6-month follow-up. Some participants did not complete all questionnaires. The post-hoc analysis was 0.41, which demonstrates a lack of power in this study. Results may not be generalizable to children and teens in the United State. Outcomes measured only at 6 months. Self-selection bias of the participants. High rate of noncompliant participants. Self-selection bias.

Year Author Title Purpose	Design, Intervention & Sample	Measures	Major Findings	Strengths & Limitations
	passive relaxation, cue-controlled relaxation and differential relaxation.		Minor improvements in quality of life across all groups, save for the improvement of the effect size of CBT.	
2006 Trautmann et al Psychological Treatment of Recurrent Headache in Children and Adolescents - a meta-analysis Purpose: To describe the up-to-date state of evidence in the treatment of pediatric headaches using only RCTs.	**Design:** Meta-analysis **Sample:** N = 23 studies N = 935 children and adolescents Age Range = 7 to 18 years **Intervention:** Relaxation Training 16(27%) CBT 10(17%) Biofeedback 7(11%) Combination 6(10%) Waiting List Control 16(27%) Active Control 5(8%)	**Measures** Headache Symptoms Variables (frequency, intensity, and duration of headache or a comprehensive headache index) Medication Use Clinical significant change (reduction of headache symptoms $\geq$ 50% based on headache index or headache variables). **Follow-up** 6 and 12-months post-intervention	**Major Findings** There is validity of the interventions in the treatment of tension and migraine headaches. Small improvement post-therapy from 1 to 6 months follow-up assessment regarding headache variables and clinical significance. Headache symptoms showed long term improvement at 6 to 12 month follow-up assessment.	**Strengths** RCT Evidence supports psychological treatments is efficacious in pediatric headache patients. Use of controlled comparison group. **Limitations:** Small number of trials for the analysis Large variance in age of treatment participants within samples. Only completer analyses were conducted, which may cause over estimation of efficacy.

APPENDIX B

STUDY MEASURES

(BECK YOUTH DEPRESSION AND ANXIETY INVENTORIES NOT INCLUDED BECAUSE OF COPYRIGHT)

Code Number: _____
Date: _____

Teen Demographic Questionnaire

Directions:
Please fill in the blank, or check the number of the item that best answers the question.

1. Your age in years? _____

2. Your date of birth? _____

3. Your gender? ____ Male ____ Female

4. Please check your ethnic background. Mark all that apply.
   ____ a White, not of Hispanic origin
   ____ b Black, not of Hispanic origin
   ____ c American Indian/Alaskan Native
   ____ d Asian/Pacific Islander
   ____ e Hispanic
   ____ f Other

5. During the school year, how many hours per week do you usually work for pay?
   ____ 1 0 hours ____ 2 1-9 hours ____ 3 10-19 hours
   ____ 4 20-29 hours ____ 5 30-39 hours ____ 6 40 hours
   ____ 7 More than 40 hours

6. Do you have headaches 15 or more days a month?
   ____ Yes ____ No

7. Does you have headaches that last for more than 4 hours a day?
   ____ Yes ____ No

8. Have you had these type headaches for more than 3 consecutive months?
   ____ Yes ____ No

9. Do you speak and understand English?
   ____ Yes ____ Yes

10. Are you enrolled in high school?
    ____ Yes ____ No

11. If yes, what grade are you in?
____ 9th ____ 10th ____ 11th ____ 12th

12. Do you feel that you get adequate support (family, school, work) to assist you in dealing with your headaches?
____ Yes ____ No

13. Has there been a change in your work or social activities since being diagnosed with chronic daily headaches?
____ Yes ____ No

14. If there has been a change in activities, please describe the change.
_____
_____
_____

Code Number: _____
Date: _____

Parent Demographic Questionnaire

Directions:
Please fill in the blank, or check the number of the item that best answers the question.

1. What is your age in years? _____

2. Gender: ____ Male ____ Female

3. Please check your ethnic background. Mark all that apply.
   _____ a White, not of Hispanic origin
   ____ b Black, not of Hispanic origin
   ____ c American Indian/Alaskan Native
   ____ d Asian/Pacific Islander
   ____ e Hispanic
   ____ f Other

4. Do you speak and understand English?
   ____ Yes ____ No

5. What is your marital status?
   ____ 1 Married (first time)
   ____ 2 Never Married
   ____ 3 Separated
   ____ 4 Divorced
   ____ 5 Widowed
   ____ 6 Married (2nd time)
   ____ Married (3rd time)

6. List the members of your family that live in your home and their relationship to you.
   _____
   _____
   _____

7. Are you the parent or legal guardian that is responsible for a large portion of the adolescent's care and supervision?
   ___ Yes ____ No

8. Have you ever been diagnosed with a learning problem?
   ____ Yes ____

9. Do you now have or have you ever been diagnosed with a mental health problem, such as anxiety or depression?
   ____ Yes ____ No

10. Do you have or have you ever had problems with chronic headaches?
____ Yes ____ No

11. How much school did you complete?
_____ 1 Did not finish high school
_____ 2 Finished high school or got GED
_____ 3 Some college or training after high school
____ 4 Finished college
____ 5 Master's degree or a PhD
____ 6 I don't know

12. Does your child currently have any physical problems or chronic illness, such as asthma, diabetes, cancer, arthritis, heart disease, seizures, kidney problems etc.?
___ Yes ____ No

13. Has your teen been diagnosed with chronic daily headaches or one of the following subtypes: new daily persistent headaches, medication overuse headaches, chronic migraines, hemicrania continuum, or chronic tension-type headache?
____ Yes ____ No

14. Do you feel that there are adequate support systems for your teen to help with his or her headaches?
____ Yes ____ No

15. Has there been a change in your teen's work and/or social activities since being diagnosed with chronic daily headaches?
____ Yes ____ No

16. Have you ever been told that your teen has a brain tumor, brain cyst, abnormal development of brain, or about some other brain abnormality?
____ Yes ____ No

17. Is your teen now or has your teen been treated for a mental health problem (e.g., depression, anxiety disorder, or attention deficit/hyperactivity disorder)?
____ Yes ____No

18. Is there family history of chronic headaches?
____ Yes ____ No

19. Are there family members with a mental health condition?
____ Yes ____ No

20. Please describe any stressful current life event(s) that you and/or your family are currently experiencing?

_____
_____
_____
_____

21. If a program was available to help your teen to cope with his chronic headaches, would you be interested in having him or her attend it?
____ Yes ____ No

22. How many weekly sessions would you be willing to bring your child to the clinic to attend a program that could help him or her cope with his or her chronic headaches?
____ a) Two
____ b) Three to Five
____ c) Six to Seven
____ d) Eight to Ten
____ e) Eleven to Fifteen

23. List all medications your teen currently takes for his or her headaches.

_____
_____
_____
_____
_____

Code Number: _____
Date: _____

Belief Scale for Teens

Below are 18 statements that relate to your overall health and well-being. There are no right or wrong answers to the following statements. Please circle the number that best describe your agreement or disagreement with each statement

		Strongly Disagree	Disagree	Don't Care	Agree	Strongly Agree
1	I am sure that I will do what is best to lead a healthy life.	1	2	3	4	5
2	I believe that exercise and being active will help me to feel better about myself	1	2	3	4	5
3	I am certain that I will make healthy food choices.	1	2	3	4	5
4	I know how to deal with things in a healthy way that bother me.	1	2	3	4	5
5	I believe that I can reach the goals that I set for myself.	1	2	3	4	5
6	I am sure that I can handle my problems well.	1	2	3	4	5
7	I believe that I can be more active.	1	2	3	4	5
8	I am sure that I will do what is best to keep myself healthy.	1	2	3	4	5
9	I am sure that I can spend less time watching TV.	1	2	3	4	5
10	I know that I can make healthy snack choices regularly.	1	2	3	4	5
11	I can deal with pressure from other people in positive ways.	1	2	3	4	5
12	I know what to do when things bother or upset me.	1	2	3	4	5
13	I believe that m parents and family will help me to reach my goals.	1	2	3	4	5

		Strongly Disagree	Disagree	Don't Care	Agree	Strongly Agree
14	I am sure that I will feel better about myself if I exercise regularly.	1	2	3	4	5
15	I believe that being active is fun.	1	2	3	4	5
16	I am able to talk to my parents or family about things that bother or upset me.	1	2	3	4	5
17	I am knowledgeable about how to handle my headaches.	1	2	3	4	5
18	I am sure I will do what I need to do to help my headaches.	1	2	3	4	5

Code Number: _____
Date: _____

Perceived Stress Scale

The questions I this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and your should treat each on as a separate question. The best approach is to answer each question fairly and quickly. This is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate. Please circle the number that best describe your feeling or thoughts for each statement.

		Never	Almost Never	Some-times	Fairly Often	Very Often
1	In the last month, how often have you been upset because of something that happened unexpectantly?					
2	In the last month, how often have you felt that you were unable to control the important things in your life?					
3	In the last month, how often have you felt nervous and "stressed"?					
4	In the last month, how often have you dealt successfully with irritating life hassles?					
5	In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?					
6	In the last month, how often have you felt confident about your ability to handle personal problems?					
7	In the last month, how often have you felt that things were going your way?					
8	In the last month, how often have you found that you could not cope with all the things that you had to do?					
9	In the last month, how often have you been able to control irritations in your life?					
10	In the last month, how often have you felt that you were on top of things?					
11	In the last month, how often have you been angered because of things that happened that were outside of your control?					
12	In the last month, how often have you found yourself thinking about things that you have to accomplish?					
13	In the last month, how often have you been able to control the way you spend your time?					
14	In the past month, how often have you felt difficulties were piling up so high that you could not overcome them?					

PedMIDAS

Headache Disability.

The following questions try to assess how much the headaches are affecting day-to-day activity. Your answers should be based on the last three months. There are no "right" or "wrong" answers so please put down your best guess.

1. **How many full school days of school were missed in the last 3 months due to headaches**?

2. **How many partial days of school were missed in the last 3 months due to headaches (do not include full days counted in the first question)**?

3. **How many days in the last 3 months did you function at less than half your ability in school because of a headache (do not include days counted in the first two questions)?**

4. **How many days were you not able to do things at home (i.e., chores, homework, etc.) due to a headache?**

5. **How many days did you not participate in other activities due to headaches (i.e., play, go out, sports, etc.)?**

6. **How many days did you participate in these activities, but functioned at less than half your ability (do not include days counted in the 5th question)?**

Total PedMIDAS Score _____

Headache Frequency _____

Headache Severity _____

Code Number: _____
Date: _____

Headache Diary

1. Please check the number that best describes your number of headache days per week.

   ____ 1 day
   ____ 2 days
   ____ 3 days
   ____ 4 days
   ____ 5 days
   ____ 6 days
   ____ 7 days
   ____ 8 days

2. How long does a headache typically lasts?

   ____ a. ≤ 1 hour
   ____ b. 2 hours
   ____ c. 3 hours
   ____ d. 4 hours
   ____ e. 5 hours
   ____ f. 6 or more hours

3. How would you rate the pain level of your headaches (See attached Wong Baker FACES Pain Scale)?

   _____ 0 No Hurt
   _____ 2 Hurts Little Bit
   _____ 4 Hurts Little More
   _____ 6 Hurts Even More
   _____ 8 Hurts Whole Lot
   _____ 10 Hurts Worst

4. What medications do you use for your headaches?

   _____
   _____
   _____

5. How often do you take medications?

   ____ 1 dose per week
   ____ 2 doses per week
   ____ 3 doses per week
   ____ 4 or more doses per week

PARENT PERCEPTION OF PAIN INTERFERENCE

Parent Name:_____ Child's Name:_____
Date:_____

Circle a number on each scale to indicate your perception of how your child's pain affects each situation.

1. In general, how much does your child's pain interfere with his/her day-to-day activities?

0 1 2 3 4 5 6
No Interference Extreme Interference

2. In general, how much does your child's pain interfere with his/her ability to attend school?

0 1 2 3 4 5 6
No interference Extreme Interference

3. How much has your child's pain interfered with his/her ability to get enough sleep?

0 1 2 3 4 5 6
No Interference Extreme Interference

4. How much has your child's pain affected his/her ability to take part in recreational and other social activities?

0 1 2 3 4 5 6
No Affect Extreme Affect

5. How much does your child limit his/her activities in order to keep pain from getting worse?

0 1 2 3 4 5 6
Not At All Very Much

6. How much has your child's pain affected his/her ability to do household chores?

0 1 2 3 4 5 6
No Affect Extreme Affect

7. How much has your child's pain interfered with his/her ability to plan activities?

0 1 2 3 4 5 6
No Interference Extreme Interference

8. How much has your child's pain affected his/her friendships with people other than your family?

0 1 2 3 4 5 6
No Affect Extreme Affect

9. How much has your child's pain affected the amount of satisfaction or enjoyment he/she gets from family-related activities?

0 1 2 3 4 5 6
No Affect Extreme Affect

10. How much has your child's pain affected the amount of satisfaction he/she gets from school?

0 1 2 3 4 5 6
No Affect Extreme Affect

11. How much has your child's pain affected the amount of satisfaction or enjoyment he/she gets from participation in social and recreational activities?

0 1 2 3 4 5 6
No Change Extreme Change

Adapted from the West Haven-Yale Multidimensional Pain Inventory. Kerns, R. D., Turk, D. C. & Rudy, T. E. (1985). The West Haven-Yale Multidimensional Pain Inventory (WHYMPI). *Pain, 23*, 345-356.

Code Number:_____
Date: _____

Teen Exit Questionnaire – COPE HEP

Direction:
Please fill in the blank, or check the number of the item that best answers the question.

1. Was the format of the program acceptable to you?
   ____ Yes ____ No
   If no, why wasn't it acceptable?
   _____
   _____

2. Was the number and length of sessions acceptable to you?
   ____ Yes ____ No
   If no, why not?
   _____
   _____

3. Was the intervention helpful to you?
   ____ Yes ____ No
   If yes, how was it helpful?
   _____
   _____

   If no, why wasn't it helpful?
   _____
   _____

4. What improvements to the program would you recommend?
   _____
   _____

5. How could your participation been made easier for you?
   _____
   _____

6. Would you recommend the program to a friend with headaches?
   ____ Yes ____ No

   If no, why not?
   _____
   _____

Code Number:_____
Date: _____

Parent Exit Questionnaire – COPE HEP

Direction:
Please fill in the blank, or check the response that best answers the question.

1. Was the format of the program acceptable to you?
   ____ Yes ____ No

   If no, why wasn't it acceptable?

   _____

   _____

2. Was the intervention helpful to your teen?
   ____ Yes ____ No

   If yes, how was it helpful?

   _____

   _____

   If no, how was it not helpful?

   _____

   _____

3. What do you think made the biggest improvement in your teen's headaches?

   _____

   _____

4. How could your participation been made easier for you?

   _____

   _____

5. Would you recommend the program to a friend who has a teen with headaches?
   ____ Yes ____ No
   If no, why not?

   _____

APPENDIX C

SUPPLEMENTAL STUDY MATERIALS

Adherence Log

ID: _____
Session #: _____
Session Length: _____

	DATE	PRESENT Yes No	RE-SCHEDULED DATE	QUALITY OF WORK (Poor, Fair, Good, Excellent)
Homework Headache Diary				
Homework Headache Diary Headache Hygiene Monitoring				
Homework Headache Diary Relaxation Self-Monitoring Log				
Homework Headache Diary				
Homework Headache Diary				
Homework Headache Diary Headache Hygiene Monitoring				
Homework Headache Diary				

Fidelity Monitoring Log – COPE- HEP
Thinking, Feeling, and Behaving: What is the Connection?
Session 1
Clinic

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Overview of Thinking, Feeling, Behaving Concepts/Triangle			
	Examples of Events That Trigger Negative Thinking			
	Overview of Headache Hygiene Behaviors			
	A Review of Things to Do to Stay in Present Moment			
	In-Session Activities Re: Negative Thinking, Healthy Lifestyle Behaviors, Headache Hygiene			
	Review of Headache Goals, Perceived Barriers, and Resources/Support Needed to Remove Barriers			
	Overview of Homework Activities			

Fidelity Monitoring Log – COPE-HEP
Self-Esteem/Positive Thinking/Self-Talk/Headache Hygiene
Session 2
Telephone

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Examples of Headache Triggers			
	Examples of Healthy or Positive Self-Esteem			
	A Review of Thinking, Feeling, Behavior Triangle			
	Overview of Change			
	Review of the Steps of Change			
	Review of Headache Hygiene Behaviors			
	Overview of Homework Activities			

Fidelity Monitoring Log – COPE-HEP
Stress and Coping
Session 3
Clinic

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Overview of the ABCs			
	Overview of Stress			
	Discuss Negative Thoughts and Stress			
	Describe Physical Responses to Stress			
	Discuss Signs of Healthy Coping			
	Overview of Signs of Depression in Teens			
	Practice Abdominal Breathing and Relaxation Techniques			
	Manipulation Check #1			
	Overview of Homework Activities			

Fidelity Monitoring Log – COPE-HEP
Problem Solving and Setting Goals
Session 4
Telephone

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Review of Antecedents, Beliefs, and Consequences (ABCs)			
	Discuss Headache Goals			
	Discuss Barriers or Potential Barriers to Achieving Headache Goals			
	Overview of the 4-Step Problem Solving Process			
	Discussion Re: When Does Success Happens?			
	Overview of Homework Activities			

Fidelity Monitoring Log – COPE-HEP
Dealing With Your Emotions in Healthy Ways and Effective Communication
Session 5
Telephone

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Healthy Ways of Dealing with Stress			
	Overview of Mental Imagery			
	Role Play a Guided Imagery Exercise			
	Discuss Emotion Regulation			
	Overview of Self Control Strategies			
	Discuss Other Healthy Coping Strategies			
	Discuss the Effective Components of Communication			
	Manipulation Check #2			
	Overview of Homework Activities			

Fidelity Monitoring Log – COPE-HEP
Coping with Stressful Situations
Session 6
Telephone

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Review of Thinking, Feeling, Behaving Triangle			
	Discuss Events in Which Teen Used Previously Learned Coping Strategies			
	Role Play of Challenging Situations			
	Overview of Homework Activities			

Fidelity Monitoring Log – COPE-HEP
Putting It All Together for a Healthy YOU
Session 7
Clinic

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Review of Thinking, Feeling, Behaving Triangle			
	Discuss Transition from Negative Thinking to Positive Thinking			
	Important Points Review			
	A Review of the ABCs			
	Wrap-Up Points			
	Celebration			

Fidelity Monitoring Log - Control
Lifestyle Triggers of Headaches
Session 1
Clinic

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Discussion of Teen's Thoughts about Headache Trigger Behaviors			
	Overview of Lifestyle Triggers of Headaches			
	Discussion of Disturbed Sleep Patterns			
	Scenario of Disturbed Sleep Patterns			
	Fatigue as a Trigger of Headaches			
	Importance of Regular Eating Patterns			
	Discussion of the Role of Sudden/ Intense Exertion in Headaches			
	Discussion of Teen's Warm-up Before Exercise			
	Overview of Homework Activities			

Fidelity Monitoring Log - Control
Environmental Triggers
Session 2
Telephone

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Overview of Environmental Triggers of Headaches			
	Examples of Light Triggers of Headaches			
	Discussion of Role of Smells/Odors in Headaches			
	A Review of Barometric Pressure and Its Relation to Headaches			
	The Impact of Traveling on Headaches			
	Overview of Homework Activities			

Fidelity Monitoring Log - Control
Medication Triggers
Session 3
Clinic

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Overview of Medication Triggers			
	Discussion of Birth Control Pills and Hormone Replacement and Headaches			
	Impact of Diuretics on Headaches			
	Discussion of When and How Diuretics are Used			
	Discuss Role of Anti-Asthma Medications in Headaches			
	Discussion Re: Teen's Use of Asthma Medication			
	Overview of Homework Activities			

Fidelity Monitoring Log - Control
Hormonal Triggers of Headache
Session 4
Telephone

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Discussion Role of Menstruation in Headaches			
	Describe Menstrual Migraines			
	Define Ovulation			
	Overview of the Role of Ovulation in Headaches			
	Discussion Re: Puberty and Its Impact on Headaches			
	Pubertal Changes in Girls Compared to Boys and Headaches			
	Describe the Role of Menopause in Headaches			
	Overview of Homework Activities			

Fidelity Monitoring Log - Control
Dietary Triggers of Headaches
Session 5
Telephone

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Overview of Dietary Triggers of Headaches			
	Discussion of Alcohol's Contribution to Headaches			
	Overview of the Role of Tyramine in Headaches			
	Identify Foods that Contain Tyramine			
	Discuss Role of Chocolate in Headaches			
	Overview of Caffeine and Its' Relation to Headaches			
	Overview of Homework Activities			

Fidelity Monitoring Log - Control
Headache Management Tips
Session 6
Telephone

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Overview of Behaviors to Decrease Headaches			
	Discussion of the Importance of Diet Adjustment and Headaches			
	Describe Good Sleep Pattern and Sleep Behavior			
	Discuss Role of Routine Exercise in Reducing Headaches			
	Describe Impact of Alcohol and Drugs on Headaches			
	Overview of Food Additives that Trigger Headaches			
	Discuss Role of Aspartame in Headaches			
	Overview of Homework Activities			

Fidelity Monitoring Log - Control
The Importance of Hydration/Wrap-Up
Session 7
Clinic

Date: _____

DATE	TASK	TIME Start Stop	SUPPORTING MATERIALS	DELIVERY METHOD
	Review of Previous Week's Homework			
	Define Hydration			
	Discussion of Relationship of Dehydration and Headaches			
	Review of Causes of Dehydration			
	Discuss Signs of Dehydration			
	Discuss Ways to Prevent Dehydration			
	Describe Ways to Keep the Body Hydrated			
	Wrap-Up Points			
	Celebration			

ID: _____
Session: _____

Manipulation Check #1

Please complete the following multiple-choice questions.

1. What are the parts of the behavior triad?
a) Coping, appraisal, stressing
b) Dancing, singing, eating
c) Thinking, Feeling, Behaving

2. Which of the following thinking patterns will make you happier and have less stress?
a) negative thinking
b) positive thinking
c) stressful thinking

3. Why is it important for you to become more "aware" of how you think?
a) to help my thinking to be more negative
b) to help my thinking to be more positive
c) to increase my stress level

4. If negative thoughts go into your brain everyday, you will store:
a) positive thoughts
b) negative thoughts
c) neutral thoughts

5. Which of the following are headache triggers?
a) disturbed sleep patterns
b) regular sleep patterns
c) adequate hydration

6. Which of the following is an example of positive self-talk?
a) I am not a good friend
b) I am not going to give up
c) I am not in control of my feelings

7. Please select the choice that best describes self-esteem.
a) negative self-talk can change the way you see yourself
b) self-esteem should come from within you
c) your self-esteem is determined by your peers

8. Which of the following represents an unhealthy lifestyle behavior?
a) avoiding drugs and alcohol
b) eating junk foods
c) problem-solving when angry

9. Select the healthy headache behavior.
a) engaging in excessive amounts of routine exercise
b) drinking plenty of water
c) consuming excessive amounts of caffeine

10. What are signs of healthy or positive self-esteem?
a) being overly concerned with what others think
b) feeling depressed
c) not being afraid to try new things

ID: _____
Session: _____

Manipulation Check #2

Please complete the following multiple-choice questions.

1. Which of the following thought patterns can trigger stress?
a) positive thoughts
b) neutral thoughts
c) negative thoughts

2. Complete the following sentence Too much stress, especially if not handled in a healthy way, can:
a) lead to positive thoughts
b) increase your physical ability
c) be harmful to your body and mind

3. Which of the following responses indicate a physical response to stress?
a) headaches
b) clear thinking
c) normal heart rate

4. What is a common trigger of stress for teenagers?
a) being liked by friends
b) pressure from parents
c) getting good grades in school

5. Please select the item that does not describe healthy coping or positive ways to deal with stress.
a) talking about how you feel
b) responding to stress with negative emotions
c) writing thoughts and feelings in a journal

6. Which of the following behaviors are a sign of stress?
a) participating in school and social activities
b) lack of enjoyment of usual activities
c) doing things with friends

7. Select the response that shows a stress reduction behavior.
a) screaming
b) self-blame
c) abdominal breathing

8. Why is it important to know how to problem solve?
a) to create barriers to reaching my goals
b) in order to lead a healthy lifestyle
c) so that I can appear smart

9. How many steps are in the problem solving process?
a) 10 steps
b) 3 steps
c) 4 steps

10. Your negative thinking about an event is triggered by which of the following:
a) the people involved in the event
b) the location of the event
c) your beliefs and thoughts about the event

ID# _____
Session #: _____

Attrition Log

DATE	REASON(S) FOR LEAVING STUDY
	1. Please check the response(s) that reflects your reason(s) for leaving the study. _____ There were too many sessions. _____ The sessions were too long. _____ I had trouble getting to clinic visits. _____ I loss motivation to continue the study. _____ My headaches improved before the end of the study. _____ I couldn't keep up with the homework requirements.
	2. If your reason for leaving the study is not listed above, please use this space to provide your reason for leaving the study.

APPENDIX D

COPE-HEP TEEN MANUAL

COPE *for* HOPE HEADACHE EDUCATION PROGRAM

Teen

Creating Opportunities for Personal Empowerment

Cognitive Behavioral Skills Building/ Headache Education Program
7 Sessions

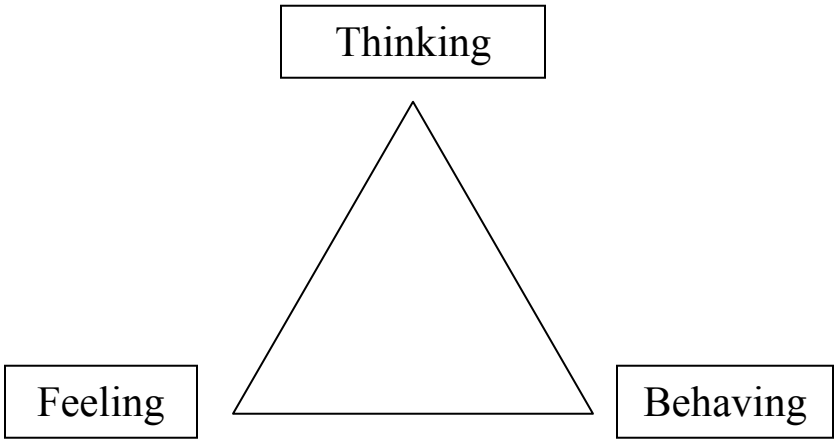
Session 1
Thinking, Feeling, and Behaving:
What is the connection?
Teen Parent Clinic Session

Everyone has a certain amount of stress and has to deal with difficult times in their life, but making a choice to deal with these things in a positive way will help you to feel good about yourself.

When you think positively, you will be happier and have less stress. Less stress results in fewer headaches.

How you THINK affects how you FEEL and how you BEHAVE.

Thinking, Feeling, Behaving Triangle



Many times, there is a trigger event that starts the negative thinking.

Examples

16-year old Dana has daily headaches. She feels that headaches will never get better (negative thinking). As a result, she feels depressed (negative emotion) and gives up right away if she does not get immediate headache relief (negative behavior). The trigger event here was Dana's feelings that her headaches will never get better. That started her believing that she can't do anything to make her headaches better.

16-year old Darcy gets a D on a science test. Darcy thinks "OK. I goofed, but I will study harder and do better next time." Darcy feels _____.

The trigger event was the D grade on the science test.

Becoming more "aware" of how you think is important so that you can help your thinking to be more positive.

Headache Triggers

Like triggers for negative thinking, there are also triggers that increase the chance of getting a headache. Triggers also can cause headaches to linger.

- **Lifestyle Triggers for Headaches**
  Stress
  Disturbed sleep patterns/Lack of sleep
  Fatigue
  Irregular eating habits
  Smoking
  Sudden or intense exertion (sports)
  Dehydration

- **Environmental Triggers**
  Light (bright sunlight, flashbulbs, fluorescent)
  Complex visual patterns
  Odors (perfumes, cigarette smoke)
  Barometric pressure changes
  Traveling

- **Medication Triggers**
  Birth control pills
  Certain diuretics
  Estrogen replacement therapy
  Certain anti-asthma medications
  Overuse of over the counter pain medications

- **Hormonal Triggers**
  Menstruation
  Ovulation
  Puberty/Menopause

- **Dietary Triggers**
  Alcoholic beverages
  Aged Cheeses
  Chocolate
  Excess caffeine
  Food additives (MSG, Aspartame, NutraSweet)
  Onions
  Nuts
  Salty foods
  Cured Meats
  Citrus fruits

Becoming more "aware" of headache triggers is important so that you can better manage your headaches by avoiding things that make your headaches worse.

The brain is like a computer. If negative thoughts go into it every day, it will store only negative thoughts and the output will be negative as well.

We need to program our brains with positive input (reading and saying positive things). We can reprogram our negative thinking like we can reprogram computers.

Although you can't change how other people think or what they say, you can choose how YOU react to them.

Let's talk about your week:

Think back over the last week. Share a couple of events that happened this week that led to negative thinking.

Write down a few thoughts.

- What happened?
- What did you think?
- How did you feel?
- How did you behave?
- How could you have changed your thinking in each situation to see it more positively?

1. _____
2. _____
3. _____
4. _____
5. _____

Know your ABCs:

A = the **A**ntecedent event that triggers your thinking

B = the **B**eliefs or thoughts about the event or situation

C = the **C**onsequence of your beliefs or thinking, for example, how you feel (your emotions) and how you behave

Your thoughts about certain situations may have become automatic (happen without you're your realizing it). This program will help you to stop those automatic negative thoughts and turn them around so that your emotions are more positive.

One way to do this is to practice POSITIVE SELF-TALK.

Positive self-talk is one way to begin to change your negative thinking. Positive self-talk helps you to focus on your thought on words of encouragement, praise, and support. Examples of positive-self include:

- I am a good friend.
- I did that well.
- I'm not going to give up.
- I'm going to stay calm.
- This won't last forever.
- I am in control of my feelings.
- I'm going to try harder next tie.

How do you feel when you say these positive self-talk statements?

_____

_____

_____

Let's now talk about worry. On a scale from "0" meaning "NOT AT ALL" to "10" meaning "VERY MUCH SO," how much do you tend to worry every day?

1	2	3	4	5	6	7	8	9	10

Not at all **Very much so**

Staying "In the Moment"

Staying "in the moment" means that you only focus on what you are doing right now. Staying "in the moment" helps to lessen your worries because most of what people worry about never actually happens!

To worry less, stay in the present moment. There are some fun things to do that you can do to practice staying in the moment.

- Chew a piece of gum and count how many chews it takes to lose its flavor.

- Bounce a ball 50 times and count the bounces along the way.

- Make clapping sounds and have your friends repeat the pattern.

Let's try one of these "in the moment" exercises now

Practicing the things you learned today will be important in helping you to learn to think more positively. Thinking more positively will help you to feel emotionally better and to behave in positive ways.

So let's review:

- **How you think affects how you feel and how you behave.**

- **Remember your ABCs**:

  A = the **A**ntecedent event that triggers your thinking
  B = the **B**eliefs or thoughts about the event or situation
  C = the **C**onsequences of your beliefs or thinking, for example, how you feel (your emotions) and how you behave

- **Positive self-talk takes practice but is VERY important in helping you change your negative thinking.**

- **You will worry less if you remember to stay "in the Moment".**

Let’s think about this situation:

Leslie, age 15, has been overweight ever since she can remember. Her classmates have always made fun of her, calling her names like “Chubbo” and “Moon Face”. Although she really likes to learn new things in school and gets A and B grades, she hates going to school because the other kids often make fun of how she looks. Leslie hasn’t joined any clubs in school because of the fear that she has of being rejected. She often feels “down” and will have increased headaches. When feeling down, Leslie likes to eat, especially those foods that are high in carbohydrates and fats (like cakes, cookies, potato chips). She lies to take walks, but has no one to walk with since one of her good friends moved out of her neighborhood, so she doesn’t walk anymore. Leslie has one close friend left who she shares her feelings with and who supports her when she is feeling “down”. She has headaches almost daily and feels “down” a lot and tells herself things like “I will always be fat and ugly and have headaches. I can’t do anything about my weight and my headaches. Nothing helps. I’m a failure.”

What types of positive self-statements would help Leslie to feel better about herself?

Examples might include: “I am a nice person. I do well in school. I’m going to exercise a lot so that I can start to lose weight. I am going to avoid foods that I know trigger headaches.”

If it’s going to be, it’s up to me!” is a good positive self-statement to say when you start something new.

Think about something that you say to yourself on a regular basis that is a negative statement (for example, “I can never do anything right”). Turn that statement into a positive one (for example, “I can do some things right; I am a terrific person; I am good at talking with other people; I can do anything that I put my mind to; I am a friendly person.”)

Let’s try this right here.

Negative Statement	Changed to a Positive Statement

Session 1
Homework
Thinking, Feeling and behaving/Positive Self-Talk

1. Name a situations in the past few days of how your thinking negatively affected how you felt and how you behaved. Write down how you could have changed your thinking to feel better and act differently.

1. **Describe the situation you were in (for example, hanging out with your friends; at home, with your parents) and the trigger that started you thinking in a negative way (for example, your friend was rude to you).**

What did you think?

How did you feel?

How did you act or behave?

How could have you changed what you thought so that you would have felt better or acted differently?

2. Choose the scenario that is more supportive of a healthy lifestyle, which decreases headache disability.

a) Sally is an asthmatic and is on multiple medications for her asthma. Because of her asthma, she is only averaging 6 hours of sleep per night.

b) Juan plays basketball and is very conscious of what he eats. Juan eats 3 regular meals per day with in-between snacks. One the weekends, he hangs out with friends and engages in behaviors such as smoking, drinking, and recreational drug use.

c) Bill likes to experiment with a variety of foods; however, he watches his intake of caffeine, chocolate, processed meats, monosodium glutamate

	(MSG), and salty foods. He totally avoids, alcohol, tobacco, and drugs. **d) Ian is a 14-year old tall thin lacrosse player. He weighs 88 pounds and is 6 feet 3 inches tall. Ian drinks 32 ounces of water per day. He typically does not drink any other liquids. Ian averages between 9 to 11 hours of sleep per night.**
3. Which group of foods do you think is a more healthy food choice, especially since you experience headaches?	**Which group of foods do you think is a more healthy food choice, especially since you experience headaches.** **a) Coke, Doritos, Cheez-its** **b) Chocolate candy bar, cheddar cheese, Dr. Pepper** **c) Hot cheetos, Ramen noodles, Pepsi** **d) Mashed potatoes, gravy, meatloaf**

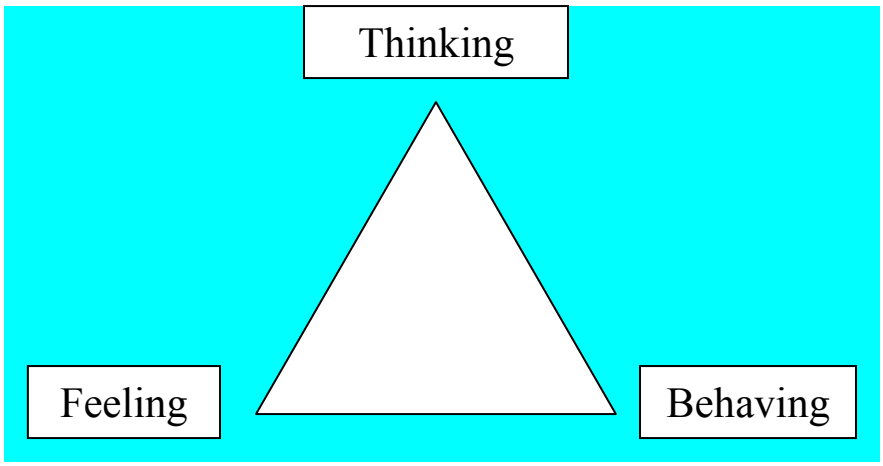
Describe 3 goals that you have for your headaches upon completion of the 7-week training program.

What barriers do you perceive in reaching these goals?

What resources or support do you need in removing these barriers?

 **Practice being in the present moment at least twice a day.**

 **BE MINDFUL EVERY DAY.**
Begin recording your mood, emotions, and feelings on the following MOOD LOG SHEET. Write down how your thinking affected your feelings and behavior.



MOOD LOG SHEET

DATE	THINKING	FEELING	BEHAVIOR

DATE	THINKING	FEELING	BEHAVIOR

DATE	THINKING	FEELING	BEHAVIOR

DATE	THINKING	FEELING	BEHAVIOR

DATE	THINKING	FEELING	BEHAVIOR

 **BE MINDFUL EVERY DAY.**
Begin recording the pain level of your headaches, how long the headaches last, possible triggers of the headaches, and healthy headache hygiene behaviors during and after the headache on the following Headache Log.

Headache Log

Date	How long did the head-ache last?	How bad was the head-ache 1 (not bad) to 10 (bad)	Possible Triggers	Describe your healthy headache hygiene behaviors

Homework
Self-Analysis
Session 1 Exercise

Name 3 things about yourself that you like and would keep the same:

1.
2.
3.

What are things that you have done to keep these things the same?

_____
_____
_____

Name 3 things about yourself that you would like to change:

1.
2.
3.

How can you go about changing these things?

_____
_____
_____

Do you think that making these changes is under your control, or do you think it is outside your control?

Circle one: Under my control Outside my control

Are there other people in your life right now that you can talk to when there is something on your mind? Please circle Yes No

Name this person: _____

Relationship to you _____

How often do you exercise? Circle the answer that is closest to your answer:

Once a year Once a month

Once a week 2-3 times each week

Once a day Never

Place a mark on the line below to tell us how healthy do you think you are at this time?

Not healthy Very healthy

|_____|

Please fill in the following responses:

When I am happy I _____

When I am sad I _____

When I am angry I _____

When I am scared I _____

When I am worried I _____

When I am stressed I _____

Please respond to each of the following regarding how you feel right now, on a scale of 0 meaning "not at all" to 10 "a lot."

_____happy
_____sad
_____worried
_____stressed

Name _____ ***Week #__:***

Dates_____

COPE
TEEN Goal Setting & Self-Monitoring Log

_T_hinking, _E_motions, _E_xercise, _N_utrition

Thinking Goal Day #1 Day #2 Day #3 Day #4 Day #5 Day#6 Day #7

Number of Times You Said Your Positive Self-Statements

Goal: Positive Self-Statements

_____ _____ _____ _____ _____ _____ _____ _

_____ _____ _____ _____ _____ _____ _____ _

Goal for Number of times per day
to say the positive
self statements _____

Emotions **(How have you felt this week?)**

Rate your emotions on a scale from 0 "not at all" to 10 "a lot"

Worried _____
Stressed _____
Happy _____
Sad _____

What barriers made it challenging for you to reach your goals this week?

What can you do to overcome these barriers so that you meet your goals next week?

Session 2
Self-Esteem and Positive Thinking/Self-Talk
Headache Hygiene
Telephone Session

Let's Review:

- Name at least 5 headache triggers.

- How you think affects how you feel and how you behave.

- ❖ ***What is self-esteem?***

  How you see and feel about yourself.

  Self-esteem needs to come from within YOU!

  Positive self talk can change the way you see yourself.

❖ ***What are signs of poor self-esteem?***

Being worried about what others think of you

Giving into peer pressure

Not trying things for fear of failure

Using drugs and alcohol

Having casual sex

Acting "cocky" like you know everything

Being depressed

Getting jealous

Getting angry a lot

❖ ***What are signs of healthy or positive self-esteem?***

Not being afraid to try new things

Feeling happy

Not being overly concerned with what others think

Standing up for what you believe in
not giving into peer pressure

People often cope in unhealthy ways when they have negative thoughts and feelings. Some of these ways include:

Eating junk foods

Using drugs or alcohol

Smoking cigarettes

Acting out in angry ways

Social Withdrawal

- **What are positive ways to build self-esteem?**

Change your self-talk and talk more positively
Positive self-talk takes practice but is VERY important in helping you to change your negative thinking

Is your cup half full or half empty?

People who see their cup half full or focus on the good instead of the bad not so good things in their lives tend to think more positively and feel happier.

❖ **Write down 5 people or things for which you are thankful.**

1. _____

2. _____

3. _____

4. _____

5. _____

Think POSITIVE and you will begin to feel more positive!

Remember, how you think is related to how you feel and act.

Although you can't change how other people think or what they say, you can choose how you think and how you react to them

- **Habits**

  You also can change things that you do every day that have become habits.

  Decide to make a change to a healthy lifestyle and positive ways of thinking and talking,

  "Inch by Inch, it's a cinch. Yard by yard it's hard!"

- **Do you know people who changed unhealthy habits?**

  How did they change them?

  What helped them and what blocked them from changing the habit?

❖ Change

Change has to happen within a person and a person has to want to change.

Other people can't change you and you can't change other people.

Even though you can't change other people, you can change how you react to them so you don't feel angry or down about it on a regular basis.

Don't give up when you try to change how you react to them so you don't feel angry or down about it on a regular basis.

Don't give up. Be determined and keep trying.

❖ Steps in Change

Make a decision to change

Set the goal (I will say my positive statements 10 every day).

Believe that you can do it because

Anything is possible when you believe!

Take action—One step at a time

You can make changes to your lifestyle that may greatly decrease the occurrence and frequency of your headaches. Listed are headache 'hygiene' behaviors that will help improve your headache status.

Headache Hygiene Behaviors

Get Regular Sleep

- Do not sleep too much on the weekends and too little on the weekdays
- Most teenagers need about 8 to 12 hours of sleep per night
- Go to bed and wake up at regular times each day

Eat Regular Meals

- Low blood sugar can trigger a headache
- Eat regular meals 3 times each day

including protein, fruits, vegetables, and carbohydrates
- Too much sugar can lead to a rapid increase in blood sugar, which is followed by a rapid decrease in blood sugar, which can trigger a headache

Get Moderate Amounts of Routine Exercise

- Moderate exercise 3 to 5 times each week will help reduce stress and keep you physically fit
- Too much exercise or inconsistent patterns of exercise may trigger stress, which starts a headache

Drink Plenty of Water

- Teens should drink 8 glasses of water per day.
- Dehydration may cause headaches. Avoid being out in the heat for long periods of time

Limit Caffeine, Alcohol, and Other Drugs

- Because caffeine is a stimulant, drops in blood levels of caffeine may cause headaches

Reduce Stress

- Stress may cause increase headaches
- Reduce stress through relaxation and other ways, which we will cover in one of the next sessions

Overuse of Over The Counter Medications

- Overuse of over the counter medications (Tylenol, Ibuprofen, Motrin, Aleve, etc.) **may increase headaches**

- Limit over the counter medications, like Tylenol or Motrin, to no more than 3 times a week

Session 2
Self-Esteem and Positive Self-Talk
Headache Hygiene
Homework

1. Keep saying your positive statements to yourself 10 times every morning and every night. Check off the Positive Self=Statement Log each day that you remember to say your positive self-statements.

2. Do at least 2 or 3 healthy headache behaviors weekly. Check off the hygiene measures that you practice each week (See Headache Hygiene/Monitoring Log).

3. What is your headache goal this week?

_____

_____

COPE/HEP
Headache Hygiene Monitoring Log

Name: _____ Week: _____

Headache Hygiene Behaviors	S	M	T	W	Th	F	S
Get Regular Sleep (8 to 12 hours per night)							
Eat Regular Meals (3 full meals a day)							
Get Moderate Amount Exercise (3 to 5 times each week)							
Drink Plenty of Water (8 glasses a day)							
Avoid Caffeine, Alcohol and Other Drugs							
Reduce Stress (Engage in relaxation or some other strategies to reduce your stress)							
Avoid overuse of over the counter (OTC) meds (Tylenol, Motrin,							

etc). (Limit OTC medications to no more than 3 times a week).							

Name 2-3 positive headache hygiene habits that you have.

1.
2.
3.

Name 2-3 negative headache hygiene habits that you have.

1.
2.
3.

You can change your negative headache hygiene habits if you choose to do so.

Name one thing that you can do to go about changing your negative headache hygiene?

_____
_____
_____
_____

Name _____ ***Week #__:***
Dates_____

COPE
TEEN Goal Setting & Self-Monitoring Log

_T_hinking, _E_motions, _E_xercise, _N_utrition

Thinking Goal Day #1 Day #2 Day #3 Day #4 Day #5 Day#6 Day #7

Number of Times You Said Your Positive Self-Statements

Goal: Positive Self-Statements

_____ _____ _____ _____ _____ _____ _____ _

_____ _____ _____ _____ _____ _____ _____ _

Goal for Number of times per day
to say the positive
self statements _____

Emotions **(How have you felt this week?)**

Rate your emotions on a scale from 0 "not at all" to 10 "a lot"

Worried _____
Stressed _____
Happy _____
Sad _____

What barriers made it challenging for you to reach your goals this week?

What can you do to overcome these barriers so that you meet your goals next week?

Session 3
Stress and Coping
TEEN AND PARENT
CLINIC SESSION

❖ ***What is stress*?**

Stress is when you do not have the ability or skills to deal with things that you see as frightening or unpleasant (like taking a test that you didn't study for or missing your curfew)

❖ ***Do you think stress is good or bad? Why?***

There are times when some stress can be good (for example, to prompt you to do things, like study for a test).

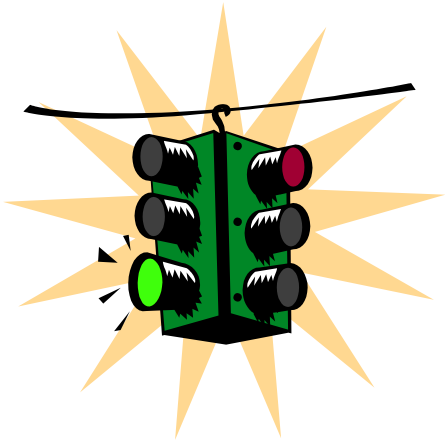
Too much stress, especially if it is not handled in healthy ways, can be harmful to your mind and body (for example, it can cause headaches, depression and stomach ulcers).

❖ **NEGATIVE THOUGHTS → STRESS**

Negative thoughts often lead to stress.

Stressor⟶Thought⟶Negative Physical Response,
to Stop Emotion & Behavior

Stressor→ Positive Thought-→ Positive Emotion & Behavior



❖ ***What do you think are the most common causes of stress and worry for teens?***

- Whether they are liked by your peers; what others think of them
- Peer pressure to smoke, drink, have sex
- Being "made fun of" or bullied by classmates
- Pressure from parents
- Parents arguing or separating/divorcing
- Are they developing normally
- Are they anxious or depressed
- Their self-esteem
- How to cope with stressful things
- School and grades
- What they will do when finished with school
- Acne

How do you feel physically when you are stressed?

❖ **Physical responses to stress**

- Heart beating fast or pounding
- Breathing fast
- Sweating
- Anger
- Restlessness
- Headaches
- Stomach aches
- Tightness in the neck and/or shoulders
- Difficulty thinking clearly
- Trouble sleeping or sleeping too much
- Fatigue; feeling tired all the time

❖ ***How do you feel emotionally when you are stressed?***

❖ **Emotional signs of stress**

- Feeling anxious
- Feeling nervous
- Feeling down or depressed
- Feeling hopeless
- Feeling angry or irritable
- Feeling overwhelmed or "burned out"

❖ ***How do you act when you are stressed?***

Behaviors that can mean you are stressed:

- Arguing with parents or friends
- Overeating
- Using drugs and alcohol
- Smoking cigarettes
- Getting poor grades on school assignments
- Poor grooming

❖ ***How do you usually deal with or cope with being stressed or upset?***

❖ ***How would you describe healthy or unhealthy coping?***

Healthy coping: when you deal with stressors in ways that will help you to decrease stress without harming yourself or other people.

Signs of Healthy Coping/Positive Ways to Deal with Stress

❖ Talking about how you feel
❖ Exercise (when you exercise, endorphins or substances in your body are released that make you feel good in addition to the healthy things that exercise does for the body, such as maintaining or losing weight,

building the heart muscle, preventing diabetes)

- ❖ Seeking out family and friends for support and help
- ❖ Writing thoughts and feelings in a journal
- ❖ Turning a negative thought in response to a stressor into a positive one
- ❖ Using positive self talk (I am feeling calm; I can do anything that I set out to do).
- ❖ Doing relaxation techniques (we will finish today's class with one)
- ❖ Taking one bite of the elephant at a time when you start something new

STRESSOR 

↓

NEGATIVE THOUGHT TO STOP 

↓

REPLACE THE NEGATIVE WITH A POSITIVE THOUGHT

↓

POSITIVE EMOTION & BEHAVIOR 

Unhealthy Ways to Cope with Stress

- Alcohol or drug use
- Overeating (when some people are stressed, they overeat, especially foods high in carbohydrates {like cake and donuts} and salt {like potato chips}
- Fighting with others
- Disobeying your parents
- Making fun of others
- Constant denial, such as "nothing will happen if I drink and drive."
- Excessive use of over the counter pain medications

When people get really stressed and are not using healthy coping strategies, they can get depressed or anxious.

❖ **Signs of depression in teens:**

- Lack of energy and enthusiasm
- Feeling sad
- **Feeling hopeless**
- Poor grades in school
- Lack of enjoyment of usual activities
- Withdrawal from friends

- Low self-esteem
- Feelings of guilt
- Difficulty sleeping (too much or too little)
- Alcohol or drug use
- Inability to concentrate
- Restless and agitated
- Anger and fighting
- High levels of guilt
- **Thoughts and/or plans of actions of self-harm**

The main difference between "normal" mood swings versus teens having depression and too much anxiety is that these symptoms are persistent (for example, they last 2 or more weeks for depression and at least 6 months for anxiety) and interfere with doing things normally, such as the ability to get up and go to school and to get good grades.

Signs of anxiety

- Excessive worry
- Trouble concentrating
- Restlessness
- Being irritable or angry a lot
- Muscle tension
- Difficulty falling asleep or staying asleep
- Fatigue or feeling tired a lot

❖ **Help is available---Don't wait to ask for help.**

- **SEEK HELP FROM YOUR PARENTS, TEACHER, SCHOOL COUNSELOR OR HEALTH CARE PROVIDER IF YOU OR SOMEONE YOU KNOW IS SHOWING SIGNS OF DEPRESSION OR A LOT OF ANXIETY**

Remember, there are a lot of things that you can do to cope well with stress. Practice those things every day and you will feel much better and be able to handle the challenges that you face!

Session 3
Managing Stress
Homework

What things do you see as stressful in your life right now?

What are some stressful situations you have had this week?

What things did you do to decrease your stress and coping with these stressful situations (include both healthy and not healthy things)?

 **Continue to say your Positive Self Statements 10 times in the morning and 10 times at night.**

 **Do at least 2 or 3 healthy headache hygiene behaviors each week.**

 **Record the healthy things that you did this week to cope with stress by checking the appropriate relaxation measure on the Relaxation Techniques Self-Monitoring Log. (For example, exercise, abdominal breathing).**

Name:_____ Week #:_____

Self-Monitoring Log Relaxation Techniques

Relaxation Method	S	M	T	W	TH	F	S
Progressive Relaxation							
Abdominal Breathing							
Visual Imagery							
Listening to Soft Music							
Other: Please describe							

Name _____ ***Week #__:***
Dates_____

COPE
TEEN Goal Setting & Self-Monitoring Log

_T_hinking, _E_motions, _E_xercise, _N_utrition

Thinking Goal Day #1 Day #2 Day #3 Day #4 Day #5 Day#6 Day #7

Number of Times You Said Your Positive Self-Statements

Goal: Positive Self-Statements

_____ _____ _____ _____ _____ _____ _____ _

_____ _____ _____ _____ _____ _____ _____ _

Goal for Number of times per day
to say the positive
self statements _____

Emotions **(How have you felt this week?)**

Rate your emotions on a scale from 0 "not at all" to 10 "a lot"

Worried _____
Stressed _____
Happy _____
Sad _____

What barriers made it challenging for you to reach your goals this week?

What can you do to overcome these barriers so that you meet your goals next week?

Session 4
Problem Solving & Setting Goals
TELEPHONE SESSION

Review:

- Let's start this session by reviewing the ABCs:

A = the **A**ntecedent event that triggers your thinking

B = the **B**eliefs or thoughts about the event or situation

C = the **C**onsequence of your beliefs or thinking, for example, how you feel (your emotions) and how you behave

- **Fill in the blanks:**

How I _____ affects how I _____ and how I _____!

❖ ***Do you dream about what you want to be when you get older and the things that you want to do?***

For people to succeed, they have to first picture in their mind what it is they would like to be or do and keep that picture in their mind a lot of the time.

❖ **Picture yourself being successful at what you want to do.**

❖"What the mind can see and believe, it can achieve!"

❖ **Belief is a very important thing in helping people to reach their goals**

❖ ***Do you have goals and a plan for how to make your headaches better?***

❖ **Write your goals or plans here:**

_____

_____

_____

Before you start on a cross-country trip, you need to plan and map out the route that you would take to get to your destination (e.g., from Arizona to California). In the same way, you need to plan for how you will reach your headache goals.

Example:

Carl, a 13 year old, has a dream to go to college to become a teacher.

- **How can Carl be successful in fulfilling his goal?**
- **A lot of people don't accomplish what they would like to because they don't sit and write down their goals.**
- **They also don't make good plans for what it is they want to accomplish.**

Write down a headache outcome that you would like to accomplish in the next 2 to 3 months?

Now, write down weekly goals and tasks that would help you to achieve that outcome.

- **What barriers (people, events, or situations) might prevent you from achieving that outcome?**

- **What things can you do to overcome those barriers?**

Problem Solving

It is important to know how to solve problems in order to lead a healthy lifestyle.

- **The Four Step process of problem solving:**
  - **What is the problem?**
  - **What is the cause?**
  - **What are the best solutions, with their pros and cons?**
  - **What is the best solution?**

Example:

- **Jake, a 16 year old has a problem. He promised a good friend who is failing science that he would help him study for a big test on Sunday so that he does well on the test on Monday, but now he has a chance to go to a Cardinals football game with another friend. Jake has never seen a professional football game and would really like to go. He is deciding what he should do.**

Let's use the Four Step process of problem solving to talk through how Jake should handle the problem.

Success happens when:

- You start achieving your goal by taking small steps.
- You overcome barriers to your goals by problem solving.
- You build o your strengths and **BELIEVE** in yourself.

Another example:

Katie is a 14 year old who has chronic headaches. Her 2 best friends, Jamie and Lisa, also have chronic headaches. They have hung out together for the past 3 years. After school, at least 3 times every week, they go to their local neighborhood store and they each get a 44-ounce Dr. Pepper, large bag of hot Cheetos, and a chocolate candy bar. Katie now realizes that during these times is when she notices more headaches. She loves to hang out with her friends, but now she realizes that eating these type foods isn't going to help her control her headaches, which she really wants to do.

How would Katie use the 4 step problem solving approach in dealing with the situation?

Session 4
Strategies to Overcome Barriers
Homework

Set one short-term "real-time" goal for your headaches for the next week of the program.

My goal for my headaches is: _____

Identify barriers in achieving that goal:

_____

_____

_____

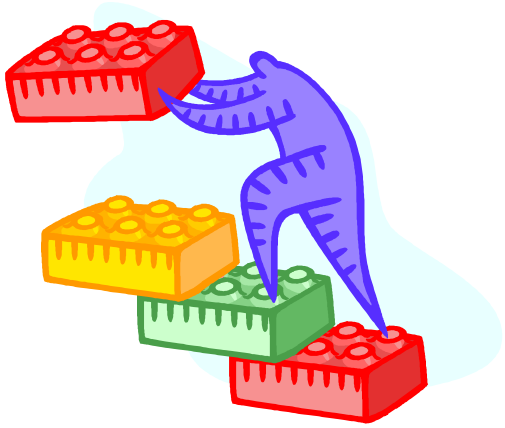
Identify strategies for dealing with those barriers:

_____

_____

_____

Use the 4 step problem solving method in solving a problem that you have today or this week.



1. **What is the problem?**

2. **What is the cause of the problem?**

3. **What are the possible solutions with consequences?**

4. **What is your best solution to the problem?**

Now, go with the

best solution and do it!

What are you thankful for today?

1.

2.

3.

What are 2-3 good things about you?

 **Write down another positive self-statement:**
(be sure to put it on your index card)

Say this new positive

self-statement along with your other statements at least 10 times every morning and at night.

List three new things that are good about yourself:

1.

2.

3.

Remember, how you think affects how you feel and how you act. THINK POSITIVELY!!!!

Name _____ ***Week #__:***
Dates_____

COPE
TEEN Goal Setting & Self-Monitoring Log

_T_hinking, _E_motions, _E_xercise, _N_utrition

Thinking Goal Day #1 Day #2 Day #3 Day #4 Day #5 Day#6 Day #7

Number of Times You Said Your Positive Self-Statements

Goal: Positive Self-Statements

_____ _____ _____ _____ _____ _____ _____ _

_____ _____ _____ _____ _____ _____ _____ _

Goal for Number of times per day
to say the positive
self statements _____

Emotions **(How have you felt this week?)**

Rate your emotions on a scale from 0 "not at all" to 10 "a lot"

Worried _____
Stressed _____
Happy _____
Sad _____

What barriers made it challenging for you to reach your headache goals this week?

What can you do to overcome these barriers so that you meet your goals next week?

Session 5
Dealing with Your Emotions in Healthy Ways and Effective Communication
TELEPHONE SESSION

Let's review:

- **What things have you learned about in this program that is helping you to deal with your stress in healthy ways?**

- **What things have you learned in this program that is helping you to deal with your headaches in healthy ways?**

Mental Imagery

What do you think mental imagery is?

Mental imagery is a healthy way to cope that involves imagining that you are in one of your

favorite places or doing one of your favorite things.

Close your eyes and picture the following:

Imagine that you are on a beach; the sunshine is glowing on your face, your body feels nice and warm; the sound of the ocean waves is soothing, and you can feel cool, grainy sand under your feet.

How do you feel?

Were you thinking about anything else while you were doing the exercise?

Guided Imagery

Before imagining or listening to this scene, close your eyes and take 3 deep breaths….breathe slowly and easily, in through your nose and out through your mouth…

Now picture a happy pleasant time, a time when you have little or no problems or worries about your health…

Fill in the details of that time….Look at the surroundings.

Is it indoors? Is it outdoors? Who is there? What are you doing?

Listen to the noises….even those in the background

Are there any pleasant smells?

Feel the temperature.

Now, just enjoy your surroundings…you are happy…your body feels good…enjoy your surroundings…fix this feeling in your mind…you can return any time you wish by just picturing this happy time

When you are ready, take 3 deep breaths…with each breath say the word "**relax**." Imagine the word written in the warm sand…now open your eyes.

Remain quiet for a few minutes before slowly returning to your activities.

When your mind is on something pleasant, there is no room for worry or stress to come into your mind

Imagery takes practice like the other skills you are learning, but by practicing it on a regular basis, you will learn how to relax.

Regulating Your Emotions

What do you think it means to regulate your emotions?

- Emotional regulation is a positive way to gain control over stress and emotions, such as anger or anxiety.

- Remember that emotions like sadness, anxiety, fear, jealously and anger are not unhealthy; they are normal.
- It is important to recognize and get in touch with these emotions when you feel them. It is the behaviors that follow the emotions that can have positive or negative consequences.

Self-Control Strategies

What types of self-control strategies do you think teens can do to help regulate their emotions?

- **Positive Thinking**

  How your think affects how you feel and behave!

- **Positive self-talk**
  "I'm not going to lose control and get angry."
  "I'm going to stay calm."
  "She is going to stop saying all of those things. "My headaches won't last forever."
  "I can get myself in control."
  "I've calmed down before when I'm angry and I can do it again."

- **Counting to 100 or slowly saying the ABCs**
- **Deep breathing**
  Take a deep breath and hold it for 2 seconds, then breath out slowly through your mouth

- **Walk away and find a quiet place to put your head down and practice relaxation breathing**

- **Find a friend or adult who will listen and support you**

- **Go for a walk**

❖ ***What are the consequences of using a self-control strategy?***
- Feeling better emotionally
- Not getting expelled from school

- Taking control of the situation instead of losing control
- Better self-esteem

Role playing and talking through what you would do the next time that you are in a stressful situation will help you to use your self-control strategies and turn a negative situation into a positive one.

Healthy choices are under your control; they are your decision. At first, especially if you haven't been making healthy choices, it may be a little challenging to make good choices. But, it will get easier with time.

Use positive self-talk to begin:

- I believe that I can make healthy choices
- I am going to make healthy choices
  If it is going to be, it is up to me!

What are some positive things that you can do to help yourself to feel good besides eating or other unhealthy habits (like drinking alcohol, taking drugs, or smoking cigarettes) when you are stressed or upset?

Other healthy coping strategies:

- Listening to your favorite music
- Exercise, such as walking or riding a bike
    - Physical activity releases great amounts of stress and endorphins in the body
- Spending time with a friend
- Relaxation techniques
- Writing in a journal
- Reading a favorite book
- Watching a funny movie
    - Laughing releases great amounts of stress and endorphins in the body, just like exercise)
- Singing
- Having quiet time
- Doing hobbies

Practice Self-Control Strategies

Remember, practice and rehearse your self control strategies when you are calm so when something happens that annoys you or makes you feel angry or anxious, you will be ready to deal with it in a healthy way.

Effective Communication

- ***What are effective components of communication?***

  - **Active listening**-always look at the person you are talking with; think about what is being said; wait your turn, and then say what you would like to say.
  - **Body language** - it should communicate that you are interested in what the other person is saying

  - **Tone of voice** - people listen more when you speak in a quiet tone instead of a loud, angry tone

  - **Facial expression** – scowling decreases acceptance of what the other person is saying

  - **Physical closeness** – standing too near the person you are speaking with can decrease effective communication

  - **Word choice** – curse words increase people's defensiveness

When we get stressed out or upset, we tend to blame others, saying such things as "You NEVER believe me or you ALWAYS criticize me!

Instead, tell the person how you feel with "I" statements.

For example, "I didn't like it when you said that my hair looked funny."

Using "I" statements doesn't put people on the defensive. They remain more open to listening to your comments.

Remember, how you think affects how you feel and how you behave.

Session 5
Dealing with your Emotions in Healthy Ways
Homework

Mental Imagery	

Before bed every night, practice imaging yourself in a relaxing, calming or peaceful place. Close your eyes, and deliberately slow your breathing. Can you feel your heart rate slow and your shoulders relax?

It takes practice to focus only on the moment and block your surroundings from your awareness. Keep trying! You can do it.

Mark off the nights that you practiced visual imagery:

Mon	Tues	Wed	Thurs	Fri	Sat	Sun

Anger and Anxiety Triggers

Write down your strongest anger or anxiety triggers and a plan of how you will respond to them the next time they happen.

Anger Trigger:

_____

_____

_____

Response Plan (Including THINKING):

_____

_____

_____

_____

Anger trigger:

_____

_____

_____

Response Plan (Including THINKING):

_____

_____

_____

_____

_____

Headache Triggers	

Write down the 2 strongest triggers of your headaches with a plan of how you will avoid them.

Headache trigger:

_____

Response plan (Including Thinking):

_____

Headache trigger:

_____

Response plan (Including Thinking):

_____

Strategies to Manage Headaches

List four strategies that YOU USED in the past few months to manage your headaches:

1._____
2._____
3._____
4._____

What healthy things could you have tried to better manage your headaches?

1._____

2._____

3._____

4._____

Describe one or two situations this past week in which you may not have coped in a healthy way?

What can you do the next time these situations happen to cope in a healthy way?

Describe a few situations this week in which you were able to cope in a healthy way.

Name _____ ***Week #__:***
Dates_____

COPE
TEEN Goal Setting & Self-Monitoring Log

_T_hinking, _E_motions, _E_xercise, _N_utrition

Thinking Goal Day #1 Day #2 Day #3 Day #4 Day #5 Day#6 Day #7

Number of Times You Said Your Positive Self-Statements

Goal: Positive Self-Statements

_____ _____ _____ _____ _____ _____ _____ _

_____ _____ _____ _____ _____ _____ _____ _

Goal for Number of times per day
to say the positive
self statements _____

Emotions **(How have you felt this week?)**

Rate your emotions on a scale from 0 "not at all" to 10 "a lot"

Worried _____
Stressed _____
Happy _____
Sad _____

What barriers made it challenging for you to reach your headache goals this week?

What can you do to overcome these barriers so that you meet your goals next

Session 6
Coping with Stressful Situations
TELEPHONE TEEN

Review:

- **Let's start by reviewing the ABCs:**

  A = the **A**ntecedent event that triggers your thinking

  B = the **B**eliefs or thoughts about the event or situation

  C = the **C**onsequence of your beliefs or thinking, for example, how you feel (your emotions) and how you behave

- **The Thinking-Feeling-Behaving Triangle**

  Complete this sentence:

  How I _____ affects how I _____ and how I _____.

- What event occurred this week that led you to use the strategies that we have talked about in this program? (For example: Positive thinking, positive self-talk, relaxation, emotional regulation, problem-solving, effective communication).

Let's try some role plays

- How to express your feelings when you are hurt or disagree with another person.
  - Always use "I" statements; do not accuse the other person or call them names

- How to ask for help or what you need.
  - Asking for help is not a sign of weakness; everyone needs help at times in their life

- How to say “no” to others.
    - When you don’t give into peer pressure, you are less likely to 1) get into trouble; 2) be safer and less likely to get in a dangerous situation; 3) be seen as a positive leader rather than a follower; and 4) serve as a role model for other teens

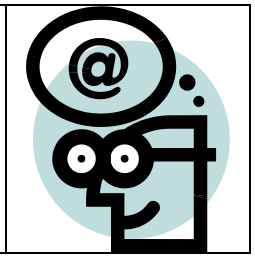
- How to deal with conflict or being teased/bullied

- How to deal with being left out

- How to deal with being criticized in a mean way
    - When someone gives you feedback in a positive way, it can help you to grow as a person

- How to accept “no”
    - When you accept “no,” people may be more likely to listen to you the next time you have a concern or ask for something.

Session 6
Personality and Effective Communication
Homework



Planning how you will respond BEFORE the situation arises will help you when you are stressed, anxious or have any strong emotion.

Think about and write down how you will respond in the following situations:

- When you are hurt or disagree with another person

- When you need help with something

- When you need to say "no" to your friends

- When someone is trying to argue with you

- When you are being teased/bullied

- When you are being left out of a group

- When you are being criticized in a mean way

- When you are having difficulty accepting "no"

Practice the skills you have just learned.

 **Add Another Positive Self Statement: Be sure to put it on your index card and say it 10x every morning and 10x every night.**

 **Remember, how you think affects how you feel and how you behave.**

 **Say at least 3 headache hygiene behaviors daily this week that you have not said before.**

Name _____ ***Week #__:***
Dates_____

COPE
TEEN Goal Setting & Self-Monitoring Log

_T_hinking, _E_motions, _E_xercise, _N_utrition

Thinking Goal Day #1 Day #2 Day #3 Day #4 Day #5 Day#6 Day #7

Number of Times You Said Your Positive Self-Statements

Goal: Positive Self-Statements

_____ _____ _____ _____ _____ _____ _____ _

_____ _____ _____ _____ _____ _____ _____ _

Goal for Number of times per day
to say the positive
self statements _____

Emotions **(How have you felt this week?)**

Rate your emotions on a scale from 0 "not at all" to 10 "a lot"

Worried _____
Stressed _____
Happy _____
Sad _____

What barriers made it challenging for you to reach your headache goals this week?

What can you do to overcome these barriers so that you meet your goals next week?

COPE/HEP
Headache Hygiene Monitoring Log

Name: _____
Week:_____

Headache Hygiene Behaviors	S	M	T	W	Th	F	S
Get Regular Sleep (8 to 12 hours per night)							
Eat Regular Meals (3 full meals a day)							
Get Moderate Amount Exercise (3 to 5 times each week)							
Drink Plenty of Water (At least half your weight in ounces)							
Avoid Caffeine, Alcohol and Other Drugs							
Reduce Stress (Engage in relaxation or some other stress management							

exercise)							
Avoid overuse of over the counter (OTC) meds. (Limit OTC medications to no more than 3 doses a week).							

Session 7
Pulling It All Together for a Healthy YOU!



Review:

- Over the past few weeks, you have learned how to handle some difficult situations by thinking more positively and coping in healthy ways.

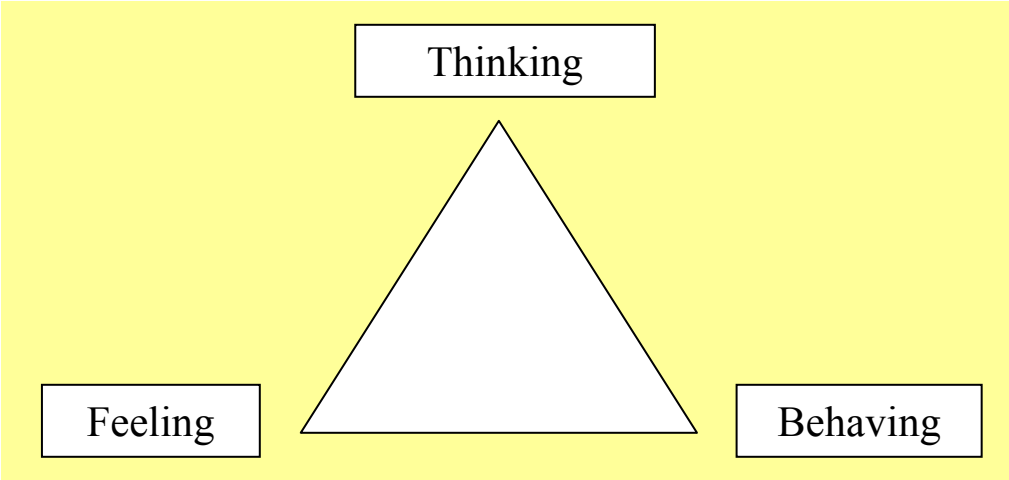
  Describe a situation that occurred this past week that you think you handled differently because of the things that you have learned through the COPE/HEP Program.

  Describe a situation where you "turned around" your negative thinking to a positive thought. How did you feel and behave?

Important Review Points

- **Positive Thinking is up to you!**

- **How you think affects how you feel and how you behave**



- **When you talk positively, you will feel happier.**

  Remember to say your positive self statements every day!

- **Stay in the present moment to lessen your worries.**

- **Avoid headache triggers**

  Remember to surround yourself with positive influences (books, music, movies, people).

- **Focus on healthy headache hygiene measures**

- **Focus on what you have, not what you don't have.**

  Look at the cup ½ full instead of ½ empty

- **You cannot change other people; you can only change how you react to them**

- **You can change a habit or reach a new goal through**
  making a decision to change
  - **setting the goal and picturing yourself reaching it**
  - **believing you can do it!!**
  - **taking action (one step at a time)**

- **You can 4 Step Problem solve by asking:**

  - **What is the problem?**

- **What is the cause of the problem?**

- **What are all of the possible solutions to the problem and the pros and cons of each?**

- **What is the best solution?**

- **ACT on the best solution!**

- **When you are faced with something stressful and start to think negative thoughts, turn the negative thought into a positive one to feel better and act in a positive way.**

Remember your ABCs:

A = the **A**ntecedent event that triggers your thinking

B = the **B**eliefs or thoughts about the event or situation

C = the **C**onsequence of your beliefs or thinking, for example, how you feel (your emotions) and how you behave

- **To deal with stress, practice the things that help you, like relaxation techniques, writing in a journal, talking**

to someone, listening to music, and exercising!

- **When you have a headache and are feeling down, practice your self-control strategies, like counting to 10, visual imagery, listening to music, and exercising.**

- **Communicate effectively:**

    - **Look at people when you talk with them**
    - **Listen actively**
    - **Use "I" statements instead of "You" statements when you are upset or talking about your feelings**
    - **Accept "no!"**
    - **Ask for help when you need it**

Remember, anything the mind can conceive and believe, you can achieve.

You CAN continue to think positively about your headaches and make good choices for a healthier YOU!

Congratulations---You did it!!!!!!

APPENDIX E

COMPARISON GROUP MANUAL

Session 1
Lifestyle Triggers of Headaches

This session will provide an overview of everyday behaviors that may trigger headaches.

Before we get started, take a few moments to think about some of the things that you do or do not do on a regular basis that may make your headaches worse.

What things did you come up with?

What are headache triggers?

- Specific factors that may increase the risk of having a headache
- Triggers activate processes that cause headaches in people who are prone to them.

Overview of lifestyle triggers of headaches

- Disturbed Sleep Patterns

  Teenagers require from 9 to 11 hours of sleep per night.

Sleep pattern becomes disturbed when sleep rhythm/cycle is altered.

Which of the following scenarios describe a disturbed sleep pattern?

1) Mary, a 16-year old cheerleader, is exhausted after her afternoon practices. Mary goes to bed each night at 9 o'clock p.m. and awakes at the same time each morning around 6:30 am. Mary has lots of energy when she awakens.

2) Chad, a 17-year old high school Junior, has no after school activities. Chad typically hangs out with his friends until around 9 o'clock each night. He plays video games for 2 hours before going to bed. Chad typically gets to bed by midnight and awakens at 6 a.m.

- FATIGUE

  Fatigue is defined as extreme tiredness.

  Fatigue can be caused by mental or physical exertion of illness.

  When fatigued, there typically is lack of energy and motivation.

- IRREGULAR EATING PATTERNS

  Irregular eating may lead to headaches.

  Lack of food, delayed meals, fasting and dieting can all lead to lowered blood sugar.

- SMOKING

    - May cause a wide variety of health issues.

    - Nicotine in tobacco can cause blood vessels in the brain to enlarge and press on nerves, which may trigger headaches.

- SUDDEN OR INTENSE EXERTION

    - When exercising, warm up slowly.
    - Sudden, intense exercise (e.g. running, weight lifting, wrestling, etc.) may cause headaches.

What is your warm-up routine before exercising?

Session 1
Lifestyle Triggers of Headaches
Homework

Write down at least 3 things in the environment that may cause headache or make your headaches worse.

1. _____

2. _____

3. _____

Write down thing that you can change in your immediate environment to decrease your risk for headaches.

1. _____

2. _____

3. _____

Please use the information provided in this scenario to complete a headache diary.

Erin has been having headaches off and on for one-year. The headaches are worsening. This past Sunday, Erin had a headache that started at 1:00 p.m. She rated this headache as a 7 to 8 pain level. Erin experienced an aura of dizziness ten minutes before the headache started. Associated symptoms were nausea, vomiting, throbbing, pulsating, and pounding sensation, light sensitivity, noise sensitivity, smell sensitivity, and double vision. Erin skipped breakfast on Sunday. She ate lunch at 12:30 p.m. For lunch, she had Coke and a bag of hot cheetos. Erin took 500 mg of Tylenol at 1:00 p.m. and 375 mg of Motrin at 3:00 p.m. at 7:00 p.m., she took Phenergan for her nausea. Please use the information provided in this scenario to complete a headache diary. Erin's headache subsided at 10:00 p.m. on Sunday.

Headache Diary

Date of Headache:

When headache started:

Symptoms prior to start of headache:

Severity of worst pain:

Symptoms associated with the headache:

Medication 1 (type, dose, time of dose)

Medication 2 (type, dose, time of dose)

Time of headache relief:

Noted triggers (e.g., caffeine, irregular sleep, etc.):

Other (please specify)

Session 2
Environmental Triggers of Headaches

This session will provide an overview of environmental factors that may trigger headaches.

Describe some of the things in the environment that trigger (cause) your headache or make your headaches worse.

KNOWN ENVIRONMENTAL HEADACHE TRIGGERS

- LIGHT

  Light is often a trigger for headaches.

  Bright lights cause increased sensitivity and pain during a headache.

Other high intensity visual stimuli (bright objects) can cause headaches.

- COMPLEX VISUAL PATTERNS

Geometric or screen patterns may trigger headaches.

Examples of other visual patterns that may trigger headaches include strips, checks, or zigzag lines.

Are your headaches triggered by a complex visual pattern?

If so, what pattern triggers your headaches?

- ODORS

Perfumes, cigarette smoke, exhaust fumes, and the smells of flowers are a few of the odors that may trigger headaches.

Other triggering smells include the smell of sharpies, musk, peppermint, and grape flavoring.

Odors that trigger headaches are unique to each individual.

What smell or odors trigger your headaches?

- BAROMETRIC PRESSURE CHANGES

  Headaches can be caused by weather changes.

  A barometric pressure change is a change in air pressure.

  There is little a person can do to avoid the barometric pressure trigger.

- TRAVELING

  Trips upset our daily routine (e.g., sleep and eating patterns) and may trigger headaches.

  Stress, scheduling problems, missed connections, and jet lag may trigger headaches.

Session 2
Triggers of Headaches
Homework

Which of the following represents environmental triggers for headaches?

a). light (bright sunlight, flashbulbs, and fluorescent).
b) complex visual patterns
c) Odors, perfumes, cigarette smoke
d) Barometric pressure changes
e) Traveling
f) None of the above
g All of the above

A headache diary is described as a written documentation that details the date of headache, treatments taken, response to treatment, any recognized triggers, and associated symptoms (e.g. nausea, vomiting, abdominal pain, light sensitivity or noise sensitivity, etc.)

What are some ways that you can keep documentation of your headaches?

1. _____

2. _____

3. _____

Write down all the medications you take for your headaches.

_____
_____
_____
_____

Traveling in higher elevations can increase the probability of having a headache.

a). Yes

b). No

Session 3
Medication Triggers

This session will review medication triggers of headaches to include birth control pills, certain diuretics, estrogen therapy, and certain anti-asthma medications.

- BIRTH CONTROL PILLS/HORMONE REPLACEMENT

  Birth control pills may worsen headaches.

  Fluctuation in estrogen seems to trigger headaches.

  Increased levels of estrogen may cause headaches.

- DIURETICS

  What are diuretics?

  Diuretics are medications that cause the body to rid itself of excess water through urination.
  When are diuretics used?

Diuretics are used to treat high blood pressure and swelling or excess fluid builds up in the body.

Diuretics may trigger headaches.

- ANTI-ASTHMA MEDICATIONS

Anti-asthma medications are medications that are used to treat asthma.

A side effect of several of these medications may be headaches.

Are you currently taking asthma medication(s)?

If so, have you noticed the onset of headaches or increased headaches after using your asthma medications?

- What medications do you take on a regular basis?

- How often you take these medications?

- What do you know about rebound headaches?

Session 3
Homework

Go to the library or goggle search hormonal triggers of headaches.

Write down at least 2 hormonal triggers of headaches and share at next session.

1. _____

2. _____

Which medication(s) help your headaches the most?

_____
_____
_____

Which medication(s) help your headaches the least?

_____
_____

Do you think that certain medications trigger your headaches?

_____ Yes _____ No

If yes, what medications do you think triggers your headaches?

Juan is a 13-year old male who is on multiple medications for asthma. In addition, to signs of pubertal changes, Juan has been complaining of frequent headaches. Juan eats healthy and avoids foods and conditions that are known to trigger his headaches. What explanation would you give for Juan's headaches?

a) Eating junk foods
b) Pubertal changes
c) Asthma medications
d) Combination of pubertal changes and asthma medications
e) None of the above
f) B, C, and D
g) A only
h) C only
i) All of the above

Session 4
HORMONAL TRIGGERS OF HEADACHES

This session provides an overview of hormonal triggers of headaches to include menstruation, ovulation, puberty, and menopause.

- MENSTRUATION

  - Headaches may start just before or shortly after onset of menstruation.
  - Monthly menstrual cycle may be associated with increased headaches.
  - Seventy percent of women report headaches related to menstrual change.

What are menstrual migraines?

Migraines related directly to menstrual cycle with no other identifiable triggers.

- OVULATION

What is ovulation?

Ovulation occurs when a mature egg is released from the ovary.

Headaches and moodiness can be associated with ovulation.

Headaches occur during ovulation because of fluctuations in estrogen levels.

- PUBERTY

What is puberty?

Puberty is the time when your body begins to change from that of a child to that of an adult.

Pubertal changes can trigger headaches.

Before puberty, boys may have a slightly higher rate of headaches.

After puberty, girls outnumber boys by 2 to 1 with headaches.

Does puberty occur at the same age for boys as for girls?

MENOPAUSE

What is menopause?

Menopause is the ceasing of menstruation. Menopause typically occurs between 45 and 50 years of age. Headaches are triggered during menopause for some women because of drops in estrogen level.

Session 4
Hormonal Triggers of Headaches
Homework

Write down all the foods that you think trigger or cause your headaches.

_____
_____
_____
_____
_____
_____
_____

Puberty, ovulation and menstruation are triggers for headaches.

a). Yes

b). No

Do you have control of hormonal triggers of your headaches?
_____ Yes _____ No

If yes, please explain how you control your hormones?

If no, why not?

Session 5
Dietary Triggers of Headaches

This session will provide an overview of the following dietary and food triggers for headaches: alcoholic beverages, tyramine (aged cheese), chocolate, excessive caffeine, and food additives (MSG, nitrite, aspartame).

OVERVIEW OF DIETARY TRIGGERS OF HEADACHES

Food and beverages may be responsible for up to 30% of migraines, according to some estimates.

- ALCOHOLIC BEVERAGES

Alcohol is one of the highest contributors to migraine headaches.

Dark colored alcoholic beverages such as red wine and whiskey are more likely to cause migraines than light colored alcoholic beverages.

- TYRAMINE

Tyramine is a compound found in fermented pickled or smoked foods such as aged cheeses, beer, smoked fish, yeast extract, fermented soy products, sauerkraut, fava beans, and cured meats.

What foods with tyramine do you eat?

- CHOCOLATE

Chocolate contains an ingredient, phenylethylamine, which can trigger headaches.

Chocolate as a trigger varies greatly among headache sufferers.

For some people, chocolate may help ease or get rid of the headache.

What affect does chocolate have on your headaches?

- CAFFEINE

Caffeine is a common cause of migraine attacks, however, the effect of caffeine changes based on the dosage.

High doses of caffeine may cause headaches.

Low doses of caffeine can lead to headache alleviation.

Abrupt withdrawal from caffeine can cause migraines.

How often do you drink caffeinated drinks?

Are your headaches caused or stopped by caffeine?

Session 5
Dietary Triggers of Headaches
Homework

Write down the time that you went to bed, fell asleep, and awaken for the next 5 days.

Day 1:

_____

_____

Day 2:

_____

_____

Day 3:

_____

_____

Day 4:

_____

_____

Day 5:

_____

Which group of foods do you think is a more healthy food choice, especially if you experience headaches?

a). Coke, Doritos, Cheez Its

b). Chocolate candy bar, cheddar cheese, Dr. Pepper

c). Hot Cheetos, Ramen noodles, Pepsi

d). Mashed potatoes, gravy, meatloaf

Select the letter that contains a food, condition, or behavior that may trigger headaches.

a). Non-smoking

b). Eating breakfast, lunch and dinner daily

c). Stress

d) Regular sleep patterns

Session 6
Headache Management Tips

This session will provide an overview of tips for better health to include regular sleep and eating patterns, moderate and routine exercise, limited caffeine, and alcohol and other drugs.

THINGS YOU CAN DO TO DECREASE HEADACHE

- ADJUST YOUR DIET

  Avoid excessive caffeine intake.

  Reduce your caffeine intake slowly to avoid withdrawal headaches.

  Avoid aged cheese (blue, brie, Swiss, etc.)
  Stay away from fermented soy products (miso, soy sauce, teriyaki sauce).

Avoid snow peas, fava beans, sauerkraut, pickles, olives, nuts or nut products, MSG, nitrites, and yeast.

- ESTABLISH REGULAR SLEEP PATTERNS

  A good sleep pattern is key for getting a good night's sleep.

  The key to establishing a good sleep pattern is to go to bed at the same time each night.

- ENGAGE IN MODERATE ROUTINE EXERCISE

  To avoid headaches, start exercise slowly.

  Moderate aerobic exercise reduces the frequency, intensity, and duration of headaches.

  Consider a daily brisk walk.

- LIMIT ALCOHOL AND OTHER DRUGS

  Avoid dark colored alcoholic beverages such as red wine, whiskey, bourbon, beer, margarita, etc.

  Avoid or limit use of drugs that may trigger headaches.

  If you are on a prescription drug that triggers your headaches, talk to your doctor about the possibility of an alternative medication.

- FOOD ADDITIVES

  Monosodium glutamate (MSG) and sodium nitrite are preservatives that improve the flavor of food and can cause migraines.

  MSG is most commonly found in Chinese restaurant meals, soups, bouillon cubes, Ramen noodles, hot Cheetos.

  Nitrites are most commonly found in cured meats such as bacon, cold cuts, hot dogs, and cured ham.

- ASPARTAME

  Aspartame is an artificial sweetener (NutraSweet) that can trigger headaches in certain people.

  Aspartame is the ingredient in most diet drinks.

Session 6
Headache Management Tips
Homework

Keep a daily count of the amount of water your drink. Please record as the number of ounces consumed per day. Be prepared to discuss at next session.

Day 1: _____

Day 2: _____

Day 3: _____

Day 4: _____

Day 5: _____

Day 6: _____

Day 7: _____

What are the recommended hours of sleep per night for adolescents?

a). 4 to 6 hours

b). 10 to 14 hours

c). 9 or more hours

d). 6 to 8 hours

Choose the scenario that is more conducive of a more healthy lifestyle and decrease headache disability.

a). Michael is an asthmatic and is on multiple medications for her asthma. Because of his asthma, he is only averaging 6 hours of sleep per night.

b). Teddy plays basketball and is very conscious of what he eats. Teddy eats 3 regular meals per day with in-between snacks. On the weekends, he hangs out with friends and engages in behaviors such as smoking, drinking, and recreational drug use.

c). Chris likes to experiment with a variety of foods; however, he watches his intake of caffeine, chocolate, processed meats, monosodium glutamate (MSG), and salty foods. He totally avoids alcohol, tobacco, and drugs.

d) Jesus is a 14-year-old tall thin lacrosse player. He weighs 88 pounds and is 6 feet 3 inches tall. Ian drinks 32

ounces of water per day. He typically does not drink any other liquids. Ian averages between 9 to 11 hours of sleep per night.

What is the appropriate daily fluid intake in ounces for an adolescent that weighs 110 pounds?

a). 20 ounces

b). 30 ounces

c). 60 ounces

d) 50 ounces

Session 7
The Importance of Hydration/Wrap-up

This session will provide an overview of the importance of keeping the body well hydrated and the relationship of hydration to headache and other health conditions.

- **HYDRATION**

What is hydration?

Hydration is the uptake of water in the cells.

What is dehydration?

Dehydration occurs when the amount of water leaving the body is greater than the amount of water taken into the body.

Dehydration is the process that occurs when the water level in the body drops below two-thirds.

What causes dehydration?

GI illness (stomach bug)
Vomiting
Diarrhea
Playing sports and not drinking adequately
Using diet supplements such as laxatives or diuretics (water pills)

What are signs of dehydration?

Dizziness and lightheadedness
Dry sticky mouth
Producing less urine and darker urine

How do you prevent dehydration?

PREVENT DEHYDRATION THROUGH HYDRATION!!

- **WAYS TO KEEP YOUR BODY HYDRATED**

Drink lots of fluids, especially on hot, dry or windy days.

Water is usually the best method for hydrating and it does not add calories.

Wear loose-fitting clothes if outside on hot days to decrease fluid loss through sweating.

If engaged in sports or strenuous activities, drink lots of water before the activity begins and then every 20 minutes or so thereafter.

Avoid caffeine, which is a diuretic that can cause you to urinate (pee) more.

WRAP-UP

How will you celebrate your successfully completing the 7 sessions?

THANK YOU!

References

www.achenet.org/tools/triggeravidanceinformation.asp

http://www.americanheadachesociety.org

http://www.google.com/#pq=drinking+water+and+headaches&hl

www.health.com/health/condition-article/0

www.headaches.about.com/od/headaches101/a/triggers.htm

www.health.howstuffworks.com

http://kidshealth.org/teen/safety/first_aid/dehydration.html

www.nationalpainfoundation.org/articles/…/exercise-and-headache

www.relieve-migraine-headache.com/headache-exercise.htm

www.webmd.com/migraines-headaches/guide/triggers-caffeine

www.webmdcom/…headaches/slideshow-surprising-headaches-trigger.com