The Relationship of Maternal Stress and Coping, Development Knowledge, and Infant Crying to Maternal Abuse Risk at Two Months

DISSERTATION

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By

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Abstract

Abusive head trauma (AHT) or shaken baby syndrome (SBS) is the most frequent cause of infant morbidity and mortality. Lazarus’s Theory of Stress and Coping was used to develop a theoretical model for AHT used in this study to evaluate variable relationships. The aims were to describe relationships among parent’s infant development knowledge, infant crying, parent stress, parent coping, and infant abuse risk and to determine what content should be included in AHT prevention programs according to the theoretical model. A cross-sectional descriptive research design was used to obtain data from mothers of two month old infants who presented for a well-child visit at pediatric primary offices. A convenience sample of 99 mothers completed the Knowledge of Inventory Development Inventory (KIDI), the Crying Patterns Questionnaire (CPQ), the Parenting Stress Index Short Form (PSI-SF), the Jalowiec Coping scale (JCS), and the Brief Child Abuse Potential Inventory (BCAP), and a demographic questionnaire developed by the researcher. Various statistical tests and descriptive statistics were used in the data analysis.

Infant crying and parent’s infant development knowledge were not related to infant abuse risk. Maternal stress differentiated between high and low abuse risk groups. Six percent of the mothers at high risk for abuse in this study is comparable to the national average of 9.6% of children in general who are abused. There was a difference
between coping style and effectiveness related to crying between high and low risk mothers. Supportant coping and its effectiveness with crying was used more by low risk mothers. High risk mothers used more often evasive, fatalistic, and emotive coping strategies. Several infant soothing techniques for crying infants were utilized at significantly different rates by the mothers who were in the high and low risk groups. The findings suggest that AHT prevention programs should provide parents with content related to soothing techniques for crying infants. Based on the results, the Brief Child Abuse Potential Inventory is identified as a screening tool to be used by pediatric primary care providers to target AHT prevention.
This document is dedicated to my family

Wes, Zebulon, Dad and Mom
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# Table of Contents

Abstract............................................................................................................................... ii

Dedication.......................................................................................................................... iii

Acknowledgments .............................................................................................................. v

Vita..................................................................................................................................... vi

List of Tables ..................................................................................................................... ix

List of Figures .................................................................................................................... xi

Chapter 1: Introduction...................................................................................................... 1

Chapter 2: Infant Crying ................................................................................................... 15

Chapter 3: Secondary Analysis of a SBS Education Program.......................................... 24

Chapter 4: Correlates of Risk for Maternal Infant Abuse and Abusive Head Trauma..... 42

Appendix A....................................................................................................................... 66

Appendix B....................................................................................................................... 71

References......................................................................................................................... 88
List of Tables

Table 1. Participant Demographics ................................................................. 72
Table 2. Pre and post-test results: Percent of participants with correct responses ....... 73
Table 3. Pre and post-test Cronbach’s alpha coefficients .................................... 74
Table 4. Mother Demographics .................................................................... 75-76
Table 5. Infant Demographics ...................................................................... 77-78
Table 6. Frequency of Overall Infant Crying and Persistent Crying Reported in Minutes ........................................................................................................ 79
Table 7. Parent Stress Inventory Scores ........................................................... 80
Table 8. Mothers’ Jalowiec Coping Scale Subscale Scores ................................. 81
Table 9. Differences Between Selected Mother and Infant Variables to the Brief Child Abuse Potential Inventory Scores ................................................................. 82
Table 10. Relationship of Selected Variables to the Brief Child Abuse Potential Inventory Scores ........................................................................................................ 83
Table 11. Relationship of Predictor Variables to Maternal Child Abuse Potential Scores ........................................................................................................ 84
Table 12. Selected Variable Differences Based on High and Low Abuse Scores on the Brief Child Abuse Potential Inventory ........................................................................ 85
Table 13. Differences Between Mothers with High and Low Risk for Abuse on Infant Development Items Related to Crying in the Knowledge of Infant Development Inventory (KIDI).

Table 14. Selected Instrument Score Differences Based on High and Low Abuse Scores on the Brief Child Abuse Potential Inventory.
List of Figures

Figure 1. Application of the Theory of Stress and Coping to Shaken Baby Syndrome Prevention ......................................................................................................................... 67
Figure 2. Crying Handout ................................................................................................ 68
Figure 3. Crying Card ...................................................................................................... 69
Figure 4. Partial Test of the Theorized Application of the Theory of Stress and Coping to Abusive Head Trauma .......................................................................................... 70
Chapter 1: Introduction

Child maltreatment continues to occur at an alarming rate. In 2010, an estimated 695,000 children were victims of maltreatment (United States (U.S.) Department of Health and Human Services (DHHS) & Administration on Children, 2011). The youngest children endured the highest rate of victimization of any other group, which is similar to data from previous years (U.S. DHHS ACYF, 2002 & 2007). The incidence of victimization in children one year of age and younger was 20.6 per 1,000 children. A parent was responsible for maltreatment in almost 81 percent of all cases (U.S. DHHS ACYF, 2011). With the rising number of maltreated children and large percentage of parent perpetrators comes the societal responsibility and dilemma of preventing abuse. It is imperative that abuse prevention efforts target the youngest population (Bechtel et al., 2011; Reece et al., 2010). Shaken baby syndrome (SBS) is a severe form of physical abuse that results in significant head trauma and long term impairment (33%) or death (33%). SBS is the result of vigorous manual shaking of an infant or small child with or without impact (Christian & Block, 2009). SBS accounts for approximately 10 percent of deaths from infant abuse (March & Calrera, 2011). There are no accurate national statistics on the prevalence or incidence of SBS as a result of several factors: 1) the wide range of injury severity from shaking and likelihood of presenting for medical attention, 2) the difficulty of clinical recognition of SBS, and 3) the lack of an established national
SBS registry and reporting system. Researchers in the United States estimate that 30 per 100,000 infants are SBS victims each year (Keenen et al., 2003; Reece et al., 2010). Similarly, studies in Estonia, Scotland, New Zealand, and the United Kingdom estimate that annually a minimum of 15 to a maximum of 39 per 100,000 infants are SBS victims (Kelly & Farrant, 2007; Talvik et al., 2006). These estimates of annual incidence are calculated from SBS cases presenting for medical attention that are accurately identified. These cases are typically the most severe. Therefore, the actual incidence of SBS may be much higher than current estimates.

SBS Societal Burden

_Lost Life and Functional Capacity_

About 20 to 50 percent of SBS victims die (Eisele, Kegler, Trent, & Coronado, 2006; Keenan, Runyan, Marshall, Nocera, & Merten, 2004; Myhre, Grogaard, Dyb, Sandvik, & Nordhov, 2007). About 20 to 30 percent of SBS survivors exhibit signs of appropriate growth and development at hospital discharge and/or follow-up (Barlow, Thompson, & Minns, 2005; Lo, McPhillips, Minns, & Gibson, 2003). Approximately 80% of SBS survivors experience morbidity ranging from mild to severe disability (Barlow et al.; Lo et al, March & Calrera). At least half of SBS survivors with morbidity have moderate to severe disability (Fanconi & Lips, 2010; King, MacKay, & Sirnick, 2003). Most survivors experience two or more chronic sequelae. Sequelae commonly experienced by SBS victims following the abusive event can include blindness, deafness, seizures, cerebral palsy, paralysis, developmental delay, mental retardation, and/or learning disabilities (Barlow, Thompson, Johnson, & Minns, 2004; Barlow et al., 2005;
The majority of SBS victims die following victimization and/or presentation to the emergency medical care or experience chronic disabling sequelae, meaning that SBS is a huge burden to society in terms of lost life and functional capacity.

Financial

Because SBS survivors endure multiple and complex health problems they produce significant financial burden on the family and health care system. The median hospital stay of SBS victims is 26 days (range 3-57) (Barlow et al., 2005). Survivors of SBS incur the highest charges for emergency room care (up to $30,000) and hospitalization compared to all other forms of child maltreatment (up to 3 million for the first five years of life) (Maryland Center for Health Promotion, 2012; Rovi, Chen, & Johnson, 2004). Initial hospitalization, lifetime intervention and follow-up costs taxpayers billions (an average of 1.2-16 billion) of dollars over SBS survivors’ lives (Ettaro, Berger, & Songer, 2004; Maryland Center for Health Promotion, 2012). Conversely, it is estimated that the direct costs of administering SBS prevention programs is about $177,000 per year or $4.50 per newborn (Altman et al., 2011; Dias et al., 2005). Given the number of infants that will become victims of SBS annually, it would be in the public’s best interest to fund prevention programs to reduce the incidence and cost of SBS.

SBS Primary Prevention

One goal of Healthy People 2020 is to “prevent unintentional injuries and violence, and reduce their consequences (Office of Disease Prevention and Health
Promotion (ODPHP), United States (U.S.) Department of Health and Human Services (DHHS), 2010).” Currently, there are various shaken baby syndrome (SBS) primary prevention programs throughout the United States. Excessive crying is often the “trigger” that causes parents to physically abuse their infants and toddlers. The focus of many of these programs is to 1) increase the awareness of the dangers of infant shaking, 2) educate parents about the developmental normalcy of infant crying, and 3) educate parents about ways to cope with infant crying (Dias, Smith, deGuehery, Mazur, Li, & Shaffer, 2005; Deyo, Skybo, & Carroll, 2008; National Center on Shaken Baby Syndrome, 2007; Showers, 1992).

Showers’ study (1992) found that only about half of participants were less likely to shake after receiving a “Don’t Shake the Baby” packet over a one year period. While Dias et al. (2005) a study conducted over a 5.5 year period provided post-partum education to multiple sites in Western New York that included information about SBS and emphasized signing a commitment statement confirming receipt and understanding of the education to parents found a 47% reduction in the number of SBS cases. Deyo et al.’s (2008) study evaluated an education program provided to mothers in the post-partum period over 3 years. The study found that mother’s gained knowledge from the information provided about SBS and crying and that they utilized the infant soothing techniques, but that the instruments the program utilized were not highly reliable. All three studies found that parents thought the education was helpful and that other parents should be offered SBS prevention programs (Deyo et al.; Dias et al.; Showers). More research is needed to identify whether or not there are similar or different findings.
between SBS education programs. Outcomes of preventive interventions should expand to include actual cases of abuse from parents who have and have not received the education. It is difficult to compare SBS education programs because different protocols are used including education materials, education methods, and data obtained from the participants. Furthermore, the majority of education programs reported in the literature are not developed using evidence based protocols, primarily because there is insufficient evidence. Prevention efforts are futile if the information provided to parents do not meet their needs or the messages do not specifically support SBS prevention.

SBS and Lazarus’ Theory of Stress and Coping

Parents of infants are exposed to potentially stressful stimuli that will elicit different responses, one of which may be abuse. Identification of these stimuli is important to SBS prevention work because if they precipitate abuse they may be possible focuses of intervention. Lazarus’ model of stress and coping (Lazarus, 2000) was used to explain the outcome of a parent’s response to infant crying transacted with other antecedents (see Appendix A, Figure 1). According to the theory, person and environment antecedents of the potential stressor transact. Transaction allows for individual differences in the cognitive appraisal of potentially stressful stimuli and the use of subsequent coping strategies. Cognitive appraisal of the person and environment variables is performed by each individual. The person variables theorized to be relevant in the SBS transaction are race, age, gender, education, financial resources, relationship status, birth order, biologic child, and infant development knowledge. The environment variables theorized to be pertinent are infant crying, socioeconomic status, and household
occupants. These variables were considered the moderators. Moderators are variables that interact with independent variables to influence the dependent variable and are typically present prior to the stressor (Baron & Kenny, 1986). The variables theorized to be mediators are stress and coping. Mediators are variables that account for the relationship between an independent and dependent variable (Baron & Kenny). Mediation allows for individual cognitive processes to occur spontaneously and these variables are not present prior to the stress encounter.

Transaction of the antecedents employs cognitive mediating processes. A stressor is appraised (primary) allowing the parent to identify the level of psychological stress the person-environment relationship imposes. With secondary appraisal, the parent identifies coping resources to assist in adjusting to the stress of the person-environment relationship. Coping behaviors assist in the overall adjustment to the stressor. Stress and coping are the mediators that attempt or actually alter the relationship between the stressor and the outcome. The outcome is a short-term response, namely child abuse, which is the result of an acute stress situation. When the interaction of the person-environment transaction is appraised as stressful and the coping resources are inadequate negative responses/outcomes, such as abuse, occur.

**Concept Support**

Application of Lazarus and Folkman’s (1984) theory of stress and coping and Lazarus’ later work (2000) to the problem of SBS can be supported by empirical evidence. Literature was used to provide support for all theorized concept relationships.
and use of the main concepts: child development knowledge, infant crying, stress, and coping, infant abuse/SBS, in studies pertinent to SBS prevention.

Person antecedent: infant development knowledge.

Knowledge of normal child development is an important dimension of maternal cognition that can affect parenting behaviors (Huang, O’Brien Caughy, Genevro, & Miller, 2005; Miller, 1988). A majority of studies support that maternal knowledge of child development is a significant factor in parenting (Miller; Parks & Smeriglio, 1986; Stevens, 1984). Mothers with more child development knowledge are less likely to use assertive discipline measures; rather they use more inductive reasoning (Smith, 2002). Mothers with less accurate child development expectations are more likely to resort to severe discipline measures or abuse (Azar, 2002; Belsky, 1980; Berger & Brooks-Gunn, 2005; Dukewich, Borkowski, & Whitman, 1996; Hunt & Paraskevopoulos, 1980). It is noteworthy that a few studies have found no significant relationship between maternal knowledge and parenting behavior when focusing on predominantly White, highly-educated, middle-class mothers (Conrad, Gross, Fogg, & Ruchala, 1992; Myers, 1982). In other studies, race and socioeconomic status are reported to have a moderating effect on maternal knowledge and subsequent parenting behaviors (Benasich & Brooks-Gunn, 1996; Huang, et al., 2005; Miller; Zepeda & Espinosa, 1988). Wealthy mothers made more accurate estimates of child development than their impoverished counterparts (Benasich & Brooks-Gunn; Huang, et al., 2005). One study found that low income, foreign born Hispanic mothers were more likely to underestimate the development of their children when compared to low income, U.S. born Hispanic, Anglo, and Black
mothers (Zepeda & Espinosa). Another study found that White and Hispanic mothers had more accurate child development estimates compared to African-American mothers (Huang, et al., 2005). Demographic variables and parent characteristics may play an important role in child development knowledge and subsequent parenting behaviors, specifically discipline measures and abuse.

*Environment antecedent: infant crying.*

Crying becomes patterned throughout the growth and development of the infant (Brazelton, 1962). There is a universal infant crying pattern. Crying increases after birth and peaks around two months of age (Brazelton). For most infants, crying and irritability substantially decreases by about three months (Barr, 1990a, b; Barr, Kramer, Boisjoly, McVey-White, & Pless, 1988; Lee, Barr, Catherine, Wicks, 2007). There is variability in the frequency and duration of infant crying (Brazelton; Baildam, et al., 1995; St James-Roberts & Halil, 1991). About 30 percent of the infant population cries excessively, which many term colic (Clifford, Campbell, Speechley, & Gorodzinsky, 2002; Keefe & Froese-Fretz, 1991; Lehtonen & Rautava, 1996; Lucassen et al., 2001). Colic crying behavior is actually on the upper end of the normal infant cry behavior spectrum (Barr, 2001). It is often defined as when an infant cries at least three hours a day, three days per week, for three weeks (Wessel, Cobb, Jackson, Harris, & Detwiler, 1954). Even though only about 30 percent of infants met the criteria for colic, more than 41 percent of parents in a study of 3,259 infants reported crying as excessive (Reijneveld, van der Wal, Brugman, Hira Sing, & Verloove-Vanhorck, 2004). Reijneveld and colleagues (2004) also found that nearly six percent of the parents had shaken, hit, or smothered their infant
to stop the crying. Crying is a normal part of infant development. It is likely that reports of excessive crying higher than that of the prevalence of infant colic are due to a lack of parental knowledge about infant cry behavior and development.

*Mediating process: stress.*

Parents report several sources of stress. Single parenting, lack of education, and poverty are factors that make maternal parenting difficult (Combs-Orme, Cain, & Wilson, 2004; Copeland & Harbaugh, 2005). The inability to recognize normal infant development and respond to normal infant cues is stressful for both mothers and fathers (Wilkie & Ames, 1986). High stress situations potentiate violence (Butler, 1995; Guterman, Lee, Taylor, Rathouzm, 2009). An aversive stimulus, like infant crying though a normal part of development, increases the likelihood of caregiver aggression (Berkowitz, 1974). It is likely that SBS is a result of the interaction of an amalgam of factors that create parent psychological distress as indicated by Lazarus’ model.

*Mediating process: coping.*

Coping can alter parent perception of stress encounters. Mothers of new infants find more coping strategies useful than do fathers (Ventura & Boss, 1983). Child abusing mothers rely more on emotion-focused coping versus problem-focused coping strategies and perceive their coping to be more ineffective when compared to non-abusing mothers (Cantos, Neale, O’Leary, & Gaines, 1997). Emotion-focused coping is when strategies are used to aid in handling distressing emotions evoked by a situation and problem-focused coping is when strategies are identified to target the cause of stress in practical ways to eliminate it (Lazarus, 2000; Lazarus and Folkman, 1984). The usefulness of
either coping strategy depends on the individual and circumstances of a situation; however, emotion-focus coping is often less effective because it does not provide a long-term solution to deal with a stressor. Emotion-focused coping is often effective when the situation is out of an individual’s control. Although there are no universal or right or wrong coping strategies according to stress and coping theory, some coping strategies are more maladaptive in stressful parent situations, such as avoidance (Lazarus, 2000; Lazarus and Folkman, 1984). Prevention efforts to teach or reinforce parent coping strategies that are adaptive in stressful encounters may be useful to prevent SBS.

**Outcome: infant abuse/SBS risk.**

There are several person characteristics of the caregiver/perpetrator that increase the potential to abuse. Three quarters of SBS perpetrators are parents or parent figures, with female babysitters making up the difference (Starling & Holden, 2000). The majority of parents or parent figures who perpetrate are fathers, stepfathers, or mothers’ boyfriends (60-70%) (U.S. DHHS ACYF, 2011). Parent risk factors for abuse include substance abuse (53%), domestic violence perpetration (42%), a criminal history (32%), unrealistic expectations of child behavior (42%), and infant attachment problems (32%) (Ricci, Giantris, Merriam, Hodge, & Doyle, 2003). Perpetrators often report that an inconsolable crying infant provokes shaking (67%) (Reijneveld, et al., 2004; Ricci et al.). Biron and Shelton (2005) found that the majority of parents with infants admitted to the hospital with a diagnosis of SBS (88%) had contacted their primary care provider regarding excessive crying preceding the admission.
There are several person characteristics of the infant that increase the risk of being abused. Shaken baby syndrome victims are most often less than one year of age with a median age of three months and a mean age of six months (Biron & Shelton, 2005; Keenen et al., 2003; March & Cabrera, 2011; Reece et al., 2010; Talvik et al., 2006). Similar to perpetrators, the majority of SBS victims are male infants (60-80%) (Biron & Shelton; Starling & Holden, 2000; Starling, Holden, & Jenny, 1995; Talvik et al., 2006). Other SBS victim characteristics include being a racial minority, living with the mother and the biological father or maternal boyfriend, not having a chronic medical condition or physical problem, and having evidence or a history of prior abuse by a caregiver (Alexander, Crabbe, Sato, Smith, & Bennett, 1990; Keenen, et al, 2004; King et al.; March & Cabrera, 2011; Ricci et al., 2003). Efforts to prevent SBS should emphasize infant development and crying behavior expectations. Target populations should be parents. It appears that specifically minorities and males should be the aim of prevention work; however, it is important to note that as previously stated all SBS victims do not present to healthcare. This means that the current perpetrator and victim demographics, based on those SBS victims who present to medical attention, may not provide an accurate representation of all SBS victims.

It is more amenable in a longitudinal study to capture SBS incidence. To overcome this challenge in a cross-sectional study of mother-infant dyads, infant abuse potential may be a useful proxy. Parents at higher risk of abusing children experienced stress caused by changes in public assistance status (McCurdy, 2005), had deficits in childrearing knowledge (Milner, 1994), were less educated, had a higher level of
emotional distress (Budd, Heilman, & Kane, 2000), and were less empathetic and more hostile to infant crying (Milner, Halsey, & Fultz, 1995). In the model, outcomes include infant abuse and potential for infant abuse. Potential for abuse at one point in time may become actual abuse when person and environmental factors transact to increase potential stress.

Study Significance

Abuse, specifically SBS, is a complex phenomenon. The theory of stress and coping can be used to organize variables that are potential and known catalysts for SBS perpetration. Studying these variables is important for prevention. More research is needed on the relationship of the variables theorized and supported in the literature as catalysts for SBS. Lazarus’ (2000) theory of stress and coping was used in this study to identify factors that may be amenable to SBS education. Furthermore, it is hopeful that studying this theory will aid in the recognition of variables or content that would be integral to SBS prevention programming.

Specific Aims and Research Questions

The first specific aim of the study was to describe the relationships among mother’s infant development knowledge ( moderator), infant crying (moderator), mother’s stress (mediator), mother’s coping (mediator), and mother’s infant abuse risk (outcome). The second specific aim of the study was to determine content that can be included in SBS prevention programs. Five research questions were derived from these two specific aims.

1. What is the difference between infant and maternal demographic characteristics and maternal infant abuse risk?
2. What is relationship of infant crying, infant development knowledge, parent stress and coping to infant abuse risk?
3. What variables best predict child abuse risk?
4. Do parent stress and coping mediate the effect of infant crying and infant development knowledge on infant abuse risk?
5. What content should be included in an SBS prevention program?

**Format of the Dissertation**

This dissertation is composed of published or publishable manuscripts with content relevant to the research study. Each manuscript can stand alone; therefore, the complete dissertation may have information that is redundant.

The first chapter provides the introduction that includes background information regarding shaking baby syndrome, support for the significance of the dissertation research, the specific aims and research questions. In addition, the chapter includes the theoretical framework that was used to guide the research.

The second chapter entitled, “Infant Crying” is a review of infant crying literature. The findings from this review supported crying as a normal part of infant development. Evanoo (Deyo), 2007) discussed the epidemiology of crying, the relationship of crying to abuse, and comforting techniques for a crying infant. Also it includes an infant crying handout that was developed by Deyo that can be provided by healthcare professionals to caregivers of crying infants. This crying handout was used in the dissertation study as an informational tool for participants. The material in this chapter was published in *Journal of Pediatric Care* (2007) by Evanoo (Deyo).
The third chapter entitled, “Secondary Analysis of a SBS Education Program”, provides an overview of a SBS prevention program implemented jointly by Prevent Child Abuse Ohio and the Council for Jewish Women (n=7,051). The purpose of the study was to perform a secondary analysis of the program in order to learn the knowledge mothers’ gained from the program and to test program instrument reliability. The findings from the conduct of this study are discussed and in large part focuses on prevention program development. This study was an impetus for the dissertation study. The material in this chapter was published in *Child Abuse and Neglect* (2008) by Deyo, Skybo, and Carroll.

The fourth chapter, “Correlates of Mother Infant Abuse Risk and SBS Risk Reduction,” provides a summary of the dissertation study. It includes a literature review, theoretical framework, the research questions, the methods, and the findings. Research questions are evaluated and conclusions are generated regarding recommendations for the theoretical framework, future research in order to inform SBS prevention programs, and implications for clinical practice.
Chapter 2: Infant Crying

This chapter is based on a review of infant crying literature. The findings from this review support that crying is a normal part of infant development. This review was done early in development of the author’s dissertation topic. The material in this chapter was published in *Journal of Pediatric Care* (2007) by Evanoo (Deyo).

Introduction

Crying is a common, normal occurrence in a healthy infant. However, crying is one of the primary reasons parents seek health care for their infant child (Barr, 1990a). Many parents find inconsolable crying to be particularly difficult because the use of soothing techniques to comfort the baby seems futile. Parents may also view infant crying as a negative reflection on their ability to parent, increasing their distress. Primary care professionals have a responsibility to prepare parents with information and strategies to help them understand and manage both their infant’s crying and their own frustration with crying. Knowledge of the infant crying literature ensures that parents will have accurate, evidence-based information.

Crying Epidemiology

*Typical Crying Patterns*

Every infant cries. Most infants follow a universal crying pattern over the first few months of life. Crying progressively increases after birth and peaks at six weeks of
age, thereafter declining until three months of age (Brazelton, 1962). There is a marked
tendency for peak crying to concentrate in the evening (St. James-Roberts & Halil, 1991).
From three months to one year of age, a lower level of crying continues (St. James-
Roberts & Halil). Numerous cross-cultural studies have replicated this typical crying
pattern (Alvarez, 2004; Barr, 1990b; McGlaughlin & Grayson, 2001; St. James-Roberts,
Bowyer, Varghese, & Sawdon, 1994). However, non-Western infants exhibit a lesser
amount of crying compared to Western infants (Barr, Konner, Bakeman, & Adamson,
1991; Brazelton, Robey, & Collier, 1969). This literature suggests that the crying pattern
of early infancy is a result of innate programming and maturation, but that environment
influences other aspects of infant crying, such as the amount of crying.

There is little daily stability in crying frequency and duration within and between
individual infants (St. James-Roberts & Halil; St. James-Roberts & Wolke, 1988). Cry
durations range from 20 minutes to 3 ½ hours, with longer durations occurring at six
weeks of age (Baildam et al., 1995; Brazelton, 1962; St. James-Roberts & Halil, 1988).
Due to the considerable variation in infant cry characteristics, it is impossible to define
what is normal and abnormal crying behavior.

**Colic**

Colic is a variant of normal crying behavior (Barr, 2001). Some infants simply cry
more than others. Colicky infants exhibit a crying amount that is on the upper end of the
normal spectrum. However, colicky infants follow the same universal crying pattern as
do noncolicky infants (Barr, 1998; St. James-Roberts & Halil, 1991). Few infants
continue to exhibit colic behaviors beyond 3 months (6%) and 6 month of age (3%) (von Kries, Kalies, & Papousek, 2006).

There is no single definition of colic. The earliest and most widely used definition of colic is the “rules of three,” which requires the infant to cry at least three hours a day, three days per week, for three weeks (Wessel, Cobb, Jackson, Harris, & Detwiler, 1954). Depending on the definition used, colic occurs in up to 28 percent of infants across all categories of gender, race, and socioeconomic status (Clifford, Campbell, Speechley, & Gorodzinsky, 2002; Keefe & Froese-Fretz, 1991; Lehtonen & Rautava, 1996; Lucassen et al., 2001). Low birth weight infants appear to have twice the risk of developing colic compared to normal weight infants (Sondergaard, Skaja, & Henriksen, 2000).

Colic is a clinical diagnosis of exclusion. Several theories exist to explain colic, but there is no evidence to support either medical or physiological causes of colic. Gastrointestinal disorder theories are the most prominent in the literature, especially excessive gas. However, on x-ray, there was less gas at crying commencement and more gas at crying completion (Illingworth, 1954) and the use of simethicone to treat gas is not superior to placebo in reducing colicky crying (Garrison & Christakis, 2000; Lucassen, Assendelft, Gubbels, van Eijk, & Douwes, 2000). Gastroesophageal reflux (GER) is another theory. The use of anti-reflux medications, such as ranitidine, to treat GER is not superior to placebo in reducing colicky crying (Heine, 2006; Jordan, Heine, Meehan, Catto-Smith, & Lubitz, 2006).

Food allergy or sensitivity is another proposed cause of colicky crying (American Gastroenterological Association, 2001). Nevertheless, about five percent of infants who
cry excessively, spit up, and/or are constipated benefit from a food elimination diet or change to a hypoallergenic formula (Heine, 2006; Rautava, Helenius, & Lehtonen, 1993). In one study, *Lactobacillus reuteri*, a probiotic, reduced the median amount of crying from 159 minutes per day on day seven to 51 minutes per day on day 28 in 95 percent (n=39/41) of breastfeed colicky infants (Savino, Pelle, Palumeri, Oggero, & Miniero, 2007). Although this finding is promising, there is not enough evidence to support a change in practice. Of note, this would coincide with the normal timeframe for the resolution of colic.

Additional colic explanations are under investigation. Some researchers suspect an internal mechanism, such as an autonomic nervous system response, that renders the infant unable or less able to regulate crying once it is started than other babies (Barr, Young, Wright, Gravel, & Alkawaf, 1999; DeGangi, Dipietro, Greenspan, & Prges, 1991). Psychosocial factors, like maternal anxiety, as well as maternal and paternal smoking have been associated with an increase in the risk of colic (Akman et al., 2006; Rautava et al., 1993; Reijneveld, Lanting, Crone, & Van Wouwe, 2005; Sondergaard et al., 2003). It appears that excessive infant crying may be associated with, not caused by, multiple biopsychosocial factors.

*Triggers for Crying*

The exact cause of crying remains unknown. The most worrisome for parents is concern that the infant is ill, although many needs trigger crying including hunger, thirst, extremes of temperature, and the desire for caregiver contact (Illingworth, 1985; Pellissier, Coplan, Jackson, & May, 2000). Hypothesized internal triggers of infant crying
include the release of excess energy and tension (Brazelton, 1962), emotional response (Darwin, 1972) and central nervous system maturation (Emde, Gaensbauer, & Harmon, 1976).

Infants who cry due to organic causes or illness typically have other signs and symptoms of illness indicating the need for medical intervention in addition to the crying (Schwartz, Bell, Bingham, Chung, Freidman, et al, 2005). Parents are excellent observers of their infants and frequently identify the earliest signs of illness in their infants. Primary care professionals should take advantage of parental sensitivity and encourage parents to consult with them if they feel something is wrong with their infant.

_Crying and Abuse_

Parents report feeling stressed by infant crying and this may result negative feelings toward the infant (Wilkie & Ames, 1986). In one study of 3,259 Netherlands parent-infant (1-6 months old) dyads, 5.6 percent of parents smothered, slapped or shook their infants to stop crying (Reijneveld, van der Wal, Brugman, Sing, & Verloove-Vanhorick, 2004). Infant crying is the primary trigger for infant abusive head injury or shaken baby syndrome. The most frequent cause of serious morbidity and mortality from trauma in infants is head injury resulting from child abuse (Bechtel et al., 2004; Billmire & Myers, 1985; Overpeck, Brenner, Trumble, Trifiletti, & Berendes, 1998; Ventura, Peters, Martin, & Maurer, 1997). Health care providers have an obligation to provide parents with healthy, non-injurious ways to intervene with their crying infant in order to prevent infant abuse.
What Works: Comforting the Non-Colicky Infant

Parents report using a variety of soothing techniques to calm their infant; frequently used techniques include swaddling, holding, carrying, rocking, playing music, offering a pacifier, or some combination of these strategies (van der Wal, van den Boom, Pauw-Plomp, & de Jonge, 1998). Researchers have examined several of these soothing strategies to determine which techniques help to decrease crying.

The literature supports swaddling as a beneficial strategy for reducing cry duration, especially in infants younger than eight weeks of age (van Sleuwen et al., 2006). Increasing or decreasing stimulation also reduces infant crying (Wolke, Gray, & Meyer, 1994). Data are inconclusive regarding the effectiveness of carrying for reducing crying for infants in all cultures. Massage and supplemental carrying together approached statistical significance (≤0.06) in the reduction of crying (Elliott, Reilly, & Drummond, 2002). However, supplemental carrying alone has not been associated with a reduction in crying (Elliott et al., 2002; St James-Roberts, Hurry, Bowyer, & Barr, 1995).

In one study, a regimented daily schedule reduced the number of parents seeking help for crying and sleeping problems (St James-Roberts, Sleep, Morris, Owen, & Gillham, 2001). A consistent routine may promote infant self-regulation and decrease crying (St James-Roberts et al.). It appears that all or a combination of these soothing techniques may be helpful for parents to use to calm their crying infant.

Two studies found a significant reduction in infant crying with the implementation of an intervention called REST (Keefe, Barbosa, Froese-Fretz, Kotzer, & Lobo, 2005; Keefe, Froese-Fretz, & Kotzer, 1997). REST for infants consists of
regulation (e.g. reading cues), entrainment (e.g. synchronizing infant behavior with the environment like light or noise), structure (e.g. routine), and touch (e.g. soothing techniques such holding or rocking). REST for parents includes reassurance, empathy, support from the healthcare provider, and timeout for the parents (e.g. rest and renewal). The REST intervention decreased both parent stress and infant crying (Keefe et al., 2005; Keefe et al., 1997). Providing crying interventions and parent support are an important part of anticipatory guidance in early infancy to reduce infant crying and improve parent mental health.

*What Works: Comforting the Colicky Infant*

Soothing techniques specific to colicky infants have been widely studied. Commonly recommended strategies include increased carrying, a crib vibrator, and infant massage, however, data do not support their effectiveness in reducing crying in colicky infants (Barr et al., 1991b; Huhtala, Lehtonen, Heinonen, & Korvenranta, 2000). One study found swaddling superior to massage in calming colicky infants (Ohgi, Akiyama, Arisawa, & Shigemori, 2004). Another study found that a structured behavioral management program by trained counselors tailored to each mother-infant dyad reduced excessive infant crying (Wolke et al., 1994). Counseling alone, however, was no more effective than general support measures in the management of colic (Parkin, Schwartz, & Manuel, 1993). In summary, it appears that effective soothing interventions differ little between infants with and without colic.

Without a treatment for colic, soothing techniques are often the last hope for successful parent intervention with infant crying. Providing practical advice about infant
crying and the most effective soothing techniques as well as parent support can improve parent morale and self-esteem (Long & Johnson, 2001). Even if the soothing techniques do not reduce infant crying, parents will feel better prepared to handle the stress of crying.

Helping the Parent Cope with Infant Crying

The problem of infant crying is very real to every parent who presents with complaints of infant crying. Parents should not feel alone or helpless when handling infant crying. It is helpful to normalize, but not minimize the situation. The literature confirms that a number of emotional and behavioral interventions are helpful in reducing crying although not all soothing interventions work for every infant. With support from the primary care professional, most parents can discover the unique combination of soothing techniques that works for their infant.

It is often helpful to offer parents a handout summarizing potentially effective soothing techniques to review at home. Crying: What can I do? (Appendix A, Figure 2), offers several suggestions for effective infant soothing. This handout also includes an explanation of typical infant crying, advice on illness symptoms associated with crying that require attention by a health care professional, and steps to reduce parent frustration. Field testing of the handout with seven mothers’ of infants garnered many positive comments about its usefulness as well as additional suggestions included in this final version. Parents who understand these concepts will feel empowered to cope with infant crying and have a more positive relationship with their infant.
Conclusion

Crying, regardless of the duration, is normal. It is often emotionally distressing to parents, creating worry over possible illness and placing the infant at risk for abuse. However, over 95 percent of the time, medical intervention is unnecessary to manage crying. The research literature supports the effectiveness of interventions aimed at helping parents cope with infant crying by providing support and suggestions for soothing interventions. By providing emotional and behavioral interventions to parent-infant dyads, pediatric health professionals may help to prevent shaken baby syndrome and its often lifelong sequelae.
Chapter 3: Secondary Analysis of a SBS Education Program

This chapter is based on a secondary analysis of a research study of a Shaken Baby Syndrome prevention program. This study was done with Dr. Theresa Skybo and Alisa Carroll. The findings from the study were the impetus to pursue dissertation research pertaining SBS. The material in this chapter was published as a manuscript in *Child Abuse and Neglect* in 2008.

Introduction

The most frequent cause of serious morbidity and mortality from trauma in infants is head injury resulting from child abuse (Bechtel et al., 2004; Overpeck, Brenner, Trumble, Trifiletti, & Berendes, 1998; Ventura, Peters, Martin, & Maurer, 1997). Shaken baby syndrome (SBS) or non-accidental head injury (NAHI) is vigorous manual shaking of an infant with or without impact resulting in head trauma. Accurate national and international statistics are lacking on the incidence of SBS. It is estimated that 21 to 74 per 100,000 children under the age of 1 suffer abusive head trauma each year in countries around the world, including Estonia, Scotland, Taiwan, the United Kingdom, and the United States (Barlow & Minns, 2000; Huang, Chang, & Wang, 1998; Jayawant et al., 1998; Keenan et al., 2003; Talvik et al., 2006). These estimates, however, are believed to be low due to the high probability of missed or incorrectly identified cases (Kost & Schwartz, 1989).
About one third of SBS victims die (Dias, Backstrom, Falk, & Li., 1998; Hadley, Sonntag, Rekate, & Murphy, 1989; Hennes, Kini, & Palusci, 2001; Sinal & Ball, 1987). The majority of SBS survivors (70-80%) endure multiple and complex health problems, such as blindness, deafness, seizures, cerebral palsy and/or paralysis (Barlow, Thompson, Johnson, & Minns, 2004; Kivlin, Simons, Lazoritz, & Ruttum, 2000; Wyszynski, 1999). These health problems produce a significant financial burden on the health care system. Initial hospitalization, lifetime intervention, and follow-up costs taxpayers millions of dollars over the survivors’ life (Bopp, Fraiser, & Fitch, 1997; Ettaro, Berger, & Songer, 2004; Rovi, Chen, & Johnson, 2004). It is estimated that the direct costs of administering SBS prevention programs is about $177,000 per year (Dias et al., 2005). Given the number of infants who suffer from complications of SBS, it would be in the public’s best interest to implement prevention programs. Education is the key to preventing SBS and its subsequent sequelae (Carbaugh, 2004).

SBS Primary Prevention Literature

Currently, there are various SBS primary prevention programs throughout the World. The focus of many of these programs is to 1) increase the awareness of the dangers of infant shaking, 2) educate parents about the developmental normalcy of infant crying, and 3) educate parents about ways to cope with infant crying (Dias et al., 2005; Gutierrez, Clements, & Averill, 2004; National Center on Shaken Baby Syndrome, 2007; Prevent Child Abuse Ohio, 2004; Showers, 1992). Many programs are administered as universal primary prevention education during the post-partum period to all parents of new-born infants (Dias, 2005; Kent, 2002; National Center on Shaken Baby Syndrome,
Some programs target SBS education toward high-risk parents and families during health care provider visitation (Nagler, 2002). Other programs target males who are new or future dads specifically in the military, prisons, and youth detention centers (National Center on Shaken Baby Syndrome, 2007). Unfortunately, limited research has been performed and published to actually evaluate the majority of these SBS prevention programs (Carbaugh, 2004).

To date, the authors are aware of two research studies that evaluate SBS prevention programming. One prospective longitudinal study was performed on the “Don’t Shake the Baby” program provided in six maternity wards in Franklin County, Ohio (Showers, 1992). A second prospective longitudinal study was performed in maternity wards in an eight county region of western New York State (WNY) (Dias et al., 2005). The results of these studies are inconclusive about the effect of SBS education on parent behavior related to shaking. In the first study, only about half of participants were less likely to shake (Showers, 1992), while in the second study a significant reduction was found in the number of SBS cases (Dias et al., 2005). Despite this difference, both studies found that parents thought SBS education was helpful and that other parents should receive it (Showers, 1992; Dias et al., 2005). More research is needed to identify whether or not there are similar or different findings with other SBS education programs.

It is difficult, however, to compare SBS education programs because not all programs are administered utilizing the same protocols, this includes education materials, education methods, and data obtained from the participants. Furthermore, none of the
education programs report program refinement according to an evidence base because there is no evidence to support this process (Carbaugh, 2004). It is important to analyze the current SBS education programs in order to assess whether they are relevant to parent needs and effective to alter parent behaviors. Additionally, evaluation of SBS education programs is a way to identify the program impact and whether funding is warranted for continued SBS primary prevention.

Imperative to the SBS program evaluation process are the instruments used to collect participant data. Neither of the two previous studies has reported reliability and validity of the instruments used to collect data. Studies that utilize invalid and unreliable measures do not provide an accurate picture of the relevance and effectiveness of SBS prevention. More research is needed for SBS education program instrument development.

The purpose of this study is to perform a secondary data analysis of the “Love Me…Never Shake Me” SBS education program. Prevent Child Abuse Ohio (PCAO) and The Council for Jewish Women jointly launched the “Love Me…Never Shake Me” program in December 2002. Since initiation, the program has expanded to provide education in several different venues across central Ohio, including hospitals, schools, and prisons. As part of the educational program, participants receive information about SBS, typical patterns of infant crying, infant soothing techniques, and self-coping strategies. Infant soothing techniques recommended included holding, rocking, singing, playing soft music, and/or feeding. Self-coping strategies recommended included exercising, calling a friend or family member, taking a time-out, meditating or deep
breathing, and/or listening to music. There are four instruments used to collect participant data, which include a pre and post-test, commitment statement, and follow-up survey.

The participant data from these instruments were maintained in a database that had not been analyzed since program inception. Analysis of this existing database was based on five research questions, in order to provide information on how to develop and refine the current education program and/or instruments. The research questions are as follows:

a) What are the demographic characteristics of the women who participated in the SBS education program?

b) What is the percentage of responses of each item on the commitment statement, pre and post-tests, and follow-up survey?

c) Is there a difference between the pre and post-test scores?

d) Is there a difference between pre and post-test scores by hospital site and demographics?

e) What is the reliability of the pre and post-test instruments?

Methods

Sample

The Ohio State University and Columbus Children’s Hospital Institutional Review Boards approved the study. The “Love Me…Never Shake Me” database utilized excluded all participant identifiers: names, addresses, and telephone numbers. The database included 25,949 participants from all study sites from 2002 to 2005. These participants were mothers and fathers of newborns, prison-inmates, and high school
students. For inclusion in this study, the participants completed the program at one of five hospitals (four postpartum units or one neonatal intensive care unit) in central Ohio, and 7,922 participants met this criterion. In addition, the participants had to be the biological mother and 18 years of age or older (born on or before 1987). A total of 7,051 participants met these inclusion criteria. Most of the 7,051 participants who met all inclusion criteria were from one of four postpartum units (91%).

Protocol

The secondary data used for the study was collected at the hospitals as follows. Nurses at the hospitals were trained by the PCAO SBS education program coordinator to recruit and deliver SBS prevention education to parents of infants. Implementation of the program was tracked by the number of commitment statements and pre and post-tests returned to PCAO by the hospital. Postpartum hospital participants were recruited following infant delivery and prior to infant discharge from the hospital. Neonatal intensive care unit hospital participants were recruited prior to infant discharge. The mothers were asked by a nurse to voluntarily participate in the “Love Me…Never Shake Me” program and initially provided verbal consent. Participants performed a pre-test, watched a short video Portrait of a Promise: Preventing Shaken Baby Syndrome (American Academy of Pediatrics, 1995), reviewed selected educational materials (Appendix A, Figure 3) with a nurse, performed a post-test, and signed a personal commitment statement. They received a copy of their signed commitment statement to not shake their infant, which doubled as a written consent form. Participants also received a gift bag that contained educational brochures about SBS and crying and an infant bib
and photo magnet that bear the saying “Love Me…Never Shake Me.” A follow-up phone call to assess retention of SBS knowledge and implementation of education was non-random and occurred with a portion (4.6%) of families about three to four months after their participation.

Instruments

The pre and post-tests measure participant knowledge related to the SBS education. Each test consists of the same eight integrating questions that assess the participant’s understanding of SBS and her attitudes about infant parenting. The response options for each item are different. For example, question two asks, “Shaking a baby can result in the following: (a) brain damage leading to mental retardation, (b) speech and learning disabilities, (c) death, (d) all of the above, or (e) none of the above.” Question six asks, “When your baby cries you might want to try the following: (a) swaddling or rocking your baby, (b) seeing if your baby’s diaper needs to be changed, (c) seeing if your baby is hungry, (d) all of the above, or (e) none of the above.” The majority of the item response options are scored using weights from zero to three representing incorrect to correct responses. The total score is a proportion of items answered correctly. Higher scores indicate a greater understanding of the SBS education content.

The commitment statement captures the participants’ written consent to participate, social commitment to not shake her child, and demographic characteristics. It also measures whether the respondent found the program to be new and helpful. The demographic data included the patient’s name, date of birth (DOB), education level, race, medical insurance, address, and phone number, and the baby’s DOB, birth hospital, and
home situation. The three questions that determine if the SBS content is new and helpful are used as descriptive measures of whether participants view the program as valuable. For example, one question asks “Is this the first time you have heard that shaking a baby can be dangerous?: a)yes or b)no ”

The follow-up survey measures what the participant remembered from the SBS education provided prior to discharge and whether the mother utilized any of the information from the education program post-discharge. The instrument consists of sixteen questions. Thirteen of the questions gather descriptive information, such as participant receipt of SBS education and utilization of coping strategies and infant soothing techniques post-discharge. A few examples of questions are 1) “Do you remember receiving any information during your hospital stay about caring for your child?: a) yes, b) no, c) don’t know”, 2) “Have you practiced any self-coping techniques suggested in the materials you received during the SBS education program at the hospital?: a) yes or b) no” and, 3) “Have you practiced any infant soothing techniques suggested in the materials you received during the SBS education program at the hospital?: a) yes or b) no.” Three of the questions are from the pre/post-test instrument and reassess the participant’s understanding of SBS and her attitudes about infant parenting.

Data analysis

The data was analyzed using SPSS 14.0 for Windows. Descriptive statistics, Cronbach’s alphas, paired t-tests, repeated measures analysis of variances (ANOVA), and multiple analysis of variance (MANOVA) were utilized where appropriate to assess the
above-stated research questions. Significance levels for all analyses were set a priori at $\alpha = 0.05$. For MANOVA, an a priori power analysis revealed that for a power of 0.80 and a medium effect size (0.50), 200 subjects are needed (Cohen, 1988).

Data from the pre and post-test instruments were negatively skewed, so the data was log transformed prior to analysis. Additionally, participants were missing pre and post-test scores at random. Listwise deletion was imposed on the data used for the analysis of research questions three and four that examine the differences between pre and post-test scores. Listwise deletion is a conservative method to manage missing data because each participant with a missing score for either the pre or post-test is deleted from the analysis.

Seven thousand and fifty one participants completed the commitment statement. Seven hundred and fourteen participants completed the pre-test and 5,222 participants completed the post-test. A total of 5,936 participants had the pre and/or post-test. Following listwise deletion 315 participants completed both the pre and post-tests. Please note that only the third and fourth questions (n=315) pertaining to the differences between the pre and post-test scores utilized listwise deletion. All participants with a pre and post-test score (n=5,936) were included in the second question assessing the percentage of responses on these instruments. Three hundred and twenty-one participants completed the follow-up survey.
Results

**Participant demographics**

There were 7,051 females who participated in the SBS education program (Appendix B, Table 1). Participants were most frequently 31 years of age. The majority of the women were White (76%), had at least some college education (62%) and private health insurance (62%), and lived with their infant and his/her father (85%).

**Participant instrument responses**

On the commitment statement (n=7,051), 96% of participants responded that they had previously heard about the dangers of SBS. Ninety-seven percent of participants thought the SBS education was helpful, and 98% recommended that all new parents be provided with SBS education.

The pre and post-tests results are available in Appendix B, Table 2. The majority (≥98%) of participants correctly responded to five of the questions (one, two, five, six, and eight) related to SBS education on both the pre and post-tests (n=5,936). There was a statistically significant (t=-3.67, p<.05) increase in knowledge from the pre to the post-test on question four, it is okay to let an infant cry (n=314). There were statistically non-significant increases in scores for questions one through three and five through eight.

At follow-up (n=321), 92% of participants recalled on their own that they had received information on SBS. When asked specifically by the interviewer, 98% of participants remembered receiving SBS information. Sixty-two percent of participants reported that they did not receive other information about SBS from their pediatrician or any other source, following the birth of their infant. Of the 38% of participants who
reported receiving SBS information after the birth of their infant, 52% received information from a home visitor, parenting class, billboard or radio. Only 40% received information from the infant’s pediatrician or primary care provider.

Several questions on the follow-up survey assess SBS information retention and use. The majority of participants correctly defined SBS and identified the physiological consequences of shaking (97%). Ninety-four percent of participants reported that they knew what to do when they became stressed when caring for their infant. The majority of participants (79%) also reported practicing infant soothing techniques, such as holding, rocking, singing and/or feeding the infant, suggested in the SBS material. Participants (92%) felt these techniques helped them to provide better care for their infant. A small percent of participants reported practicing self-coping techniques (36%) and accessing community support services (9%).

At follow-up, the majority of participants were living with their infant (99%) and the infant’s father or another adult male (88%). Eighty-seven percent of the participants reported that the male in the household received information on SBS from the hospital SBS education program. Forty-eight percent of participants shared the SBS information with the male in the household if the male did not receive SBS information at the hospital. The majority of participants (68%) reported leaving their infant in the care of another adult. Of these participants, 62% reported leaving the infant with a home-based provider, while 28% reported leaving the infant with a friend, relative, or babysitter. Half of the participants reported sharing SBS information with their childcare provider.
Pre and post-test score difference

Three hundred and fifteen mothers completed both the pre and post-tests. There was a statistically significant difference between the participants’ pre and post-test scores ($t=2.26$, $p<0.05$). However, there was less than one point difference between mean scores on the pre [23.18(1.8)] and post-test [23.28(2.1)]. There were also no significant differences in participants’ pre and post-test scores based on demographics: mother’s age ($F=0.11$, $p>0.05$), race ($F=0.78$, $p>0.05$), education ($F=0.16$, $p>0.05$), insurance type ($F=0.05$, $p>0.05$), living arrangement ($F=0.624$, $p>0.05$), or education site ($F=0.02$, $p>0.05$).

Pre and post-test reliability

To determine the reliability of the pre and post-test instruments both the standardized Cronbach’s alpha and Cronbach’s alpha were utilized (Appendix B, Table 3). Standardized Cronbach’s alpha or internal consistency measures how well the items hang together to measure the same concept. The standardized Cronbach’s alpha is 0.50 for the pre-test and 0.46 for the post-test. Cronbach’s alpha or equivalence measures the variance between the items. The Cronbach’s alpha (equivalence) for the pre-test is 0.19 and 0.20 for the post-test. Ideally, these alpha coefficients should be 0.8 or greater.

Discussion

The recommendation for and focus of most SBS prevention programs is to increase the awareness of the dangers of shaking (Loh, Chang, Kuo, & Howng, 1998; Showers, 2001). The majority of mothers in this and a previous study (Dias et al., 2005) reported that they know about SBS and that shaking is dangerous. Because there are
parents who go through SBS prevention programs of this nature and still shake (Dias et al.), it may be important to emphasize other content in SBS education. Suggested content from this study that should bear more weight in SBS education includes information about infant crying and soothing and the importance of parenting support and parent mental health. Moms did learn from the program that it is okay to let an infant cry after trying soothing techniques and making sure the infant is fed, diapered, and not sick. This finding may suggest that mothers lack knowledge about infant crying and more education related to crying and soothing may be necessary due to the association in the literature between crying and SBS (Barr, Trent, & Cross, 2006). Furthermore, only a third of mothers stated they practiced self-coping techniques and even fewer mothers accessed community support services in this study. These results may indicate a lack of knowledge related to these techniques and services or a lack of time and support to initiate self-coping techniques. Future studies should focus making the content of SBS prevention programs more relevant to parent education needs.

Although mothers knew of the dangers of shaking, they recommended SBS education continues to be provided to parents. This finding is similar to previous studies (Dias et al., 2005; Showers, 1992). This could be because parents are not receiving SBS education outside of the hospital. In the U.S., the Bright Futures Initiative (Green, Palfrey, Clark, & Anastasi, 2002) which is consistent with the American Academy of Pediatrics (AAP) guidelines, places SBS education into the anticipatory guidance section for every infant visit up until the age of 1. Deyo, Skybo, and Carroll (2008) could not locate a similar international guideline; however, the literature suggests that education
about SBS should be included in student health care provider (HCP) seminars on child abuse (Kost & Schwartz, 1989). In this study, only 15% of mothers received SBS prevention information from their primary care provider (PCP). Providing SBS education during well-child visits would provide reinforcement of the education received in the hospital. More promotion of the SBS education guideline by the AAP is critical to improve prevention efforts following the post-partum period in the US. Similarly, diligence by PCPs internationally to incorporate SBS prevention education in well-child visits will increase parental exposure to this information. A few articles suggest that specifically nurse practitioners are in optimal positions to address SBS prevention with parents and these authors agree (Walls, 2006; Wyszynski, 1999). However, the responsibility for SBS prevention belongs to every HCP that encounters children and families (Showers, 2001).

This SBS program emphasizes that males should be educated as the largest number of SBS perpetrators are males (Starling & Holden, 2000; Starling, Holden, & Jenny, 1995). Participants in the study were asked to share with their male companions’ information about infant soothing and self-coping strategies that they were taught, as well as encourage bonding of the male with the infant. This strategy is consistent with another SBS education initiative (Carbaugh, 2004). The majority of mothers ensured the infant’s father or their male companion was educated about SBS. No information is available on exactly what the participants shared with the male companion and a survey of the male companion in the future would be more informative. The highly favorable response to this question at follow-up may be a result of the fact that the mothers knew from the
program that it was desirable for her to educate the male in the house. Whereas, only half of mothers made certain their childcare providers were educated and a quarter of childcare providers are SBS perpetrators (Starling et al., 1995). More importance should be placed on parents educating the childcare provider.

The results show that participants’ knowledge gain from the SBS education program is statistically significant. Clinical significance of this knowledge gain is likely minimal because of the negligible difference in mean scores on the pre and post-tests. This study also finds that it may be advisable to continue universal primary prevention versus targeting high-risk parents, as there is no difference in participant scores by hospital site or demographics. The lack of significance could however be due to the small mean difference between the pre and post-test scores. The majority of mothers answered the pre and post-test items correctly which created the small difference in pre and post-test scores. There are several possible explanations for this finding. First, the pre and post-test instruments are inadequate measures to capture changes in participant knowledge, which is possible due to the low reliability. This highlights the need for better evaluation measures. Second, the mothers in this sample are highly educated, so their knowledge allows them to answer correctly initially and there is no room for improvement on the post-test following SBS education. Third, the questions may be socially desirable or common sense causing all mothers to answer similarly before and after receiving SBS education.

Additional instrument development and refinement is warranted. Both the commitment statement and pre and post-tests need to be improved. First, the commitment
statement and demographic data should be collected independently to ensure participant confidentiality. The commitment statement used in this and other studies (Dias et al., 2005) doubles as a commitment to not shake, a consent form collecting demographic data, and a baseline assessment of participant knowledge of SBS. It is not acceptable to store the consent form with participant response information such as the demographic data and baseline knowledge assessment due to the possibility of the responses later being linked back to the participant. Second, the reliability of the pre and post-test instruments is low meaning the instruments lack item consistency. Ideally, a new instrument should have questions which are unrelated that measure the same concept. It is recommended that the concept focus for a new instrument be infant crying because it was the only significant increase in knowledge in the study. In addition, infant crying is a common thread through all aspects important to SBS education (Barr, Trent, & Cross, 2006; Biron & Shelton, 2005; Reijneveld, van der Wal, Brugman, Hir Sing, & Verloov-Vanhorck, 2004). Unreliable instruments limit the ability to correctly evaluate the effectiveness of an SBS education program and future development can ensure a more accurate depiction of program impact.

Limitations

This study has several limitations. First, it was a secondary analysis of an already existing program. Due to the secondary nature of this study, the researchers were unable to alter the program protocol and instead had to utilize the information available for the study. For example, although the commitment statement includes the mother’s name and birth date, there were seven mothers who met inclusion criteria ages 52-63. It is likely
these women were grandmothers or foster mothers that had custody of the infants, but without taking part in data collection there was no way of knowing. Second, the program utilized a convenient sample restricting the ability to generalize the findings of this study to the broader population. Third, there were inconsistent procedures between hospitals. Not all hospitals routinely followed the protocol as set forth by PCAO, so 7,051 participants completed the commitment statement but only 315 of these participants completed both the pre and post-test. This is common with community programs and has been seen to be a problem in the literature for other SBS prevention programs even when legislation is in place mandating postpartum education (Dias, et al., 2005). Fourth, the pre and post-test instruments are unreliable for evaluation purposes and may be unrealistic for on-going evaluation as the majority of institutions returned lower numbers of these measurements to PCAO.

Conclusion

Postpartum SBS education should continue for two reasons. First, mothers report SBS education is important for all parents and it is memorable to them at follow-up. However, the SBS program in its current state warrants refinement, which should focus on program content and evaluation instruments. Mothers report they knew of the dangers of shaking prior to the SBS education program. Concentration on the dangers of shaking may be redundant. Mothers in the current study increased knowledge pertaining to infant crying and they were reluctant to use self-coping techniques or seek assistance for infant care. Consequently, SBS education should place more emphasis on educating parents about infant crying and soothing, parent coping strategies, and community resources.
Mothers also report that the majority of household males are being educated about SBS, which is positive, but the education of childcare providers is lacking. Therefore, SBS education should ensure parents know the importance of educating males as well as childcare providers. Lastly, instrument development is needed because valid and reliable instruments are necessary for program evaluation.

The second reason postpartum SBS education should continue is because mothers are not receiving education from legitimate healthcare sources post-discharge. Mothers may receive inaccurate information when provided with health information from non-healthcare providers. Postpartum education ensures mothers receive correct SBS information at least once. However, primary care providers should strive to reinforce aspects of healthy mother and infant development included in SBS prevention.
Chapter 4: Correlates of Risk for Maternal Infant Abuse and Abusive Head Trauma

Prevention

Review of Literature

Background and Significance

Shaken baby syndrome (SBS) otherwise termed abusive head trauma (AHT) (Christian & Block, 2009) is the most frequent cause of infant morbidity and mortality (Bechtel et al., 2011; Bechtel et al., 2004). Shaking is commonly reported as the mechanism of AHT by perpetrators who provide confessions (Adamsbaum, Grabar, Mejean, & Rey-Salmon, 2010; Starling et al., 2004). Crying is most often the impetus for shaking an infant (Biron & Shelton, 2005; Lee, Barr, Catherine, & Wicks, 2007), which is often addressed in prevention programs. However, the underlying stress that parents experience with crying infants, as well as their ability to cope with stress is rarely acknowledged in prevention programs. Stress and coping are important aspects of AHT prevention work because these may be a possible focus of intervention.

Prevention Programming

Since the conceptualization to the completion of this study, there have been several reports of AHT prevention programming. Abusive head trauma programming varies throughout the United States. Some hospitals do not provide any information while other hospitals provide programs that vary in their messaging (Shanahan, Nocera,
Zolotor, Sellers, & Runyan, 2011). Education most often is focused in the post-partum period and includes methods such as one-on-one teaching, videos, pamphlets, and/or books. Prevention studies have shown that AHT education can increase parent knowledge of infant crying (Bailey, Gress, Bolden, & Pfitzer, 2008; Barr, Barr, et al., 2009; Deyo, Skybo, & Carroll, 2008) and AHT (Barr, Rivara, et al., 2009; Bechtel et al., 2011; Goulet et al., 2009). Education about AHT has been found to influence parents to share information regarding AHT with other caregivers of their infants (Barr, Barr, et al., 2009; Barr, Rivara, et al., 2009; Meskauskas, Beaton, & Meservey, 2009). In one of Barr’s studies, the researchers reported that education was successful in teaching parents and influencing them (1.5 times more than controls) to walk away when they are frustrated with infant crying (Barr, Barr, et al., 2009). There is evidence to support some positive effects of AHT education on parent knowledge, dissemination and use of the information provided through the programs (Reece et al., 2010).

Three studies about the ability of AHT education to reduce the actual incidence of this type of abuse are equivocal. Two studies in New York report a 50% (M. Dias et al., 2005) and 75% (Altman et al., 2011) reduction in AHT. Another study in Utah found no significant association between education and a reduction in the occurrence of AHT (Keenan & Leventhal, 2010). Even though there are conflicting reports of the effectiveness of education on the incidence of AHT, many states have passed laws mandating AHT prevention education be provided to parents of newborns (Lewin, 2008; Meskauskas et al., 2009).
Programs should carefully develop AHT education programs because not all interventions met their intended purpose. One study found that a combination of teaching methods, a video and pamphlet, were effective in increasing the awareness of AHT, while the pamphlet alone had no effect on AHT awareness (Russell, Trudeau, & Britner, 2008). Another study found no effect of a video on the reduction of the occurrence of AHT (Keenan & Leventhal, 2010). While other studies have found that the use of one-on-one nurse teaching, a pamphlet, video, and commitment statement were successful in reducing injuries related to AHT (Altman et al., 2011; M. S. Dias et al., 2005).

Since it appears that the form of education results in differing outcomes between studies, either the content of these education materials or the “dose” of education make a difference in AHT outcome. One study found that when a video about disciplinary alternatives and another exclusively about AHT where each used separately, with a pamphlet, that they both showed an increase in the awareness of AHT (Russell et al., 2008). Another study found that education about the use of car seats, the correct infant sleep position, and correct hot water temperature were associated with significant protective effects against AHT, while a video about AHT did not provide a protective effect against AHT as measured by the incidence of AHT in Utah (Keenan & Leventhal, 2010). These are the only two studies to date to report differences in program content related to AHT. Clearly, more research is needed.

Theoretical Framework

Parents of infants are exposed to potentially stressful stimuli that will elicit different responses, one of which may lead to abuse. Lazarus’ model of stress and coping
(Lazarus, 2000; Lazarus & Folkman, 1984) was used to explain the outcome of a parent’s response to infant crying in combination with other antecedents (Appendix A, Figure 1). According to the theory, person and environment antecedents of the stressor are moderators that transact with the stressor. Person variables theorized to be relevant in the AHT transaction are race, age, gender, education, financial resources, relationship status, birth order, biologic child, and knowledge of normal infant development. Pertinent environment variables are infant crying, socioeconomic status, and household occupants.

Through primary appraisal, the mother appraises the source of stress based on her knowledge of the situation (e.g. knowledge about why infants cry and how to stop the crying). With secondary appraisal, the mother identifies coping resources that will help her adjust to the stress of a crying infant. Coping behaviors may focus on soothing the infant, and on their own adjustment to stress. The outcome may be an adaptive response to the crying infant, or a maladaptive response of abuse, manifested as shaking or otherwise abusing the crying infant.

Specific Aims and Research Questions

The first aim of this study was to describe the relationships among parents’ infant development knowledge, infant crying, parent stress, parent coping, and infant abuse risk. The second aim was to determine what content should be included in AHT prevention programs, according to the theoretical model. Five research questions were derived from the specific aims that include: 1) What is the difference between infant and maternal demographic characteristics and maternal infant abuse risk? 2) What is relationship of infant crying, infant development knowledge, parent stress and coping to infant abuse
risk? 3) What variables best predict child abuse risk? 4) Do parent stress and coping mediate the effect of infant crying and infant development knowledge on infant abuse risk? 5) What content should be included in an AHT prevention program according to the theoretical model?

Methods

Sample and Design

This cross-sectional descriptive study was approved by The Ohio State University Behavioral and Social Sciences Institutional Review Board for the Protection of Human Subjects. Data were obtained from a convenience sample of mothers of two month old infants who volunteered to be in the study. Inclusion criteria included mothers: (a) older than 18 years; (b) who could speak and read English; (c) with an infant at their 2 month well child visit (d) who was full term infant (≥36 weeks). The reason for the selection of mothers of previously full-term healthy 2 month old infants is because the normal infant crying patterns peak at 2 months of age. The timing of this pattern may be affected by prematurity and the quality of this pattern may be affected by health status.

An a priori power analysis for Pearson’s (2-tailed) and Spearman rho correlations revealed that for an alpha level of 0.05, a medium effect size (0.3), and power of 0.80, 85 participants were needed (Cohen, 1988). Multiple regression a priori power analysis to test multiple correlations (for eight predictors) revealed that for an alpha of 0.05, a medium effect (0.15), and a power of 0.80, 96 participants were required (Lenth, 2006). Statistically 96 participants with complete data were required for this study.
The actual sample was 99 mothers who met the criteria. Three pediatric primary care offices served as recruitment sites. Mothers were recruited at the infants scheduled for their 2-month well-child visit. Two offices were located in Columbus, Ohio, and one office was located in London, Ohio. All three pediatric offices placed posters in the waiting room to notify potential participants of the study. The researcher approached mothers in the waiting room, or if the researcher was not present, then an office staff person provided the mothers with a handout about the study and asked if she was willing to let the office provide her name to the researcher. If the mother was interested, she signed a permission form to share her contact information with the researcher who then screened all mothers for eligibility. Mothers who met eligibility were provided via hand or mail delivery a cover letter explaining the study, consent to participate, the packet of questionnaires, and a handout on infant crying (Appendix A, Figure 1). The questionnaires required about 1 hour to complete. Each mother who returned the study materials (consent and questionnaires) could choose a twenty dollar gift card from Wal-Mart, Target, or Babies“R”Us.

**Measurement**

Each participant completed six questionnaires/instruments that were used to measure demographics and the study variables. The demographic questionnaire was developed by the researcher. This questionnaire had 26 questions regarding the mother and infant’s age, infant’s sex, mother and infant’s race, mother’s education, religion, socioeconomic status, relationship status, household occupants, and health insurance status.
Infant development knowledge was assessed by the Knowledge of Infant Development Inventory (KIDI) (MacPhee, 2002). The KIDI has 58 items that measure parent knowledge of norms, milestones, and principles of infant development, parenting, and infant health and safety. The total score is the number of items the parent answers correctly and higher scores indicate greater knowledge of infant development. The range of scores can be from 0 to 100 percent. The internal consistency was 0.82 when administered to parents of developmentally normal children who were representative of the diversity of the population in the United States in the 1980s. Two-week test-retest reliability for parents was 0.92 for the total score, 0.80 for the attempted answers, and 0.91 for accuracy. Known-groups validity was supported by comparing scores of formal and informal experiences with infants. A person with formal experiences would have taken parenting classes, college course on child development, and/or professional work in child care centers, while a person with informal experiences would have babysat, received exposure to information about children and/or development through media sources, and/or had any other exposure to children. Formal experience with infants was significantly correlated with KIDI accuracy (r=0.45, p<0.01), whereas informal experience was inversely related to KIDI accuracy (r=0.20 to -0.25, p=0.05) (MacPhee). In this study, the Cronbach’s alpha coefficient was 0.70.

Infant crying was measured with The Crying Patterns Questionnaire (CPQ). The CPQ has eight items that assess parent perception of several aspects related to infant crying including 1) the amount and time of day infant crying occurs, 2) situations in which infant crying occurs, 3) whether the infant crying is upsetting to and results in
help-seeking by the caregiver, and 4) the caregiver’s responses to infant crying (St James-Roberts & Halil, 1991). Each question is scored differently and analyzed independently. Convergent validity (r= 0.51 - 0.68) is reported between the CPQ and Baby’s Day Diary (Wolke et al., 1994). The CPQ is frequently used with the target population of crying infants, both “colicky” and “non-colicky” (Alvarez & St James-Roberts, 1996; McGloughlin & Grayson, 2001; St James-Roberts, et al., 1994, 1995, 2001; Wolke, Gray, & Meyer, 1994).

Maternal stress was measured with The Parenting Stress Index-Short Form (PSI-SF) (Abidin, 1995). The 36-item instrument has 3 subscales. Parental distress is the stress attributed by the parent to the parenting role, including sense of competence, restrictions imposed by parenthood demands on other life aspects, conflict with the other parent, lack of social support, and depression. Difficult child characteristics attributed to the child by the parent may also be stressful on the parent. A dysfunctional parent-child relationship means that the parent perceives that the child is not meeting her expectations and that interactions with the child are unsatisfying. A defensive responding score is calculated to determine if the participant is responding in a defensive manner. A score of 10 or less means that caution should be exercised in interpreting the respondent PSI scores. The instrument is standardized for use with parents of children from 1 month to 12 years of age. Items have five response categories from “Strongly Agree” to “Strongly Disagree” concerning child and parent related stresses. Higher total scores (above the 85th percentile norms) on the instrument indicate higher levels of stress. Scores within the 15th to 80th percentiles are considered within the normal range. The instrument demonstrates
adequate internal consistency (α=0.80 - 0.91), two-week test-retest reliability (0.95), and convergent validity with the original Parenting Stress Index (r= 0.50 - 0.94) (Abidin, 1995). This study also demonstrated adequate reliability with a Cronbach’s alpha of 0.90.

Maternal coping was assessed utilizing the Jalowiec Coping Scale (JCS). The JCS has 60 items, is self-administered, and takes about ten minutes to complete (Jalowiec, Murphy, & Powers, 1984). The instrument assesses coping styles and their effectiveness in relationship to a stressful encounter, which is defined as “infant crying” in this study. Sixty coping strategies are evaluated in the instrument on a four point ordinal scale from 0 (never used) to 3 (often used). The raw total coping score can range from 0 to 180, while the mean scores range from 0 to 3. These coping strategies are grouped into eight coping styles: confronting, evasive, optimistic, fatalistic, emotive, palliative, supportive, and self-reliant. Factor analysis, a measure of construct validity, reveals that 80% of the problem-focused items loaded on Factor I and 56% of the emotion-focused items loaded on Factor II. Internal consistency alphas range from 0.81 to 0.96. Test-retest reliability is 0.79 for total coping scores, 0.86 for emotion-focused coping scores, and 0.85 for problem-focused coping scores (Jalowiec et al., 1984). In this study the total coping score Cronbach’s alpha coefficients for reliability was 0.94 for use of coping strategies and 0.92 for effectiveness of coping strategies.

Child abuse potential was assessed utilizing the Brief-Child Abuse Potential Inventory (BCAP). The BCAP is a shorter version of the widely used child abuse screening instrument the Child Abuse Potential Inventory (CAP) (Milner, 1986). It assesses the risk for infant abuse based on parent attitudes and experiences. The BCAP
has 34 items, is self-administered and takes about five minutes to complete (Ondersma, Chaffin, Simpson, & LeBreton, 2005). There are three subscale scores: random responding (items 7, 10, and 12), lie (items 1, 9, 11, 13 and 22), and risk (items 2, 15, and 23). If any of the items that comprise the random responding and lie scales are endorsed, then it is likely that the participant’s responses on the instrument are invalid. This will make the participant’s child abuse potential indeterminable. Abuse risk scores range from 0 to 24 and higher scores equate to a higher potential to abuse. The BCAP cutoff of 9 best predicts the risk distinction of the full CAP using the cutoff of 166 and a BCAP cutoff of 12 best predicts the CAP cutoff of 215. The BCAP has an internal consistency of 0.89 and a stable seven factor structure. It correlated highly with the original CAP abuse risk score (0.96). Over 50 construct validity studies are reported in the technical manual (Milner, 1986) and elsewhere (Milner, 1994), which generally show association in the expected fashion with physical child abuse risk factors supported in the literature. Some risk factors of those people who obtain higher abuse scores include having been abused as a child, more social isolation, more life stress and personal distress, more negative evaluations of child behavior, and harsher discipline techniques. Furthermore, the CAP risk cut-off score is predicted with 93% sensitivity and 93% specificity (Ondersma et al., 2005). In this study, the Cronbach’s alpha coefficient was 0.76.

Statistical Analysis

All data were analyzed using SPSS 19.0 for Windows (2007). Descriptive statistics, Cronbach’s alphas, Pearson’s correlations, Mann-Whitney U tests, chi-square
tests, t-tests, repeated measures analysis of variances (ANOVA), and multiple regression were utilized where appropriate to answer the research questions.

**Results**

The results of the study are presented in terms of demographics of the sample, the results of each research instrument and the answers to the four research questions.

**Demographics**

The final sample included 99 mothers who participated in the study. The mothers ranged in age from 19 to 44 with an average age of 30 (SD=4.84) years old. The majority of mothers were white (85%), Christian and Catholic (71%), married or engaged (90%), and highly educated with 77% having a college degree (Appendix B, Table 4). Most mothers had private healthcare coverage (91%), self-reported that they had enough financial resources (81%), did not receive assistance from Womens, Infants, Childrens (WIC) program (92%), and were not taking medications (57%). Of the mothers taking medications, 57% were taking one medication primarily for a chronic health condition (64%) such as diabetes, hypertension, epilepsy, gastrointestinal disorders, allergies, hypothyroidism, or depression. Mothers on antidepressants made up 26% of participants with chronic health conditions. Forty percent of mothers were taking vitamins or supplements and 19% were taking birth control pills.

The infants ranged in age from 6 to 15 weeks (1½-3¾ months) at the time the questionnaires were completed. The average mean age of the infants was 10 (SD = 2.16) weeks (2½ months). The majority of infants were male (54.5%), white (80%), breastfed (63%), not a first born child (63%), and had no brothers (66%) or sisters (57%). Most

52
infants were reported to be living with the mother (98%) and father (97%) (Appendix B, Table 5).

**Instrument Scores**

*Crying Patterns Questionnaire*

Mothers reported their infants cried and fussed from 1 to 600 minutes daily over the past week and on average cried 2.15 (1.9) hours per day, most often in the evening and least often during the night (Appendix B, Table 6). Infants persistently cried 0 to 60 minutes per day over the past week and the mean score for persistent crying was 3 (SD = 3.15) minutes per day, most often during the evening and the least often during the morning and afternoon (Appendix B, Table 6). The majority of mothers (68%) perceived that the reported crying represented a typical crying pattern for the infant. However, 32% perceived that their infant did not have a typical crying pattern and that crying varied significantly in regard to the amount and time of day. Eighty-one percent of infants were especially likely to cry in certain situations, including bed/naptime (55%) and/or mealtime (47%). However, the majority of infants did not cry at bath time (65%), on trips (72%), and/or when visitors came to the home (81%).

Most of the mothers (55%) perceived their infant’s crying was upsetting rarely or none of the time, while 42% perceived their infant’s crying was upsetting some of the time. Only 2% of mothers perceived their infant’s crying was upsetting most or all of the time. When asked specifically if they found their infant’s crying to be a problem 17% of mothers reported yes. Healthcare providers were consulted by 16% of mothers with
concerns about infant crying. Seven percent of these mothers consulted a provider in the past month about infant crying concerns.

Mothers used several soothing techniques to calm their infants. The majority of infants were cuddled and rocked (84%), carried (87%), given a pacifier (43%), rocked in a cradle (38%) and/or soothed with music (48%) repeatedly each day. Forty percent of mothers did not report that they used swaddling to soothe their infants and only about 25% of mothers used it repeatedly each day. Occasionally, infants were taken into their mother’s bed (23%), provided extra feeds (28%), herbal remedies (3%), over the counter medications (15%), and/or prescription medications (1%). The majority (61%) of mothers reported that they did not leave their infant to “cry it out” in the past week. Those (39%) who did leave their infant to “cry it out”: 4% left the infant frequently, 20% left the infant a few times, and 15% left the infant once. Infants were left to “cry it out” for 5 to 60 minutes with a mean of 17 (SD = 13) minutes.

Knowledge of Infant Development Inventory

The total score for this instrument ranged from 52 to 95 percent. On average the mothers scored 80% (SD = 0.1). Therefore, most mothers scored between 70 - 90% on the KIDI. This can be interpreted as the majority of the mothers in this study had a good knowledge base related to infant development. Five questions on this instrument pertain specifically to infant crying. Question 4 asks whether “Babies should not be held when they cry because this will make them want to be held all the time.” Most mothers (97%) disagreed and answered this question correctly. Question 6 asks whether “Babies do some things just to make trouble for their parents, like crying a long time or pooping in
their diapers.” Ninety eight percent of mothers disagreed and were correct. Question 15 asks if “Babies may cry for 20-30 minutes at a time, no matter how much you try to comfort them.” The majority (94%) of mothers answered this question correctly by agreeing. Question 18 asks if “Babies have little effect on how parents care for them, at least until they get older.” Eighty two percent of mothers got this question correct by answering that they disagreed. Question 29 asks if “The way the parent treats a baby in the first months of life determines whether the child will grow up to be well-adjusted or a moody misfit.” Fifty-nine percent of mothers answered this question correctly by disagreeing. In terms of these five questions pertaining to crying, the majority of the mothers answered these questions correctly.

*Parent Stress Inventory*

The majority of mothers were within the normal range for their total stress, the parental distress subscale, and the dysfunctional parent-child relationship subscale (Appendix B, Table 7). The majority of mothers scored less than the 15th percentile for the difficult child characteristic subscale (Appendix B, Table 4). Twenty-seven percent of the participants had a defensive responding score of 10 or less. These scores were included in the research question analyses given that very low defensive responding scores have been found when a parent is competent and the parent-child relationship exists within an economically advantaged social situation.

*Jalowiec Coping Scale*

The overall coping scores for the mothers in this study ranged from 10 to 133 with a mean score of 83 (SD = 27). The effectiveness of the overall coping methods used
ranged from 11 to 116 with a mean score of 70 (SD = 22). Mean scores were calculated for each subscale to compare frequency and effectiveness of different coping styles (Appendix B, Table 8). These subscale scores range from 1 to 3. Mothers used confrontive, optimistic, supportive, and self-reliant coping strategies most often with a mean score greater than 2 for each coping style. Mothers felt that emotive coping was the least effective coping strategy (Mean = 0.48), while supportive coping was the most effective coping strategy (Mean = 2.28) (Appendix B, Table 8).

Child Abuse Potential Inventory

Mothers scores on the Brief Child Abuse Potential Inventory that ranged from 0 to 19 with a mean score of 2.27 (SD = 3.1). High risk scores are ≥ 9. The majority (94%) of mothers were in the low risk category. There were five mothers who were at high risk to abuse in this sample. Seventeen percent of mothers endorsed one of four questions that comprise the random responding scale. Thirty-six percent of participants endorsed four or more of the six questions that correspond to the lie scale. It is possible that these mothers were answering randomly or lying in their responses on the questionnaire and therefore the protocol for these mothers may be invalid.

Research Question One

One-way ANOVAs were utilized to compare the effect of selected demographic variables to infant abuse risk (Appendix B, Table 9). There was a significant difference between the four relationship status groups, married/engaged, single, cohabiting, and divorced, in mean infant abuse risk score (F3, 95 = 6.56, p=0.01). Single mothers scored on the average 1 point lower on the infant abuse risk score than divorced mothers, while
cohabiting mothers scored 5.38 points lower on the infant abuse risk score than divorced mothers. Married/engaged mothers scored on the average 8.10 points lower on the infant abuse risk score than divorced mothers. There was also a significant difference between the two financial resources groups in mean infant abuse risk score ($F_{1,97} = 14.86, p < 0.001$). Mothers who reported they did not have enough financial resources scored on average 2.85 points higher on the infant abuse risk score than mothers who reported they did have enough financial resources.

*Research Question Two*

Pearson’s correlations were used to determine the relationships between infant crying, infant development knowledge and parent stress and coping to infant abuse risk (Appendix B, Table 10). No infant crying or development knowledge variables had significant relationships to infant abuse risk. Parental stress was significantly related and positively correlated to infant abuse risk for the total score ($r=0.46, p=0.01$) and all three subscale scores (difficult child: $r=0.30, p=0.01$; parental distress: $r=0.53, p=0.01$; dysfunctional parent-child relationship: $r=0.24, p=0.02$). The use of three coping strategies were positively related to infant abuse risk: evasive coping ($r=0.30, p=0.01$), fatalistic coping ($r=0.29, p=0.01$), and emotive coping ($r=0.41, p=0.01$). The more often these coping strategies were used the higher the mother’s infant abuse risk score. No coping effectiveness variables were related to infant abuse risk.

*Research Question Three*

The third research question addressed the variables that are the best predictors of parent child abuse potential. Multiple regression was used to determine what variables
could predict child abuse potential (Appendix B, Table 11). Eight independent variables were chosen a prior based on the literature and subsequent development of the theoretical model: first born child, infant race, financial resources, mother’s age, total crying, knowledge of infant development, parent total stress, and overall coping use. The infant race variable was collapsed into white and minority for purposes of this analysis as there were only 20 infants who were in the minority race categories. This model was significant \( (F_{8, 80} = 4.16, p=.00) \). The model accounts for 22% of the variance in infant abuse risk. The significant variables in the model were overall stress score and whether the child was first born. None of the other variables were significant predictors of infant abuse risk.

**Research Question Four**

This research question sought to determine whether maternal stress and coping mediate the effect of infant crying and infant development knowledge on infant abuse risk (Appendix A, Figure 2). The independent variables were infant crying and infant development knowledge, the mediators were maternal stress and coping, and the dependent variable was infant abuse risk. First the dependent variable, infant abuse risk, was regressed on the independent variables, infant crying and infant development knowledge. The model was not significant \( (F_{2, 94}=.32, p=.78) \). No relationship was found between infant crying \( (\beta=.01, p=.79) \) or infant development knowledge \( (\beta=-2.92, p=.48) \) and infant abuse risk. Therefore, no further analyses were performed because there was no effect to be mediated.
Research Question Five

In order to determine what content should be included in AHT prevention programs, variables were analyzed based on high and low abuse risk. Soothing techniques for infant crying were evaluated; there was a significant difference in the high and low infant abuse risk group means for swaddling, rocking in a cradle, and taking the infant into the mother’s bed (Appendix B, Table 12). Whether the mothers felt that the infant’s crying was upsetting was not significantly different between high and low infant abuse risk groups (Appendix B, Table 12). Five questions specific to crying development were analyzed independent from the total infant development score and were not significantly different based on high or low infant abuse risk (Appendix B, Table 13), which was a similar finding for the infant development knowledge total score (Appendix B, Table 14). High maternal stress levels differentiated between high and low infant abuse risk (Appendix B, Table 14). Overall coping use or effectiveness was not significantly different based on infant abuse risk groups (Appendix B, Table 14). However, several coping subscales were significantly different, specifically use of emotive coping, use of supportive coping, and the supportive coping style effectiveness (Appendix B, Table 14). Mothers at higher risk to abuse were more likely to use emotive coping, while mothers at low risk to abuse were more likely to use supportive coping and found that it was an effective coping style.

Discussion

In this sample of mothers, stress was an important variable in relationship to infant abuse risk. High maternal stress levels were a significant predictor of infant abuse
risk. These findings are consistent with other research. For example, personal distress was found to be elevated for high abuse risk mothers (Perez-Albeniz & de Paul, 2003). Another study found that mothers at high risk to abuse rated child behaviors as more stressful (Dopke & Milner, 2000) and yet another study found that parent stress was the strongest predictor of child abuse and neglect risk (Guterman, Lee, Taylor, & Rathouz, 2009). Overall, the literature supports that high stress potentiates violence (Butler, 1995).

Maternal stress also differentiated between high and low abuse risk groups in this study. Most of the literature pertaining to abuse risk gathers samples from at-risk populations and/or matches at-risk groups with populations not at-risk; therefore, the proportion of high risk parents is much higher (≥50%) in comparison to this study of a population not at risk to abuse (McElroy & Rodriguez, 2008; Montes, de Paúl, & Milner, 2001; Perez-Albeniz & de Paul, 2003). On average, about 10.8% of the general child population are abused (Childhelp: Prevention and Treatment of Child Abuse, 2012), which is comparable to the 6% of mothers at high risk to abuse identified in this study. Because the Brief Child Abuse Potential Inventory and Parent Stress Inventory-SF were positively correlated and aided in the differentiation of abuse risk categories, these instruments should be evaluated for use in future AHT prevention efforts.

Several demographic characteristics also had a statistically significant impact on infant abuse risk in this population. These variables included financial resources, living situation, and first born child. Mothers who reported not having enough financial resources, were single, co-habiting or divorced, and/or had a first born child were at higher risk to abuse. The literature reports that there is a relationship between single
mothers and high stress (Copeland & Harbaugh, 2005). Single mothers also often report financial challenges (Harrison & Magill-Evans, 1996). Furthermore, first time mothers with significant stress may have unrealistic expectations of parenting (Belksy, 1984) and may resort to harsh discipline practices (Rodriguez, Dumont, Mitchell-Herzfeld, Walden, & Greene, 2010). These variables may be an important focus in future research studies to identify at risk parents for abuse.

Infant development knowledge and crying had no relationship with infant abuse risk in research question five (Appendix A, Figure 4); therefore, the mediating variables of stress and coping could not be tested. Thus, the Shaken Baby Syndrome Prevention framework based on Lazarus and Folkman’s Theory of stress and coping could not be analyzed (Appendix A, Figure 1). Lazarus and Folkman’s framework has been used with AHT prevention work (Goulet et al., 2009), so it has potential to inform work within this area; however, the model has not been explicitly tested as in this study. Future work should evaluate stress and coping as moderators of child abuse potential. As moderators, stress and coping would be theorized to interact with independent variables such as infant crying and infant development knowledge to influence the dependent variable of infant abuse risk.

Emotion was added as an outcome variable by Lazarus (1999) to the Theory of Stress and Coping. It also might be helpful to change the model theorized in this study for the purpose of shaken baby syndrome prevention to include emotion as an outcome. Recent literature has supported that emotions, such as sadness, anger, hostility, and empathy, are important factors when evaluating infant abuse risk (McElroy & Rodriguez,
2008; Milner, Halsey & Fultz, 1995; Montes, de Paúl, & Milner, 2001). Generally individuals at high risk to abuse have more sadness, anger, and hostility and less empathy (McElroy & Rodriguez, 2008; Milner, Halsey & Fultz, 1995; Montes, de Paúl, & Milner, 2001). Furthermore, there is some literature to support that there are deficits in emotional recognition for those individuals at high risk to abuse (Asla, de Paúl & Pérez-Albéniz, 2011). The literature, however, does not look at the relationship of stress and coping to these two variables and it would be interesting to see if these variables are mediators in this relationship.

The mothers in this study were highly knowledgeable about infant development based on the Knowledge of Infant Development Inventory (McPhee, 2002). Mothers with more development knowledge have been found to be less likely to resort to abusive forms of parenting or discipline measures (Azar, 2002; Belsky, 1980; Berger & Brooks-Gunn, 2005; Dukewich, Borkowski, & Whitman, 1996; Hunt & Paraskevopoulos, 1980). Furthermore, these mothers were mostly highly educated (91% with at least some college), financially sound (81% perceived they had sufficient financial resources), and white (86%). Some literature supports that parents with these features do not have a significant relationship between development knowledge and parenting behaviors (i.e. discipline or abuse risk as a proxy in this study) (Conrad, Gross, Fogg, & Ruchala, 1992; Myers, 1982)

Infant crying did not emerge as a significant variable in this study population. Mothers did report more overall and persistent crying in the evening, which is consistent with the literature (St. James-Roberts & Halil, 1991). It may be that these mothers
recognized that infant crying is a normal part of infant development. The average
duration of crying for a 24 hour period in this infant population was 2 hours and 1
minute, which is similar to reports of infants at this age in the literature of 2 hours and 12
minutes (Hunziker & Barr, 1986) and 2 hours and 1 minute (St. James-Roberts & Halil).
These mothers also did not report a significant amount of persistent crying. In a 24 hour
period the infants in this study had a mean duration of 3 minutes. On average, these
infants did not have a significant amount of “excessive” crying or meet the criteria for
colic (Wessel, Cobb, Jackson, Harris, & Detwiler, 1954; Clifford, Campbell, Speechley,
& Gorodzinsky, 2002; Lucassen et al., 2001).

There was also a difference in coping style use and effectiveness related to crying
between high and low abuse risk mothers. The use of supportant coping and its
effectiveness with crying was different between the groups. Supportant coping is when
support systems, personal, professional, or spiritual, are used to cope. In addition,
emotive coping, or expression or the release of emotions to relieve stress was used at
different frequencies by the mothers of the high and low abuse risk categories.

Furthermore, it was found in this study that there were three coping strategies that
were used more often by mothers who had higher infant abuse scores: evasive, fatalistic,
and emotive. Evasive coping is when a mother does things to avoid dealing with infant
crying. Fatalistic coping is when a mother has a hopeless attitude about infant crying and
emotive coping is expressing emotion to try and relieve stress. All of these coping styles
can be negative strategies to handle infant crying. It may be helpful for future research to
examine whether providing parents with other more positive coping resources specific to
the coping subscales found to differentiate the high and low infant abuse risk categories would be protective against infant abuse. Such resources might include a support line, support groups, helping identify support people, and/or positive ways to express or relieve emotion.

This study sought to look at what content should be included in AHT prevention programs. Infant soothing techniques for crying, as well as coping styles emerged as significant variables. Swaddling, rocking in a cradle, and taking the infant into the mother’s bed, were the infant soothing techniques used at different frequencies by the mothers when categorized into high and low abuse risk. These finding suggest that it might be helpful to parents if AHT prevention programs continue to provide parents with content related to soothing techniques for crying infants. Further research might be performed to see if the infant calming techniques that differentiated these groups are significant and should be highlighted in an infant abuse prevention program.

Conclusions

Currently abusive head trauma prevention programming is provided to everyone in the general population. This study provides support for use of the Brief Child Abuse Potential Inventory (BCAP) as a population screening tool to identify caregivers at high risk to abuse to help focus AHT prevention efforts. This study showed that the BCAP can differentiate between mothers at high and low risk to abuse in a group of mothers not considered at-risk. The number of high risk to abuse mothers was relatively commiserate with the occurrence of physical child abuse in the general public. High risk scores on the
abuse risk scale correlated with some of the more “negative” coping styles and with higher maternal stress.

The most likely time for AHT to occur is around 2 months of age, so the instrument should be provided to caregivers at the 2 week follow-up visit after delivery and at the very latest at the 2 month well child visit. The BCAP could be completed in the waiting room as it only takes five minutes to complete, is comprised of minimally intrusive questions, and is written below a fourth grade reading level. The results of administration of the BCAP can be utilized by pediatric primary care providers to facilitate conversations with infant caregivers regarding stress, coping, and AHT.
Figure 1. Application of the Theory of Stress and Coping (Lazarus, 2000) to Shaken Baby Syndrome Prevention.
Figure 2. Crying Handout.

Crying: What can I do?

Is my baby’s crying normal?

Most often, yes! Crying generally increases at 2 weeks, is the highest at 6 weeks, and decreases until 3 months of age. Your baby can cry from 20 minutes to over 3 hours a day.

Calm but never shake your baby.

When should I worry about my baby’s crying?

Call your doctor or nurse practitioner if your baby has any of these ill symptoms:

- Fever: >100.4°F & under 3 months
  or >101°F & 3-6 months
- Daily or frequent vomiting and/or diarrhea
- Diarrhea with or without blood or mucus
- If you feel something is wrong with your baby

How can I calm my baby?

Every baby is unique. You have to find what works best to calm your baby. To calm your baby you can:

- Talk
- Sing
- Swaddle
- Massage
- Carry
- Rock
- Play white noise or a heartbeat sound
- Change the temperature
- Decrease or increase stimulation from touch, noise, or lights

You may have to combine a number of methods to calm your baby. Create a calming routine and use it every time you calm your baby.

Never calm your baby by shaking.

What if I’m frustrated because I can’t calm my baby?

Frustration is normal. It is important that you calm yourself first using 4 easy steps:

1) Make sure your baby is fed, diapered, and not ill.
2) Place your baby in a crib or playpen or see if someone else can watch the baby.
3) Walk away.
4) Calm yourself - call a friend, take a shower, watch TV, listen to music, read a book, or exercise.

Only return to your baby when you are calm.

If you are frustrated,
calm yourself.

Never shake your baby.
Get Ready for the crying to begin...

As a parent or caregiver you have a big responsibility to keep your child safe:

- Talk to the men in your baby's life. Male caregivers may be less familiar with infant soothing skills (and self-coping practices). Work with dad/dad figures to encourage bonding with your baby.
- Work with your child's caregiver to develop a plan of how to support her during stressful times. Tell your caregiver you will pick your child up immediately if the caregiver is over stressed.
- Identify a family member or friend who can support mom or dad if they need a break anytime during the day or night. Write their phone number next to the phone and call them.

Remember never shake a baby!

Product of PCAO. To reproduce call 1-800-CHILDREN.

Crying Happens!

Know what to do before you become frustrated:

Your baby will have times of inconsolable crying. That's how your baby communicates.

Locate a place where you can lay your baby down and walk away – a “safe spot” bed or playpen.
- Crying is not a reflection on your skills as a parent or caregiver. Crying can’t be controlled.
- It’s okay to let your baby cry – after you have tried to soothe and checked to see if your baby is fed, has a clean diaper and is not sick.
- Think about the 2-2-2 theory. Babies begin to cry as early as 2 weeks, crying peaks at 2 months and a baby can cry up to 2 hours per day.
- Premature of “colicky” infants may be more fussy. Taking care of a baby is a big job.

Remember never shake a baby!

For additional resources on Shaken Baby Syndrome Prevention, Parenting, Keeping your child safe or What to look for in good, safe childcare: 1-800-CHILDREN or keepyouchildsafer@childrens.org

Figure 3. Crying Card.
Figure 4. Partial Test of the Theorized Application of the Theory of Stress and Coping (Lazarus, 1999) to Abusive Head Trauma.
Appendix B
Table 1. Participant demographics

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
<th>Mean</th>
<th>Mode</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>28</td>
<td>31</td>
<td>31</td>
<td>18-63</td>
</tr>
<tr>
<td>Race:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>76%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>14%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (Hispanic, Native American, and Asian)</td>
<td>7%</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Education:</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Some high school</td>
<td>15%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school diploma/general equivalency diploma</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Some college</td>
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<td></td>
</tr>
<tr>
<td>Undergraduate degree</td>
<td>29%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate degree (Masters and/or Doctorate)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living Situation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both parents married with infant</td>
<td>63%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both parent unmarried with infant</td>
<td>22%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mom, grandparent(s), and infant</td>
<td>5%</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Mom and infant</td>
<td>7%</td>
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<td></td>
</tr>
<tr>
<td>Other situation not listed</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
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<td></td>
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</tr>
<tr>
<td>Government</td>
<td>35%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsure of coverage</td>
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<td></td>
<td></td>
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Note: n=7,051 females.
<table>
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<tr>
<th>Questions</th>
<th>Pre-test</th>
<th>Post-test</th>
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</thead>
<tbody>
<tr>
<td>1. SBS definition</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>2. Physiological results of shaking</td>
<td>98%</td>
<td>98%</td>
</tr>
<tr>
<td>3. Infants cry for no reason</td>
<td>75%</td>
<td>79%</td>
</tr>
<tr>
<td>4. It is okay to let an infant cry</td>
<td>74%</td>
<td>80%*</td>
</tr>
<tr>
<td>5. I will know what to do if I am stressed and my infant is Inconsolable</td>
<td>98%</td>
<td>99%</td>
</tr>
<tr>
<td>6. Appropriate action to console infant and identify reason(s) for Crying</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>7. Intense crying begins at 6 months of age</td>
<td>55%</td>
<td>60%</td>
</tr>
<tr>
<td>8. Important to screen all caregivers and share information about infant shaking</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Note: n=5,936. *t=-3.67(314), p<.05, listwise deletion implemented.
Table 3. Pre and post-test Cronbach’s alpha coefficients

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<th>Pre-test</th>
<th>Post-test</th>
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<tr>
<td>Standardized Cronbach’s Alpha (Internal Consistency)</td>
<td>0.50</td>
<td>0.46</td>
</tr>
<tr>
<td>Cronbach’s Alpha (Equivalence)</td>
<td>0.19</td>
<td>0.20</td>
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Table 4. Mother Demographics (N=99)

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<tr>
<th>Category</th>
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<th>Percentage</th>
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<tr>
<td><strong>Race</strong></td>
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<td></td>
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<tr>
<td>White</td>
<td>85</td>
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<td>Black</td>
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<td>2%</td>
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<tr>
<td>Asian</td>
<td>9</td>
<td>9%</td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Multiracial</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School/GED</td>
<td>9</td>
<td>9%</td>
</tr>
<tr>
<td>Some College</td>
<td>14</td>
<td>14%</td>
</tr>
<tr>
<td>College Degree</td>
<td>37</td>
<td>38%</td>
</tr>
<tr>
<td>Graduate Degree</td>
<td>39</td>
<td>39%</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>45</td>
<td>46%</td>
</tr>
<tr>
<td>Catholic</td>
<td>25</td>
<td>25%</td>
</tr>
<tr>
<td>Hindu</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Buddhist</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>None</td>
<td>25</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Relationship Status</strong></td>
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<td></td>
</tr>
<tr>
<td>Married/Engaged</td>
<td>89</td>
<td>90%</td>
</tr>
<tr>
<td>Single</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Cohabitating</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>Divorced</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Healthcare Coverage</strong></td>
<td></td>
<td></td>
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<tr>
<td>Private</td>
<td>90</td>
<td>91%</td>
</tr>
<tr>
<td>Government</td>
<td>9</td>
<td>9%</td>
</tr>
<tr>
<td><strong>Receives WIC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>No</td>
<td>91</td>
<td>92%</td>
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</table>

(continued)
Table 4.
Mother Demographics (continued)

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sufficient Financial Resources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>80</td>
<td>81%</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>19%</td>
</tr>
<tr>
<td><strong>Taking Medications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>42</td>
<td>42%</td>
</tr>
<tr>
<td>No</td>
<td>57</td>
<td>58%</td>
</tr>
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</table>
Table 5. Infant Demographics (N=99)

<table>
<thead>
<tr>
<th>Category</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>54</td>
<td>54.5%</td>
</tr>
<tr>
<td>Female</td>
<td>45</td>
<td>45.5%</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>79</td>
<td>80%</td>
</tr>
<tr>
<td>Black</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Asian</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>Multiracial</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td><strong>First Born</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>37</td>
<td>37%</td>
</tr>
<tr>
<td>No</td>
<td>62</td>
<td>63%</td>
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<tr>
<td><strong>Feeding Method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast</td>
<td>62</td>
<td>63%</td>
</tr>
<tr>
<td>Formula</td>
<td>35</td>
<td>35%</td>
</tr>
<tr>
<td>Both</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Living Situation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>97</td>
<td>98%</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Father</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>96</td>
<td>97%</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Partner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>No</td>
<td>97</td>
<td>98%</td>
</tr>
<tr>
<td>Grandparents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>No</td>
<td>97</td>
<td>98%</td>
</tr>
</tbody>
</table>

(continued)
Table 5. Infant Demographics (continued)

<table>
<thead>
<tr>
<th>Siblings</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Brothers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>65</td>
<td>66%</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>27%</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Number of Sisters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>56</td>
<td>57%</td>
</tr>
<tr>
<td>1</td>
<td>38</td>
<td>38%</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1%</td>
</tr>
</tbody>
</table>
Table 6.
Frequency of Overall Infant Crying and Persistent Crying Reported in Minutes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Range in Minutes</th>
<th>Mean Minutes (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Crying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning (6am-noon)</td>
<td>0-120</td>
<td>28 (28)</td>
</tr>
<tr>
<td>Afternoon (noon-6pm)</td>
<td>0-120</td>
<td>31 (27)</td>
</tr>
<tr>
<td>Evening (6pm-midnight)</td>
<td>0-360</td>
<td>55 (66)</td>
</tr>
<tr>
<td>Night (midnight-6am)</td>
<td>0-240</td>
<td>17 (39)</td>
</tr>
<tr>
<td>Persistent Crying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning (6am-noon)</td>
<td>0-6</td>
<td>0.3 (0.9)</td>
</tr>
<tr>
<td>Afternoon (noon-6pm)</td>
<td>0-5</td>
<td>0.3 (0.8)</td>
</tr>
<tr>
<td>Evening (6pm-midnight)</td>
<td>0-7</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Night (midnight-6am)</td>
<td>0-7</td>
<td>0.4 (1)</td>
</tr>
<tr>
<td>Variable</td>
<td>Mean (SD)</td>
<td>Range</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------</td>
<td>--------</td>
</tr>
<tr>
<td>Total Stress</td>
<td>62 (14)</td>
<td>39-110</td>
</tr>
<tr>
<td>Parental Distress Subscale</td>
<td>23 (7)</td>
<td>12-48</td>
</tr>
<tr>
<td>Difficult Child Characteristics Subscale</td>
<td>18 (4)</td>
<td>12-35</td>
</tr>
<tr>
<td>Dysfunctional Parent-Child Characteristics Subscale</td>
<td>21 (6)</td>
<td>12-38</td>
</tr>
</tbody>
</table>
Table 8.
Mothers’ Jalowiec Coping Scale Subscale Scores

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JCS Confrontive Use</td>
<td>1.13</td>
<td>3.00</td>
<td>2.07 (0.37)</td>
</tr>
<tr>
<td>JCS Confrontive Effectiveness</td>
<td>0.67</td>
<td>3.00</td>
<td>1.93 (0.46)</td>
</tr>
<tr>
<td>JCS Evasive Use</td>
<td>1.00</td>
<td>2.63</td>
<td>1.62 (0.38)</td>
</tr>
<tr>
<td>JCS Evasive Effectiveness</td>
<td>0.33</td>
<td>3.00</td>
<td>1.23 (0.49)</td>
</tr>
<tr>
<td>JCS Optimistic Use</td>
<td>1.00</td>
<td>3.00</td>
<td>2.24 (0.39)</td>
</tr>
<tr>
<td>JCS Optimistic Effectiveness</td>
<td>0.80</td>
<td>2.89</td>
<td>1.96 (0.49)</td>
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<tr>
<td>JCS Fatalistic Use</td>
<td>1.00</td>
<td>3.00</td>
<td>1.71 (0.57)</td>
</tr>
<tr>
<td>JCS Fatalistic Effectiveness</td>
<td>0.00</td>
<td>3.00</td>
<td>1.25 (0.74)</td>
</tr>
<tr>
<td>JCS Emotive Use</td>
<td>1.00</td>
<td>3.00</td>
<td>1.49 (0.42)</td>
</tr>
<tr>
<td>JCS Emotive Effectiveness</td>
<td>0.00</td>
<td>2.00</td>
<td>0.48 (0.46)</td>
</tr>
<tr>
<td>JCS Palliative Use</td>
<td>1.00</td>
<td>3.00</td>
<td>1.91 (0.54)</td>
</tr>
<tr>
<td>JCS Palliative Effectiveness</td>
<td>0.00</td>
<td>3.00</td>
<td>1.83 (0.67)</td>
</tr>
<tr>
<td>JCS Supportive Use</td>
<td>1.00</td>
<td>3.00</td>
<td>2.23 (0.47)</td>
</tr>
<tr>
<td>JCS Supportive Effectiveness</td>
<td>0.00</td>
<td>3.00</td>
<td>2.28 (0.55)</td>
</tr>
<tr>
<td>JCS Self Reliant Use</td>
<td>0.00</td>
<td>3.00</td>
<td>2.02 (0.42)</td>
</tr>
<tr>
<td>JCS Self Reliant Effectiveness</td>
<td>1.00</td>
<td>3.00</td>
<td>1.74 (0.51)</td>
</tr>
</tbody>
</table>
Table 9. Differences Between Selected Mother and Infant Variables to the Brief Child Abuse Potential Inventory Scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant Gender (Male or Female)</td>
<td>2.16</td>
<td>1</td>
<td>2.16</td>
<td>0.22</td>
<td>0.64</td>
</tr>
<tr>
<td>Infant Race (White, Black, Asian, or Multiracial)</td>
<td>7.49</td>
<td>3</td>
<td>2.50</td>
<td>0.25</td>
<td>0.86</td>
</tr>
<tr>
<td>First Born (Yes or No)</td>
<td>2.83</td>
<td>1</td>
<td>2.83</td>
<td>0.29</td>
<td>0.60</td>
</tr>
<tr>
<td>Biologic Child (Yes or No)</td>
<td>14.03</td>
<td>1</td>
<td>14.03</td>
<td>1.47</td>
<td>0.23</td>
</tr>
<tr>
<td>Mother Race (White, Black, Asian, Native American, or Multiracial)</td>
<td>16.52</td>
<td>5</td>
<td>3.31</td>
<td>0.33</td>
<td>0.89</td>
</tr>
<tr>
<td>Relationship Status (Married/Engaged, Single, Cohabiting, or Divorced)</td>
<td>161.67</td>
<td>3</td>
<td>53.89</td>
<td>6.56</td>
<td>0.01</td>
</tr>
<tr>
<td>Education Level (High School/GED, Some College, College Degree, or Graduate Degree)</td>
<td>54.25</td>
<td>4</td>
<td>13.56</td>
<td>1.44</td>
<td>0.23</td>
</tr>
<tr>
<td>Sufficient Financial Resources (Yes or No)</td>
<td>125.06</td>
<td>1</td>
<td>125.06</td>
<td>14.86</td>
<td>0.01</td>
</tr>
<tr>
<td>Crying a Problem (Yes or No)</td>
<td>3.13</td>
<td>1</td>
<td>3.13</td>
<td>0.32</td>
<td>0.57</td>
</tr>
</tbody>
</table>
Table 10.
Relationship of Selected Variables to the Brief Child Abuse Potential Inventory Scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pearson Correlation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Crying</td>
<td>0.04</td>
<td>0.73</td>
</tr>
<tr>
<td>Persistent Crying</td>
<td>0.05</td>
<td>0.66</td>
</tr>
<tr>
<td>Crying upsetting</td>
<td>0.16</td>
<td>0.12</td>
</tr>
<tr>
<td>KIDI Total Score</td>
<td>-0.11</td>
<td>0.26</td>
</tr>
<tr>
<td>PSI Total Stress</td>
<td>0.46</td>
<td>0.01</td>
</tr>
<tr>
<td>PSI Difficult Child Characteristics</td>
<td>0.30</td>
<td>0.01</td>
</tr>
<tr>
<td>PSI Parental Distress</td>
<td>0.53</td>
<td>0.01</td>
</tr>
<tr>
<td>PSI Dysfunctional Parent-Child Relationship</td>
<td>0.24</td>
<td>0.02</td>
</tr>
<tr>
<td>JCS Overall Use</td>
<td>0.14</td>
<td>0.16</td>
</tr>
<tr>
<td>JCS Overall Effectiveness</td>
<td>-0.07</td>
<td>0.47</td>
</tr>
<tr>
<td>JCS Confrontive Use</td>
<td>-0.10</td>
<td>0.31</td>
</tr>
<tr>
<td>JCS Confrontive Effectiveness</td>
<td>-0.15</td>
<td>0.15</td>
</tr>
<tr>
<td>JCS Evasive Use</td>
<td>0.30</td>
<td>0.01</td>
</tr>
<tr>
<td>JCS Evasive Effectiveness</td>
<td>0.06</td>
<td>0.56</td>
</tr>
<tr>
<td>JCS Optimistic Use</td>
<td>0.01</td>
<td>0.92</td>
</tr>
<tr>
<td>JCS Optimistic Effectiveness</td>
<td>-0.17</td>
<td>0.11</td>
</tr>
<tr>
<td>JCS Fatalistic Use</td>
<td>0.29</td>
<td>0.01</td>
</tr>
<tr>
<td>JCS Fatalistic Effectiveness</td>
<td>0.08</td>
<td>0.41</td>
</tr>
<tr>
<td>JCS Emotive Use</td>
<td>0.41</td>
<td>0.01</td>
</tr>
<tr>
<td>JCS Emotive Effectiveness</td>
<td>0.02</td>
<td>0.83</td>
</tr>
<tr>
<td>JCS Palliative Use</td>
<td>0.13</td>
<td>0.19</td>
</tr>
<tr>
<td>JCS Palliative Effectiveness</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>JCS Supportive Use</td>
<td>-0.09</td>
<td>0.36</td>
</tr>
<tr>
<td>JCS Supportive Effectiveness</td>
<td>-0.15</td>
<td>0.13</td>
</tr>
<tr>
<td>JCS Reliant Use</td>
<td>0.13</td>
<td>0.20</td>
</tr>
<tr>
<td>JCS Reliant Effectiveness</td>
<td>0.04</td>
<td>0.73</td>
</tr>
</tbody>
</table>
Table 11. Relationship of Predictor Variables to Maternal Child Abuse Potential Scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Born</td>
<td>1.400</td>
<td>2.23</td>
<td>0.03</td>
</tr>
<tr>
<td>Baby Race</td>
<td>-0.370</td>
<td>-0.52</td>
<td>0.61</td>
</tr>
<tr>
<td>Sufficient Financial Resources</td>
<td>1.330</td>
<td>1.61</td>
<td>0.11</td>
</tr>
<tr>
<td>Mother Age</td>
<td>-0.060</td>
<td>-1.01</td>
<td>0.32</td>
</tr>
<tr>
<td>Total Crying</td>
<td>0.002</td>
<td>0.67</td>
<td>0.51</td>
</tr>
<tr>
<td>KIDI Total Score</td>
<td>-0.720</td>
<td>-1.81</td>
<td>0.86</td>
</tr>
<tr>
<td>PSI Total Stress</td>
<td>0.090</td>
<td>4.49</td>
<td>0.00</td>
</tr>
<tr>
<td>JCS Overall Use</td>
<td>0.010</td>
<td>0.50</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Note. Adjusted R-squared = 0.22.
Table 12.
Selected Variable Differences Based on High and Low Abuse Scores on the Brief Child Abuse Potential Inventory

<table>
<thead>
<tr>
<th>Variable</th>
<th>High Risk Mean</th>
<th>Low Risk Mean</th>
<th>Z</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swaddle</td>
<td>80.33</td>
<td>49.05</td>
<td>-1.95</td>
<td>0.05</td>
</tr>
<tr>
<td>Rock in cradle</td>
<td>19.83</td>
<td>50.94</td>
<td>-1.93</td>
<td>0.05</td>
</tr>
<tr>
<td>Take into own bed</td>
<td>79.33</td>
<td>49.08</td>
<td>-1.96</td>
<td>0.05</td>
</tr>
<tr>
<td>Extra feed</td>
<td>75.67</td>
<td>49.20</td>
<td>-1.66</td>
<td>0.10</td>
</tr>
<tr>
<td>Carry</td>
<td>40.50</td>
<td>50.30</td>
<td>-1.03</td>
<td>0.31</td>
</tr>
<tr>
<td>Music</td>
<td>63.33</td>
<td>49.58</td>
<td>-0.88</td>
<td>0.38</td>
</tr>
<tr>
<td>Cuddle/Rock</td>
<td>41.83</td>
<td>50.26</td>
<td>-0.80</td>
<td>0.42</td>
</tr>
<tr>
<td>Over the counter medications</td>
<td>41.50</td>
<td>50.27</td>
<td>-0.80</td>
<td>0.43</td>
</tr>
<tr>
<td>Crying Upsetting</td>
<td>59.50</td>
<td>49.70</td>
<td>-0.67</td>
<td>0.51</td>
</tr>
<tr>
<td>Baby sling</td>
<td>58.33</td>
<td>49.74</td>
<td>-0.56</td>
<td>0.58</td>
</tr>
<tr>
<td>Pacifier</td>
<td>56.67</td>
<td>49.79</td>
<td>-0.43</td>
<td>0.67</td>
</tr>
<tr>
<td>Car rides</td>
<td>47.67</td>
<td>50.07</td>
<td>-0.17</td>
<td>0.87</td>
</tr>
<tr>
<td>Herbal remedies</td>
<td>46.50</td>
<td>50.11</td>
<td>-0.48</td>
<td>0.63</td>
</tr>
<tr>
<td>Prescription medications</td>
<td>49.00</td>
<td>50.03</td>
<td>-0.25</td>
<td>0.80</td>
</tr>
</tbody>
</table>
Table 13. Differences Between Mothers with High and Low Risk for Abuse on Infant Development Items Related to Crying in the Knowledge of Infant Development Inventory (KIDI)

<table>
<thead>
<tr>
<th>Variable</th>
<th>High Risk % Right</th>
<th>Low Risk % Right</th>
<th>$X^2$</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 4: “Babies should not be held when they cry because this will make them want to be held all the time?”</td>
<td>97%</td>
<td>100%</td>
<td>0.97</td>
<td>1.00</td>
</tr>
<tr>
<td>Question 6: “Babies do some things just to make trouble for their parents, like crying a long time or pooping in their diapers?”</td>
<td>98%</td>
<td>100%</td>
<td>0.64</td>
<td>1.00</td>
</tr>
<tr>
<td>Question 15: “Babies may cry for 20-30 minutes at a time, no matter how much you try to comfort them?”</td>
<td>95%</td>
<td>67%</td>
<td>4.04</td>
<td>0.17</td>
</tr>
<tr>
<td>Question 18: “Babies have little effect on how parents care for them, at least until they get older?”</td>
<td>81%</td>
<td>100%</td>
<td>0.69</td>
<td>1.00</td>
</tr>
<tr>
<td>Question 29: “The way the parent treats a baby in the first months of life determines whether the child will grow up to be well-adjusted or a moody misfit?”</td>
<td>59%</td>
<td>33%</td>
<td>0.81</td>
<td>0.57</td>
</tr>
<tr>
<td>Variable</td>
<td>High Risk Mean (SD)</td>
<td>Low Risk Mean (SD)</td>
<td>t (df)</td>
<td>p-value</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------</td>
<td>--------------------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>KIDI Total Score</td>
<td>0.80 (0.04)</td>
<td>0.80 (0.08)</td>
<td>-0.17 (97)</td>
<td>0.87</td>
</tr>
<tr>
<td>PSI Total Stress</td>
<td>85.50 (20.51)</td>
<td>63.56 (14.14)</td>
<td>-2.16 (88)</td>
<td>0.03</td>
</tr>
<tr>
<td>JCS Overall Use</td>
<td>91.67 (19.86)</td>
<td>82.49 (27.43)</td>
<td>-0.57 (97)</td>
<td>0.57</td>
</tr>
<tr>
<td>JCS Overall Effectiveness</td>
<td>63 (16.37)</td>
<td>70.17 (22.68)</td>
<td>0.54 (.59)</td>
<td>0.59</td>
</tr>
<tr>
<td>JCS Confrontive Use</td>
<td>18 (7.21)</td>
<td>19.43 (6.41)</td>
<td>0.38 (97)</td>
<td>0.71</td>
</tr>
<tr>
<td>JCS Confrontive Effectiveness</td>
<td>15.67 (8.08)</td>
<td>18.06 (6.40)</td>
<td>0.63 (96)</td>
<td>0.53</td>
</tr>
<tr>
<td>JCS Evasive Use</td>
<td>17.33 (11.06)</td>
<td>10.75 (6.70)</td>
<td>-1.65 (97)</td>
<td>0.10</td>
</tr>
<tr>
<td>JCS Evasive Effectiveness</td>
<td>9.33 (3.79)</td>
<td>7.5 (4.72)</td>
<td>-0.67 (95)</td>
<td>0.51</td>
</tr>
<tr>
<td>JCS Optimistic Use</td>
<td>18.33 (6.03)</td>
<td>17.95 (5.47)</td>
<td>-0.12 (97)</td>
<td>0.91</td>
</tr>
<tr>
<td>JCS Optimistic Effectiveness</td>
<td>11 (1.41)</td>
<td>15.93 (5.36)</td>
<td>1.27 (95)</td>
<td>0.21</td>
</tr>
<tr>
<td>JCS Fatalistic Use</td>
<td>4.33 (4.04)</td>
<td>3.09 (2.19)</td>
<td>-0.94 (97)</td>
<td>0.35</td>
</tr>
<tr>
<td>JCS Fatalistic Effectiveness</td>
<td>2 (1.73)</td>
<td>2.10 (1.63)</td>
<td>0.11 (97)</td>
<td>0.91</td>
</tr>
<tr>
<td>JCS Emotive Use</td>
<td>7.33 (2.08)</td>
<td>4.16 (2.53)</td>
<td>-2.15 (97)</td>
<td>0.03</td>
</tr>
<tr>
<td>JCS Emotive Effectiveness</td>
<td>1.5 (.71)</td>
<td>1.38 (1.38)</td>
<td>-12 (95)</td>
<td>0.90</td>
</tr>
<tr>
<td>JCS Palliative Use</td>
<td>8 (4.58)</td>
<td>7.38 (3.54)</td>
<td>-0.30 (97)</td>
<td>0.77</td>
</tr>
<tr>
<td>JCS Palliative Effectiveness</td>
<td>6 (3.46)</td>
<td>6.97 (3.46)</td>
<td>0.48 (96)</td>
<td>0.63</td>
</tr>
<tr>
<td>JCS Supportive Use</td>
<td>5 (4)</td>
<td>8.77 (3.21)</td>
<td>1.99 (97)</td>
<td>0.05</td>
</tr>
<tr>
<td>JCS Supportive Effectiveness</td>
<td>5 (4.58)</td>
<td>8.95 (3.25)</td>
<td>2.05 (96)</td>
<td>0.04</td>
</tr>
<tr>
<td>JCS Reliant Use</td>
<td>13.33 (2.52)</td>
<td>10.97 (4.53)</td>
<td>-0.90 (97)</td>
<td>0.37</td>
</tr>
<tr>
<td>JCS Reliant Effectiveness</td>
<td>10 (4)</td>
<td>9.35 (4.11)</td>
<td>-0.27 (97)</td>
<td>0.79</td>
</tr>
</tbody>
</table>
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105