

EVALUATING AN EVIDENCE-BASED PREVENTION PROGRAM DELIVERED
BY PRIMARY-CARE PROVIDERS AND IN-HOME NURSE VISITS: THE PERIOD OF
PURPLE CRYING: AN ABUSIVE HEAD-TRAUMA PREVENTION PROGRAM

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DOCTOR OF NURSING PRACTICE

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ABSTRACT

Shaken Baby Syndrome (SBS) is an abusive head injury where an infant is submitted to severe, repetitive acceleration-deceleration forces with or without blunt impact to the head (Centers for Disease Control and Prevention, 2012). Thirteen to thirty percent of infants diagnosed with abusive head trauma die as a result of their injuries (Dart, 2009). Fifty to ninety percent of survivors are left with varying degrees of disabilities (Reece, 2008).

The purpose of the dissertation was to increase knowledge about SBS and to help prevent future occurrences. A family medicine clinic in rural North Dakota and the Nurse Family Partnership of Cass County, ND, participated in the project.

The Period of PURPLE Crying, an SBS prevention campaign, was utilized to educate infant caregivers, as well as the registered nurses and family nurse practitioners delivering the education. The program utilizes a 10-minute DVD and a pamphlet to deliver the education. The acronym PURPLE describes the normal characteristics of infant crying. The education stresses how frustrating infant crying can be. The caregivers learn ways to console an infant, ways for the caregiver to stay calm, and how dangerous it is to shake an infant.

The targets of the evaluation were infant caregivers and the healthcare providers implementing the education. Pre-surveys utilizing a Likert scale and four short-listing questions assessed infant caregivers' knowledge and beliefs about SBS. A post-survey utilizing the same questions was then used to assess any changes in knowledge and beliefs about SBS. The infant caregivers also showed an understanding about how dangerous shaking can be.

The healthcare providers' knowledge and current practices for educating about SBS were evaluated with a free-response pre-survey. After three months of project implementation, a post-survey assessed what the providers had learned and how they felt about the educational tool,

again utilizing free-response questions. The majority of the healthcare providers' feedback was positive in relation to their experience implementing the program. Increased knowledge about normal infant crying patterns among both the infant caregivers and the healthcare providers resulted upon intervention completion. The Period of PURPLE Crying is a sound curriculum to provide SBS prevention education.

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DEDICATION

To the victims and families affected by Shaken Baby Syndrome:

May this research continue to inspire and educate others. Let the Period of PURPLE Crying and other SBS prevention tools be universally implemented in healthcare settings to help prevent this unnecessary condition.

To the victims of Shaken Baby Syndrome with whom I have worked, I dedicate this disquisition.

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CHAPTER 1. INTRODUCTION

The force generated from angrily shaking a baby causes more damage than a fall from a 3-story building (Reynolds, 2008). Irreversible violent injury can occur in as little as 5 seconds and may exhibit no outward signs of physical abuse (Reynolds, 2008). Shaken Baby Syndrome (SBS), or abusive head trauma (AHT), is an abusive head injury where an infant is submitted to severe, repetitive acceleration-deceleration forces with or without blunt impact to the head, resulting in a triad pattern of injuries (Centers for Disease Control and Prevention, 2012). Subdural hematomas, brain swelling, and bilateral retinal hemorrhages are the three classical features of SBS (Lewin, 2008). Infants and children younger than 2 years old are the most vulnerable to shaking injuries (Lewin, 2008). However, shaken impact injuries can affect children up to 12 years of age (Reynolds, 2008).

Background and Significance

Exact statistics related to SBS are not available because many states and national reporting statistics do not categorize these events and fatalities (Lewin, 2008). However, having worked in Fargo's pediatric intensive care unit (PICU), it is apparent that several cases occur each year. The National Center on Shaken Baby Syndrome (NCSBS) offers statistics related to a 2003 study performed in North Carolina. Keenan, Runyan, Marshall, Nocera, and Merten (2004) identified all North Carolina children ages 2 years and younger who were either admitted to a pediatric intensive care unit or who died from a brain injury in 2000 and 2001. There were 152 cases of serious or fatal traumatic brain injuries; of the total, 80 were victims of Shaken Baby Syndrome (Keenan et al., 2004). These statistics show that 53% of the serious or fatal traumatic brain injuries were due to SBS according to this study. In a similar study published in 2003, Keenan et al. found the incidence of inflicted traumatic brain injury occurring in the first 2 years

of life to be 17.9/100,000 people, and non-inflicted brain injury was 15.3/100,000. In the United States, SBS affects between 1,200 and 1,600 children each year (Reynolds, 2008). Thirteen to thirty percent of infants diagnosed with abusive head trauma die as a result of their injuries (Dart & Cumberland, 2009). Fifty to ninety percent of survivors are left with varying degrees of disabilities, ranging from serious behavioral and learning disabilities to paralysis, blindness, and permanent vegetative states (Reece, 2008).

In addition to the vast array of physical consequences, SBS also results in costly economic ramifications. The initial hospitalization and emergent treatment for a child with SBS can easily exceed \$150,000 (Reynolds, 2008). Long-term medical treatment, which sometimes includes in-home nursing care for certain survivors, can cost up to \$180,000 per year (Reynolds, 2008). The cost of lifelong care for a child with SBS has been estimated to be as much as \$15 million (Reynolds, 2008). The abusers rarely pay for these expenses, and the cost is, instead, left to the victim's families, taxpayers, and insurance companies (Reynolds, 2008).

Risk Factors

There are certain risk factors an infant may possess that increase the chances of becoming a victim of SBS. Risk factors include male gender, prematurity, low birth weight, a history of colic, nicotine/drug/alcohol exposure or withdrawal syndrome, medically fragile infants, special-needs infants, and infants with poor bonding to their caregivers (Meskauskas, Beaton, Meservey, 2009). These infants are sometimes viewed as "difficult babies" or ones who cry excessively.

Although perpetrators come from all areas of society, there are some risk factors which make people more likely to abuse. Risk factors include male gender, an age that is less than 30 years old, less than a high-school education, substance abuse, depression, social isolation, and illiteracy (Meskauskas et al., 2009). Other risk factors are a history of abuse, low socioeconomic

status, poor family function, poor prenatal care, and unrealistic caregiver expectations (Reynolds, 2008). Studies in Australia, Canada, and the United States have found biological fathers to be the perpetrators of Shaken Baby Syndrome in 45% of the documented cases (Dart & Cumberland, 2009). The next most likely perpetrator is the boyfriend of a single mother, shown to be responsible for 25% of reported cases, while the mother or babysitter has been found to be the perpetrator in 15% of the reported cases (Dart & Cumberland, 2009). Incidents of SBS most often occur when the caregiver momentarily loses control due to an infant crying inconsolably.

Infants can have prolonged and inconsolable crying bouts. Studies have shown that these crying bouts can follow a predictable pattern and that they form a “normal crying curve.” The curve begins to ascend when infants are 2-3 weeks of age, showing an increased number of inconsolable crying bouts for an infant. After this age, the number of inconsolable crying bouts rises rapidly and peaks at the age of 10-13 weeks. Following the peak level of incidence, there is a linear decline in crying bouts, ending around 36 weeks of age (R. Barr, Trent, & Cross, 2006). R. Barr et al. (2006) found crying to be an important stimulus for SBS. The authors compared the ages of 273 SBS victims who were hospitalized from 1996 through 2000 in California. The reported SBS cases were found to follow the same pattern as the normal infant-crying curve. The reported incidence curve for hospitalized SBS cases has a similar starting point and a similar shape to the normal infant-crying curve. The peak incidence of SBS was found to occur about 4-6 weeks later than the normal infant-crying curve. The pattern is consistent with the properties of early infant crying (R. Barr et al., 2006). The lag in the peaks of crying and SBS hospitalizations could be attributed to repeated shakings before hospitalization (R. Barr et al., 2006). Figure 1 demonstrates the time lag between the curves of normal infant-crying patterns and SBS cases.

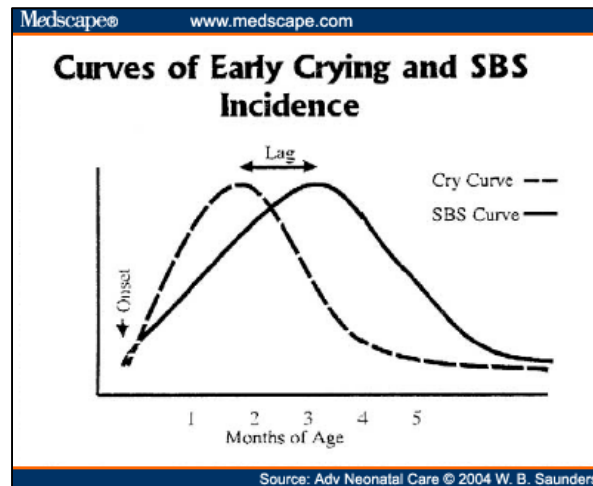


Figure 1. Curves for early crying and SBS incidence (Franklin Carbaugh, 2004).

Infant's Anatomy

Several physical characteristics of an infant's anatomy make the brain more susceptible to injury. First, a young child's skull is thin and pliable. The bones have not yet ossified; the sutures are not fused; and the fontanelles are open (Case, Graham, Handy, Jentzen, & Monteleone, 2001). An infant's head is much larger and heavier than the rest of the child's body. The brain grows rapidly and is 75% of its full weight by 2 years old (Case et al., 2001); however, the neck musculature of a young child is immature and unable to sufficiently support the head's weight (Case et al., 2001). Infant brains differ from the adult brain because they have much higher water content and less myelination of the nerve cells (Lewin, 2008). Infants also have a larger subarachnoid space than adults (Lewin, 2008). The immature brain of a young child is very soft, almost comparable to unset gelatin (Case et al., 2001). Rapid rotational acceleration and deceleration is thought to be the most likely mechanism of injury with SBS (Reynolds, 2008). The large heavy head supported on the weak neck allows greater movements of the head and brain in response to acceleration-deceleration forces (Case et al., 2001).

Physiology of the Injury

Shaking results in a force that ruptures the bridging of veins between the dura mater and the brain substance (Reynolds, 2008). Hemorrhaging into the subdural space then occurs, resulting in active bleeding and pooled areas of blood. Active bleeding and pooling blood increase the intracranial pressure which causes hypoxia to the brain and leads to cellular death (Reynolds, 2008).

Retinal hemorrhages are also associated with infants who have been abused (Reynolds, 2008). One theory proposes that this type of injury occurs from the shearing force of shaking at the junction of the vitreous and retina (Reynolds, 2008). Another theory suggests that hemorrhaging is the result of increased intraocular venous pressure caused by an increase in the intracranial pressure (Reynolds, 2008). The retinal injury's severity will determine subsequent vision impairment. Some infants will be left permanently blind.

Problem Statement

The long-term consequences of SBS are substantial, and the prevalence of abuse is alarming. Furthermore, SBS and its sequelae are 100% preventable. SBS offers the chance for prevention advocates to generate a voice for these silent and helpless victims. There is a need for educating the public about SBS and finding ways to prevent it. No single socioeconomic class is free of SBS in the United States (Meskauskas et al., 2009). The public needs to be informed about the seriousness of SBS as well as the implications this problem has on individuals and society. Infant caregivers and healthcare providers need to understand that inconsolable infant crying is a common stimulus of SBS and that the prolonged crying bouts are characteristic of normal infant development (R. Barr et al., 2006). Healthcare providers can offer this education

and can teach coping and caring mechanisms, in turn, helping to prevent further incidents of SBS.

Project Description

A family nurse practitioner (NP) in rural North Dakota, as well as a family NP in rural Minnesota, participated in the project. The southeastern North Dakota town is largely agricultural with an approximate population of 1,850 people. The west-central Minnesota community boasts a community population of approximately 5,600 residents. The town thrives off of the local University, as well as the agribusiness. Both individuals worked at family medicine clinics and served as my clinical instructors in past semesters.

In the course of this study, the primary-care providers utilized the Period of PURPLE Crying to educate parents and infant caregivers about normal infant-crying patterns. The letters in the word *PURPLE* each stand for a characteristic of crying in healthy infants which can frustrate caregivers. *P* stands for peak pattern, when crying increases, peaking during the second month. *U* is for the unexpected timing of prolonged crying bouts. *R* represents resistance to soothing. *P* stands for the pain-like expression on the child's face. *L* is for long crying bouts. *E* stands for late afternoon and evening clustering. This education also included tips about how to soothe a crying baby, coping with the stress of an inconsolable infant, and the dangers of shaking an infant. The education was delivered through a booklet of educational material that the healthcare provider reviewed with the caregiver. The caregiver was then given a DVD to watch after the booklet was reviewed. The educational sessions took place in clinic rooms. The infant's caregiver watched the DVD on a portable DVD player.

The Nurse Family Partnership (NFP) of Cass County North Dakota provided a different avenue for delivering the education because registered nurses (RNs) provided the education

during home visits instead of the clinic setting. The NFP RNs met with women at different stages in their pregnancy. The RNs utilized the booklet and DVD to educate the infant caregivers about the Period of PURPLE Crying. The NFP method of delivery was special because the RNs were paired with the mothers or families, meeting with them several times, which assists in building a relationship and rapport (Olds, 2008).

To ensure that both the NPs and RNs providing the education understood the Period of PURPLE Crying, they watched a half-hour *Implementation Training* video created by the Period of PURPLE Crying's makers and reviewed the program's educational tools. An implementation protocol was also given to each healthcare provider. Please see Appendix C for the implementation protocol. Prior to the NPs and NFP RNs delivering the education to consenting infant caregivers, a pre-education survey was completed by the infant caregivers, assessing their knowledge related to infant-crying patterns and the dangers of shaking an infant. After the education, caregivers completed a post-education survey related to infant-crying patterns and the dangers of shaking an infant.

Short-answer, qualitative surveys assessed the NFP RNs' experiences providing the education. In the clinic setting, the same pre-education and post-education surveys were given to the infant caregivers. A qualitative, short-answer pre- and post-survey was also administered to the NPs to assess their experiences and feelings about delivering the education.

Project Purpose

The rural family-practice clinics involved with the project are dedicated to promoting health and preventing disease. These two facets are reflected in this study with the intent of the project being able to increase the knowledge related to Shaken Baby Syndrome and to decrease the incidence. The objective of the Nurse Family Partnership is to introduce vulnerable, first-

time parents to caring maternal and child health nurses. The program allows nurses to deliver support to first-time moms along with promoting healthy pregnancies, knowledge, and responsible parenting (Olds, 2008).

The Period of PURPLE Crying empowers infant caregivers with education by providing a new way to understand an infant's crying and behavior. The program helps caregivers to understand that inconsolable crying between 2 weeks and 3-4 months of age can be normal for infants. Parents are then able to identify the normal characteristics of infant crying in this period: the infant may cry more each week, with a peak level of crying at 2 months and then less in months 3 to 5; crying may come and go with no identifiable reason; the infant may resist soothing and have a pain-like face; the infant may cry as much as 5 hours a day; and the infant may cry more in the evening (M. Barr, 2009). Caregivers then feel less discouraged when dealing with fussy infants and realize there is not anything wrong or defective with their infant. The PURPLE program provides tips on soothing an inconsolable infant as well as ways to cope with the frustrating the experience. Most importantly, caregivers gain knowledge about how dangerous it is to shake an infant. The hope is for them to share this information with all individuals caring for the child.

Project Objectives

Infant caregivers will be able to

1. Explain infant crying patterns
2. Describe appropriate comfort/soothing techniques for a crying infant
3. Describe inappropriate/harmful calming techniques
4. Describe ways to stay calm when caring for an inconsolable infant

Nurse practitioners and registered nurses will

1. Gain insight about the relationship between peak crying times and shaking occurrences for infants
2. Become more comfortable educating about SBS

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This integrative literature review identifies, analyzes, and synthesizes the current research findings for SBS. Quantitative and qualitative studies were examined to determine the present knowledge. The review was performed in hopes of gathering additional information about what is already known about SBS, as well as discovering new findings and perspectives. The following questions guided the review.

1. How does a caregiver's childhood, life experiences, and medical history influence the possibility he/she may abuse an infant
2. What are the perceptions of crying for infants, and how does the perception affect Shaken Baby Syndrome
3. How do male and female perpetrators compare
4. What programs and interventions are in place to prevent SBS
5. What new diagnostic tools are available to recognize SBS at its early stages
6. How does the place an infant receives emergent care affect the outcome
7. Are there variations in the SBS diagnosis that depend on the healthcare facility
8. What are the outcomes for a child with SBS

Methods

Peer-reviewed studies published between 2005 to 2011 were systematically searched in the following databases: Academic Search Premier, Alt HealthWatch, CINHAHL PLUS with Full Text, Criminal Justice Abstracts, EBSCO MegaFILE, Health Source: Nursing/Academic Edition, MEDLINE, and PsycINFO. Key terms used when searching were as follows: shaken baby syndrome, prevention, child abuse, nurse practitioner, education, intervention, traumatic brain injury, infants, parent, crying, and stress. Data were organized and analyzed with a sample

of 18 research studies selected from the 1,719 articles pertaining to SBS. Article selection was based on relevancy to the topic and the questions posed. Inclusion criteria were as follows

1. article was published in a peer-reviewed journal
2. was research based
3. written in English

Exclusion criteria consisted of

1. articles studied adults or children older than 2 years of age with brain injuries
2. was performed in an underdeveloped country
3. infant's brain injury was unintentional

Results

Results from the literature evaluated within the review were compiled into a table (Appendix A. The author and date of publication, population/sample size and methods, results, implications, limitations/levels of evidence, and rules of inference are examined in the table. (See Appendix A.)

Influence of the Caregiver's Childhood and Life Experiences

A caregiver's childhood and life experience can affect the way he/she parents. Maternal childhood maltreatment was related to the quality of the mother-child relationship and maternal perceptions of infant temperament. Maternal physical abuse was associated with poorer mother-child interactions, increased attentiveness, and difficulty recovering from distress among infants (Lang, Garstein, Rodgers, & Lebeck, 2010). Surprisingly, a history of emotional abuse was linked with less interactional dysfunction, lower levels of infant frustration, and more gratification (Lang et al., 2010). Physically traumatized mothers may perceive their infants more

negatively and/or may have unrealistic expectations of infant behavior due to a lack of accurate information about adaptive parental responding (Lang et al., 2010).

Choi et al.'s (2010) work suggested that mothers who had excessive worrying related to postpartum depression had a fear of being abusive. Fears about bonding difficulties were likely predictors of child abuse. Also implied was the correlation between postpartum depression and abusive behavior being influenced by bonding difficulty. Therefore, maternal depression may not be a predictor of maltreatment. Lang et al.'s (2010) work identified women with symptoms of depression as being defensive in their questionnaire responses, meaning that the more depressed a woman felt, the greater need she felt to present herself as competent in spite of feeling otherwise.

Perceptions of Crying and the Relationship to SBS

There is clearly a correlation between infants' peak crying periods and the incidence of SBS. In I. Talvik, Alexander, and T. Talvik's work (2008), the mean age at admission was 3.9 months old. According to outpatient records, almost all parents (88.5%) in the study (23/26) had contacted their family doctors and other specialists because of the baby's excessive crying or irritability prior to the SBS admission. A time curve computed for the infant peak crying times was similar to the curve for the highest incidences of SBS cases, with the exception of the crying curve commencing earlier (I. Talvik, Alexander, & T. Talvik, 2008). Nash, Morris, and Goodman's (2008) qualitative study pinpointed themes about the mother's and father's opinions of the infants' crying behavior. Parents felt at fault if their baby was crying and could not be consoled. Fathers cope with a crying infant by passing the care back to the mother. Parents perceive that infants cry because they want attention. Infants also cry when reacting to parental stress from tiredness or to parental arguments. Fatigue was also reported to impact the ability of

an adult to cope with a crying infant. According to these themes, parents who suffer feelings of inadequacy with regard to their parenting ability may be at risk to shake their baby (Nash et al., 2008). Feelings of exhaustion frequently accompany new parents; no parents are immune from this shaking risk factor. As noted, the study demonstrated a belief of mothers coping with crying infants better while fathers tended to hand the child to mothers when the baby is inconsolable. Two of the fathers interviewed also mentioned that they would call their own mother for help to console the baby. This finding suggests that, when fathers are left with the sole care of the infant, they might not be able to handle feelings of stress and may resort to shaking a crying baby (Nash et al., 2008).

Perpetrator Gender Differences

Significant perpetrator gender differences were noted in Esernio-Jenssen, Tai, and Kodosi's (2011) study. The authors concluded that male perpetrators were younger, more likely to confess, and more likely to be convicted of shaking an infant. Also, victims of male perpetrators had more serious, acute presentations and neurosurgical intervention while suffering worse clinical outcomes. Although the study had an equal number of male and female perpetrators, the authors noted the fact that females are viewed by society as caregivers and nurturers, and they would, therefore, be more likely to deny abuse when confronted.

Programs and Preventative Interventions

Two reviewed articles examined the Period of PURPLE Crying intervention. Both articles had promising results. The PURPLE materials were developed by the National Center on Shaken Baby Syndrome (NCSBS). The materials included an 11-page booklet and a DVD, which illustrates how these behaviors are normal. Suggested soothing and calming techniques are recommended, and emphasis is placed on how soothing may not always work. Typical

calming responses of carrying, comforting, walking, and talking with the infant are recommended. If the crying is too frustrating, the caregivers are advised to put the baby down in a safe place, calm themselves, and return to check on the baby. Finally, the parents are advised to never shake a baby. The program acknowledges the frustrations that accompany inconsolable crying and encourages caregivers to tell others about the Period of PURPLE Crying. Both studies utilizing this program led to higher scores for the knowledge about early infant crying and the dangers of shaking (R. G. Barr, Barr, et al., 2009). At the same time, there are no empirical studies assessing the incidence of SBS.

The Nurse Family Partnership (NFP) is another program that has found success in preventing child maltreatment. The goal of the NFP is to improve the outcomes of pregnancy by improving prenatal health; to improve the child's health and development by helping parents provide more sensitive and competent care for the child; and to improve the parental life-course by helping parents plan future pregnancies, complete their education, and find work (Olds, 2008). Study results in Elmira, NY, showed 80% fewer verified cases of child abuse and neglect among NFP families when compared to the control group (Olds, 2008). Another home-visitation program found success in decreasing child injuries among medically at-risk infants. A cognitive reframing intervention was combined with the traditional Healthy Start program and was associated with lower rates of corporal punishment, greater safety maintenance in the home, and fewer reported child injuries (Bugental & Schwartz, 2009).

The Perinatal Shaken Baby Syndrome Prevention Program (PSBSPP) in Canada demonstrated a perceived increase for parental knowledge about infant caring, anger, and SBS. Help was provided by identifying coping strategies. The authors felt that introducing the PSBSPP program at all birthing institutions was relevant (Goulet et al., 2009).

In western New York, all hospitals providing maternity care in an 8-county region participated in a parental education program. Nurses were asked to have parents read a 1-page leaflet and view an 11-minute video about the dangers of violent infant shaking. The nurses also described ways to handle persistent infant crying. Educational posters were displayed in the hospital wards. Both parents were asked to voluntarily sign a commitment statement acknowledging their receipt and understanding of the materials. Follow-up surveys conducted 7 months after discharge showed that more than 95% of parents remembered receiving the information. The incidence of abusive head injuries was shown to decline by 47% during the 5.5-year study (Dias et al., 2005).

Community-based parent training has also been examined. A study by Bohr, Halpert, Chan, Lishak, and Brightling (2010) found that parenting stress decreased; confidence increased; and caregivers' cognitive, growth-fostering skills increased post-intervention. The caregivers were of a high-risk population, and the intervention took place as caregivers and their children interacted with each other. The study examined the effectiveness of an attachment-focused parent group-training program that was adapted for use in a children's mental-health clinic. Twenty-two caregiver-child dyads participated, with the children's ages ranging from 4 to 41 months. Two early childhood therapists assisted with the facilitation and intervention.

Variations of Healthcare Facilities and SBS Outcomes

The place an infant is taken for emergency treatment when suffering SBS can have a vast impact on the outcome. Trokel, Waddimba, Griffith, and Sege (2006) identified a difference in children's hospitals and general hospitals' rates for diagnosing abuse. An estimated 178 infants, 39% of the study total, with injuries in the study would have been identified as abused had they been treated at a children's hospital rather than a general hospital.

Another study concluded that almost one-third of the children in the sample who had a severe traumatic brain injury failed to receive care at high-level trauma centers. Only 20% of the 68 healthcare referral regions were well regionalized in the study, meaning the infants would not receive the highest level of care (Hartman et al., 2008).

Advances in Diagnosis Techniques

Serum and CSF concentrations of neuro-specific enolase (NSE) and myelin-basic protein (MBP) may be useful as screening tests to identify infants who are at increased risk for SBS (Berger et al., 2006). In Berger and colleague's (2006) study, this screening technique identified infants who would benefit from additional evaluation with a head CT. This study improved the identification of inflicted traumatic brain injury (iTBI), which could otherwise go missed, but iTBI still needs further investigation.

Outcomes

Much is already known about the poor prognosis of SBS victims. The aim of a study completed in Estonia, Europe, was to identify the long-term neurological and developmental outcomes for children with iTBI. Two of twenty-two SBS survivors had no developmental problems at their follow-up appointment. Twenty of those children had varying developmental problems, and 3 of the 22 children were severely handicapped. Epilepsy was found in 7 of the 22 children. The major predictor of a severe outcome was a young age at the time of the insult.

Gaps in the Literature

No studies took place in the Minnesota, North Dakota, and South Dakota areas. There were no comparisons found for abuse rates in rural areas versus urban areas. There was a gap because no studies focused on the Native American populations which may be considered a higher-risk group. No studies concentrated on the possible relationship between caregivers'

substance abuse and SBS. Also concerning was the low number of studies related to prevention strategies.

**Logic Model: Preventing Abusive Head Trauma in Infants Through the Period of
PURPLE Crying Education**

The logic model was used as a theoretical framework to guide the practice improvement project. A logic model is a systematic and visual way to present relationships among the resources one has to carry out a project or activity (Millett, 2000). See Figure 2.

Logic Model: Preventing Abusive Head Trauma in Infants Through the Period of PURPLE Crying Education

Inputs	Outputs		Outcomes – Impact		
	Activities	Participation	Short	Medium	Long
<p>My dissertation project committee and me</p> <p>Nurse Family Partnership (NFP)</p> <p>Select group of family-practice healthcare providers</p> <p>Time</p> <p>Personal money or possible funding from the Stop the Shake Organization to pay for materials</p> <p>Evidence from the National Center on Shaken Baby Syndrome</p> <p>Period of PURPLE Crying education program utilizing pamphlets/DVDs</p>	<p>Establish a partnership with agencies/family-practice providers</p> <p>Travel to the family-practice providers workplace and provide training in regard to the Period of PURPLE Crying education campaign (PURPLE)</p> <p>Meet with NFP RNs to assess how they are currently providing SBS education to clients. Provide training and materials for the Period of PURPLE Crying</p>	<p>Nurse practitioner(s) in rural ND and MN communities</p> <p>NFP RNs in Cass County, ND</p> <p>Infants' parents and caretakers</p>	<p>Increased awareness of SBS (incidence, pathophysiology, risk factors, outcomes, and prevention)</p> <p>Change in attitude related to preventative education at well-child checkups</p> <p>Increased commitment to provide education about SBS with all opportunities</p> <p>Increased comfort in providing education related to normal crying patterns for infants, coping with stress as a caretaker, and the dangers of shaking or hurting an infant</p>	<p>Family-practice providers and NFP RNs will provide education on the Period of Purple Crying and will distribute an educational DVD and pamphlet for the infant caregiver to watch/read and keep</p>	<p>Decrease in the SBS incidence</p>

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Assumptions
 NFP RNs will make the time and effort to implement the PURPLE education versus their current SBS prevention/education methods.
 Providers will make the time and effort to implement PURPLE education.
 Parents/caretakers understand the importance of teaching everyone the dangers of shaking an infant.

External Factors
 Recent local, public cases of abusive head trauma in infants/toddlers.

Figure 2. Theoretical framework.

CHAPTER 3. METHODOLOGY

Project Design

The project evaluated the implementation of an evidence-based SBS prevention program, the Period of PURPLE Crying, in three settings: a family medicine clinic in rural North Dakota, a family medicine clinic in rural Minnesota, and the Nurse Family Partnership of Cass County, ND. Family Nurse Practitioners (FNPs) and registered nurses (RNs) at partnering clinics and agencies implemented the educational intervention. Pre- and post-surveys assessed changes for infant caregivers' and healthcare providers' knowledge and beliefs related to SBS.

Project Implementation

Prior to beginning implementation of the Period of PURPLE Crying, training was provided to the partnering FNPs. In both settings, training included watching the *Training for Implementation* video, a 27-minute video that teaches healthcare providers about the Period of PURPLE Crying and SBS prevention strategies. In addition, the educational booklet and protocol for the project were reviewed with the NPs. Each intervention site received 10 copies of the intervention DVD and booklet bundles, as well as pre- and post-surveys to distribute to the infant caregivers.

The implementation by registered nurses was facilitated through the Nurse Family Partnership program, a part of Fargo Cass Public Health. The Cass County Nurse Family Partnership had approximately 112 clients within its caseload. The RNs were assigned to a specific family with whom they worked, starting prenatally and concluding when the child was 21 months old. The in-home visits lasted between 1 and 1.5 hours. The RNs replaced their usual methods of SBS prevention education with the Period of PURPLE Crying education during the 3-month implementation period.

The nurses viewed the *Training for Implementation* video and received additional training about the implementation protocol. Each RN was given 10 copies of the DVD-booklet bundle with corresponding pre- and post-surveys for the clients. RNs from the NFP and NPs from the clinics were instructed to give the educational materials to the infant caregivers who could keep the materials. The implementation protocol was uniform among agencies. The healthcare providers were instructed to identify the subject population, parents and guardians of infants less than 6 months of age. Infant-caregiver participants were recruited by the NFP RNs and rural ND clinic staff. The intervention led by the healthcare provider explained the project and objectives to each subject. They explained how each pre- and post-survey would be anonymous, with no identifying factors on the survey. Verbal consent was obtained before proceeding with the intervention. Obtaining consent ensured that only individuals wanting to participate in the project were involved and protected against harm. The potential benefits for the participants who received the education about infant-crying patterns and the dangers of shaking an infant were innumerable.

The infant caregivers first completed a pre-education survey. Next, the healthcare providers assisted the subjects in watching the 10-minute PURPLE DVD. At the ND clinic site, a facility-owned DVD player was utilized while, with the home setting, the subject's own DVD player was utilized. The NFP was given a portable DVD player in case the subjects did not own a DVD player. The healthcare providers then reviewed the educational pamphlet with the infant caregivers, emphasizing the PURPLE acronym: normalcy of early increased crying, ways to comfort a crying baby, important action steps, why crying can be frustrating, why shaking is dangerous, and the importance of educating others. After finishing the education, the infant

caregivers completed a post-education survey. The surveys were then placed in a sealed box for protection and anonymity. The implementation protocol is found in Appendix C.

The project intervention was aimed at two targets, the RNs/NPs and the infant caregivers. Assessing these different facets allowed for a more rich interpretation about how well the Period of PURPLE Crying program works in SBS education. The implementation lasted approximately 3 months at each agency. The healthcare providers' current practice and comfort level providing education in regard to SBS prevention was assessed in a pre-implementation survey. A post-implementation survey was completed at the end of the 3-month study period. The healthcare providers' opinions about the Period of PURPLE Crying program were assessed, along with how their views had changed in relation to SBS.

Sample

The sample of participating healthcare providers included one FNP from the ND clinic and seven registered nurses from Cass County's Nurse Family Partnership. A total of 13 infant caregivers participated in the education intervention; five were from the family medicine clinic in ND, and eight were NFP clients. The FNP from the Minnesota clinic was unable to participate due to the lack of infant patients, staff turnover, and staff illness during the project period.

Data Collection

To assess the healthcare providers' knowledge about and comfort level with educating infant caregivers about the dangers of SBS prior to implementing the Period of PURPLE Crying, each provider was asked to complete a handwritten survey using open-ended questions. Please see Appendix D for the survey questions. After 3 months of implementing the Period of PURPLE Crying, the providers were asked to complete a handwritten post-survey evaluating

their feelings related to implementing the project, how their views had or had not changed regarding SBS, and whether they would continue to utilize the Period of PURPLE Crying in their practice.

The NP in rural ND and the RNs in Cass County provided their infant-caregiver clients with a survey to complete before learning about the Period of PURPLE Crying. The survey included statements about infant-crying patterns and Shaken Baby Syndrome and utilized a Likert scale to gain insight about the infant caregivers' opinions and knowledge. Two free-text listing questions were also utilized. After the infant caregivers received education about the Period of PURPLE Crying, their knowledge was, again, assessed with the same survey. The pre- and post-surveys are in Appendix E. Consent was received from each healthcare provider and infant caregiver prior to any education and surveying being implemented. See Appendixes D and E for the consent pages. All project procedures were approved by NDSU's Institutional Review Board (IRB).

CHAPTER 4. EVALUATION

To evaluate the project objectives, scales provided by Julie Price from the Period of PURPLE Crying were utilized. The scales measured knowledge about infant-crying patterns and SBS. The provided scales were utilized out of convenience. Two questions were added to these scales; these questions asked the infant caregivers to list strategies to calm an inconsolable infant and ways to stay calm themselves. The extra questions were added to better meet the project's objectives. It is unknown whether the scales provided by the Period of PURPLE Crying have been assessed for reliability and validity. As discussed in the Project Design section, the infant caregivers were given a survey to fill out before the PURPLE education was implemented. After the education was completed by the healthcare provider who utilized the PURPLE brochure to guide the delivery, the infant caregiver watched the short DVD. The post-surveys were completed right after the Period of PURPLE Crying education was complete. The pre- and post-surveys satisfied the first four objectives for this project. Evaluation occurred by calculating the mean for each infant caregiver pre- and post-survey question utilizing the Likert-scale responses. Calculating and comparing the means from the pre- and post-surveys facilitated the evaluation of whether the infant caregivers appropriately agreed or disagreed with the survey statements. The second portion of the infant caregivers' surveys involved the opportunity for the subjects to list ways to soothe an inconsolable infant and ways to stay calm when caring for these infants. The ideas listed by infant caregivers were tabulated and compared for recurring themes.

The project objectives related to healthcare providers were evaluated by qualitative pre- and post-surveys. The pre-survey was completed before the healthcare providers learned about the education topic. After implementing the project for 3 months, the healthcare providers completed the post-survey. The respective surveys are in Appendixes D and E. The healthcare

providers' surveys were then evaluated by comparing the different responses each provider gave for the questions on both the pre- and post-implementation survey. Themes were compiled, and conclusions were drawn from the results.

CHAPTER 5. RESULTS

The final sample size of nurse practitioners was one, the healthcare provider from the ND clinic. The NP in rural MN was unable to participate due to low infant visit numbers, staff turnover, and staff illness at the clinic. At the ND clinic, the sample size for participating infant caregivers was five. Seven of ten RNs comprised the NFP healthcare provider sample. Eight infant caregivers comprised the sample for NFP.

The following paragraphs discuss how the project's objectives were met. Three tables intermixed in the discussion illustrate how the infant caregivers, NP, and RNs responded to the Period of PURPLE Crying education. The results demonstrate how strongly the objectives were, or were not, met.

Caregiver Objectives

Objective 1. Infant Caregivers Will Explain Infant-Crying Patterns

Six statements were given in regard to normal infant-crying patterns. The infant caregivers from the ND family medicine clinic group showed improvement in their knowledge about an infant's crying pattern on the post- survey. Their Likert-scale choices more appropriately reflected the correct answers to the statements about crying patterns after they received the Period of PURPLE Crying education (Table 1). For example, the ND caregivers were asked how strongly they agreed with the statement "Infants cry more often in the late afternoon and evening." On the pre-survey, they scored an average of 3.6 on the Likert scale, indicating an opinion between neutral and agreeing with the statement. Upon taking the post-survey, the average score was 4.6, indicating they agreed to strongly agreed with the statement. For most infants on most days, the increased periods of crying will occur during the late afternoon or evening (M. Barr, 2009). Strongly agreeing with the statement, which was coded as

a score of 5, was the correct answer. This objective was met because the caregivers increased their score and more strongly agreed with the statement.

Another example of the caregivers explaining infant-crying patterns is in regard to the survey statement “When an infant cries it is always a sign that something is wrong.” The pre-survey average score was 2.8, indicating that the infant caregivers disagreed or felt neutral about the statement. The average post-survey score was 1.6, indicating that they now more strongly disagreed with the statement. The correct coded answer was 1. The caregivers’ average post-survey score of 1.6 suggested that the caregivers learned and met the objective.

The caregivers showed no change in their opinions in regard to one survey statement. The caregivers scored an average pre-survey and post-survey score of 2.4 for the statement “If an infant is healthy, it should not cry unexpectedly or without clear reason.” A score of 2.4 indicates that the caregivers’ opinion was between disagreeing with the statement and feeling neutral about the statement. Healthy infants may cry unexpectedly or without reason (M. Barr, 2009). While this topic did not see improvement in the appropriate direction on the Likert scale, there is still satisfaction seeing the caregivers appropriately agreeing with the other statements about normal infant-crying patterns.

The Nurse Family Partnership’s (NFP) infant caregivers all met the objective of explaining normal infant-crying patterns (Table 1). The post-surveys showed them more closely agreeing with the correct statement. A pre-survey statement read “Sometimes healthy infants can cry for 5 or more hours a day.” Initially, scores were 2.25, meaning that the caregivers were between disagreeing and feeling neutral with the statement that was actually correct. Post-survey scores were 3.875, showing that the caregivers’ opinion had changed to being neutral to agreeing with the statement. Healthy infants can cry for 5 or more hours a day (M. Barr, 2009).

Objective 2. Infant Caregivers Will Describe Appropriate Comfort/Soothing Techniques for a Crying Infant

The infant caregivers in the ND clinic survey group were able to list two appropriate and soothing techniques to comfort crying infants (Table 1). The majority of techniques listed on the pre-survey were physical comforting techniques, such as rocking, walking, and bouncing the infant, as well as verbal comforting with singing and shushing. The post-survey included many of the same answers. One respondent only listed one comforting and soothing technique on the post-survey. The caregivers demonstrated that they could already describe a few comforting and soothing techniques for crying infants prior to the education.

The NFP infant caregivers were able to list two appropriate ways to comfort and sooth a crying infant (Table 1). The techniques were largely gentle physical touch and soothing verbal techniques. Pacifier use was also listed as a comforting technique and tool. The third coded survey did not have any soothing or comforting techniques listed. The individual either did not know any techniques or omitted this section, perhaps due to time. On the post-survey, similar ideas were listed, including physical and verbal soothing techniques. The objective was met because the infant caregivers were able to describe appropriate comforting and soothing techniques for crying infants.

Objective 3. Infant Caregivers Will Describe Inappropriate/Harmful Calming Techniques

The infant caregivers at the ND clinic were asked how much they agreed with the statements “shaking an infant can cause serious health problems or even death” and “shaking a baby is a good way to help a baby stop crying.” Both the pre- and post-survey scores revealed an average Likert score of 5, demonstrating that the caregivers understood shaking an infant is very dangerous and can cause serious health problems that include death (M. Barr, 2009). In relation

to shaking babies as a means to stop them from crying, the pre- and post-survey scores were both 1, meaning that the infant caregivers strongly disagreed with this statement (Table 1). The infant caregivers choosing the appropriate answers on the Likert scale demonstrated that the objective was met.

The NFP infant caregivers also answered the same questions related to shaking an infant causing serious injury and death, and shaking being a good intervention to stop the infant from crying (Table 1). The pre-survey score was 4.875, with a post-survey score of 4.375. The most appropriate answer was for a caregiver to strongly agree that shaking can cause serious injury and death to an infant, so the slightly declining score was less than favorable. The caregivers still strongly agreed with the statement. The pre-survey score related to shaking as being a good calming technique was 1.125. Post-survey scores were 1.125. The caregivers did not change their opinion, and they disagreed to strongly disagreed with the statement.

Objective 4. Describe Ways to Stay Calm When Caring for an Inconsolable Infant

The ND clinic infant caregivers were asked to list two ways to stay calm when caring for an inconsolable infant (Table 1). All the caregivers listed placing the infant in a safe place and taking a break from the infant to regroup. They met the objective before the Period of PURPLE Crying education was implemented. Post-survey listings included putting the infant down in a safe place and taking a break. One person listed preparing for the period of increased crying as a way to stay calm. One person left the two spots unanswered while another individual only listing one idea to stay calm.

The NFP infant caregivers were also asked to list ways to stay calm when caring for an inconsolable infant (Table 1). Pre-survey results included ideas about taking a time out and walking away, distracting yourself, and putting the crying into perspective, “Remember he can’t

do things without your help.” The post-survey results showed an increase in the number of responses that included taking a time out and walking away as a means of staying calm when caring for an inconsolable infant. There was also more variety for answers listed in the post-survey section, including moving, holding, and rocking the baby in a chair. The objective was met because the infant caregivers were able to correctly identify ways to stay calm when caring for an inconsolable infant.

Table 1

Period of PURPLE Crying Survey for Consenting Parents and Guardians of Infants

	ND Clinic Pre- Survey	ND Clinic Post- Survey	NFP Pre- Survey	NFP Post- Survey
	Mean			
Evening Crying	3.6	4.6	3.6	3.9
Increase/Peak of Crying	2.6	4.2	3.6	4.4
Healthy Infants Crying	2.4	2.4	2.9	2.0
Crying Indicates a Problem	2.8	1.6	2.9	1.8
Crying Indicating Pain	3.6	4.4	3.1	3.9
Crying 5 Hours/Day	3.2	4.0	2.3	3.9
Good Parents	2.4	2.0	3.3	2.5
Walking Away	4.4	4.8	4.4	4.8
Telling Others	4.8	4.8	4.9	4.9
Shaking Causes Injuries	5.0	5.0	4.9	4.4
Shaking Stops Crying	1.0	1.0	1.1	1.1
Frustration	3.6	3.6	2.4	2.4
Shaking and Serious Injuries	5.0	4.0	5.0	4.5
Techniques to Soothe Infant	N			
Rocking	4	1	3	3
Verbal Soothing	2	3	3	4
Physical Soothing	3	5	4	4
Riding in Car	1	-	-	-
Pacifier	-	-	1	2
Feed	-	-	1	1
Swaddling	-	-	1	-
Put Baby in Crib	-	-	-	1
White Noise	-	-	-	1
Unanswered	-	1	1	-

Table 1. *Period of PURPLE Crying Survey for Consenting Parents and Guardians of Infants (continued)*

	ND Clinic Pre- Survey	ND Clinic Post- Survey	NFP Pre- Survey	NFP Post- Survey
Ways to stay calm when caring for an inconsolable infant	N			
Talk with Spouse	1	-	-	-
Take a Time Out/Walk Away	5	4	6	9
Count to 10	1	-	-	-
Deep Breathing	1	-	1	-
Ask for Help	2	2	1	2
Distract Yourself	-	-	1	-
Putting it into Perspective	-	-	3	2
Sing	-	1	-	-
Moving	-	-	-	1
Holding	-	-	-	1
Rocking Baby in Chair	-	-	-	1
Unanswered	-	2	1	-

Facilitators and Barriers Related to the Objectives Directed at Infant Caregivers

The facilitators for reaching this objective were the sound evidence-based educational materials used to teach about normal infant-crying patterns. The visual aids (brochure and DVD) helped to reinforce the normal infant-crying characteristics and patterns. The enthusiastic RNs and NP providing the education also helped facilitate learning because these teachers were able to explain the material and answer any questions. Barriers to the objectives may have been the infant caregivers being in a rush at the appointment or home visit; perhaps the caregivers did not feel well, were distracted while caring for their infant, or maybe were disinterested in the subject matter in general.

Primary-Care Provider Objectives

Objective 1. NPs and RNs Will Gain Insight About the Relationship Between Peak Crying Times and Shaking Occurrences in Infants

This objective was met. The NP at the ND clinic was asked how her views relating to SBS had changed or stayed the same. Prior to the project, she was unaware that it was normal for infants to have an increased level of crying and that the crying does not necessarily indicate the infant is in pain or has colic. (See Table 2.)

The NFP objectives were not as strongly met. Three RNs felt that their views towards SBS had not changed. Two RNs noted how they learned it can be normal for infants to cry for long periods on end, a risk factor for SBS. (See Table 3.)

Objective 2. The NP and RNs Will Become More Comfortable Educating About SBS

During the pre-survey, the NP was asked to describe her comfort level about discussing SBS with infants’ parents and guardians. She noted that she was not very comfortable discussing the topic. She discussed SBS prevention with parents and guardians at their infant’s first well-child visit. The NP plans to continue showing the video to new parents at their well-child visits because she felt it was an excellent educational piece. Her increased comfort level using the Period of PURPLE Crying curriculum showed how the object was met (Table 2).

Table 2

Rural North Dakota Clinic Family Nurse Practitioner Survey Responses (N=1)

Pre-Survey	
Current practice of providing education about infant crying patterns and or the dangers of shaken baby syndrome.	“Generally discuss it with parents at their first well child visit.”
Comfort level talking with parents/guardians of infants about the dangers of shaking a baby.	“Not very comfortable discussing this topic.”
Is enough time spent on SBS prevention education?	“No, they should have education on the topic before they leave the hospital and again at the well child visits.”
Describe your knowledge of SBS.	“SBS can cause brain damage and even death.”

Table 2. *Rural North Dakota Clinic Family Nurse Practitioner Survey Responses (N=1)*
(continued)

Post-Survey	
Feelings about providing the Period of PURPLE Crying education.	“Excellent education piece for and most parents were willing to watch the video and review the materials provided.”
How have your views changed related to SBS?	“Was unaware that it was normal for infants to have an increased level of crying, that it is not necessarily colic or that they are in pain.”
Are you considering changing your strategy or delivery of SBS prevention education after experiencing the Period of PURPLE Crying educational tools?	“Yes, we will continue to show the video to new parents during their well child visits.”
Other comments.	“Thank you for providing us with this excellent education piece.”

The majority of the NFP RNs felt very comfortable talking with their clients about SBS prevention prior to the project’s implementation. Four of the surveyed nurses would like to continue using the Period of PURPLE Crying curriculum with their clients. Their wish to continue is possibly an indicator that the educational tool helps them to feel more comfortable providing SBS education. However, the objective of increasing the healthcare provider’s level of comfort with SBS education was not achieved as strongly with the RNs compared to the NP. (See Table 3.)

Table 3

Nurse Family Partnership’s Registered Nurse Survey Responses (N = 7)

Pre-Survey	
Current practice of providing education about infant crying patterns and or the dangers of shaken baby syndrome.	NFP curriculum consists of prenatal mom home visits during the 3rd trimester. They utilize brochures, handouts (Never Shake a Baby, Five Calming Reflexes), and a DVD (The Happiest Baby on the Block) to provide education. They talk some about ways to cope with a crying baby. Review crying and soothing a few weeks after the infant is born. “It is normal for an infant to cry it seems to peak around six weeks; I give parents a SBS brochure and also handouts from our NFP guidelines.”
Comfort level talking with parents/guardians of infants about the dangers of shaking a baby.	Four RNs felt they were very comfortable about talking with parents about SBS prevention. Two stated that they were comfortable, and one felt “pretty comfortable.”

Table 3. Nurse Family Partnership's Registered Nurse Survey Responses (N = 7)(continued)

Pre-Survey	
Is enough time spent on SBS prevention education?	Four of the surveyed RNs felt there is not enough education about SBS. Two felt that NFP does a good job providing education but were not sure other prenatal populations were receiving enough education. "I think increasing awareness can only help."
Describe your knowledge of SBS.	The nurses reported that SBS can happen when caregivers are frustrated by crying and do not understand they can lay the child down and take a break; they get upset and shake the infant to stop the crying. The shaking can cause blindness, paralysis, and death. The RNs' understanding of the condition is largely from their NFP curriculum and other North Dakota state pamphlets they receive. "I know it is on the increase in our area and needs further addressing."
Post-Survey	
Feelings about providing the Period of PURPLE Crying education.	All positive reviews obtained related to implementing the Period of PURPLE Crying. No negative feedback was obtained. "I love it; any skills we can provide for parents to support them in parenting is good." "It is very worthwhile, the education is a must."
How have your views changed related to SBS?	Three of the RNs felt their views had not changed after implementing the Period of PURPLE Crying for 3 months. Two RNs commented how they learned it can be normal for babies to cry for long periods on end, a risk factor for SBS. "I learned from the 30 minute educational power point that crying is normal and that it starts, peaks, and diminishes. I had some knowledge, but now I am more prepared to talk with families about the subject."
Are you considering changing your strategy or delivery of SBS prevention education after experiencing the Period of PURPLE Crying educational tools?	Three of the RNs will not continue to use the Period of PURPLE Crying education during their third-trimester SBS prevention education. They will continue to use what they are familiar with, i.e., the 5 calming reflexes. Four of the nurses stated they will continue to use the Period of PURPLE Crying educational tools. "Yes! Even after the three month trial I would like to continue with this curriculum at Fargo Cass Family Health."
Other comments.	"I love the video, most of our clients are visual learners and this helps them understand better." "I wish swaddling was shown in the crying, soothing, and coping session." "My clients who received the DVD in the hospital had not watched it at home. Clients found it helpful after watching it."

Facilitators and Barriers Related to the Objectives Directed at the Project's NP and RNs

The facilitators involved with helping meet the objective related to the NP working at the ND clinic included the “buy-in.” A positive relationship already established through a previous preceptorship made it more likely for the NP to take ownership of implementing the education. She is also a young mother which, perhaps, makes it likely she would be passionate about providing education that protects children. A DVD player was available to show DVDs at the ND clinic. Completing the education helped her gain insight about the relationship between peak crying times and shaking occurrences in infants. The facilitators I have mentioned influenced her to feel more comfortable about SBS. Facilitators for NFP achieving the objective included the passion for educating clients about SBS. Also, NFP's clients are all English speaking.

Barriers to the objective being reached at the ND clinic included the community being a small, rural population. The NP implemented the education with 5 infant caregivers. She likely did not see many more infants at well-child visits. Barriers between the NFP and the objective included the Period of PURPLE Crying education being different from the usual SBS prevention curriculum. Some of the RNs may have been resistant to the change. One of the RNs noted that, because of the short 3-month implementation time frame and her client's gestational age, she was unable to provide the education.

CHAPTER 6. DISCUSSION AND RECOMMENDATIONS

Interpretation of Results

Findings from this practice improvement project (PIP) are congruent with the studies performed by R. G. Barr, Barr, et al. (2009) and R. G. Barr, Rivara, et al. (2009). The results of the PIP showed an increase for infant caregivers' knowledge about normal infant-crying patterns, the dangers of shaking an infant, techniques to calm an inconsolable infant, and strategies to cope with the frustrations of infant crying. R. G. Barr, Barr, et al. (2009) found infant caregivers who received the Period of PURPLE Crying materials also increased their knowledge about infant crying and some behaviors considered to be imperative to prevent SBS, such as telling others about normal infant-crying patterns and walking away from the infant when frustrated. R. G. Barr, Rivara, et al.'s (2009) work found that the Period of PURPLE Crying prevention materials produced an increase in knowledge which may be relevant to reducing SBS.

Variations in project implementation were likely related to the different project-implementation settings. The NP from the ND clinic likely did not see more than 5 infants throughout the 3-month project implementation period, so she likely completed the education with all the infants' caregivers or guardians. Perhaps, implementing the Period of PURPLE Crying education in the clinic setting is more favorable than the home setting as NFP implemented the project. The ND clinic did not have any prior SBS prevention curriculum; this factor could be another reason the NP reached a large number of infant caregivers utilizing the Period of PURPLE Crying. Perhaps, the NP found the prescribed education to be a gateway to provide the sometimes uncomfortable education about SBS prevention. The surveyed NFP RNs noted that they already used different educational programs to provide SBS education; the lack

of uniformity might be why only 8 Period of PURPLE Crying surveys were collected from the client caseload of approximately 100 first-time pregnant women.

The study performed by Olds (2008) showed 80% fewer verified cases of child abuse and neglect in low-income, unmarried teens who were visited regularly by Nurse Family Partnership RNs, compared to their counterparts in a control group. While the practice improvement project (PIP) did not look at any SBS rates, it did have favorable results that showed an increase in knowledge related to normal infant-crying patterns and SBS. The data from these studies suggested a successful correlation between the Nurse Family Partnership and SBS prevention.

Limitations

No demographic data were obtained from the infant caregivers, the NP, or the RNs who completed the surveys. There is no way to draw any conclusions about whether age or gender could affect opinions about normal infant-crying patterns and SBS. The small sample size is another limitation. Perhaps, limiting the sample to first-time mothers in the Nurse Family Partnership and infant caregivers from the ND clinic restricted the sample size. The project's 3-month implementation period may have limited the number of people reached and surveyed. The Minnesota clinic site experienced a large rate of healthcare provider turnover, losing approximately 3 physicians. Another longtime physician at the site was diagnosed with a terminal illness. These adverse events may have contributed to the MN clinic site NP not completing the healthcare provider survey, as well as not completing the education with any infant caregivers nor having them complete the surveys.

Recommendations for Implementation Sites

The NFP's post-implementation survey revealed 3 RNs stating they would not continue to use the Period of PURPLE Crying during their third-trimester education. They, instead,

wished to use programs with which they are more familiar. Four of the RNs were very excited to continue the Period of PURPLE Crying to deliver their SBS education. The NFP should pick one route of SBS education. The Period of PURPLE Crying education added during the 3-month project implementation brought additional education-technique choices for the RNs related to SBS prevention. The RNs already used curriculum called “Happiest Baby on the Block,” “Never Shake a Baby,” and the “Five Calming Reflexes.” They would have the most success providing education by picking one educational program and becoming experts at the educational strategy it uses versus utilizing three different programs and having mediocre knowledge and comfort with the delivery of each one. The DVD and brochure bundle was reviewed positively by the NFP RNs. They felt that clients learned well with a visual strategy they could keep and watch again later.

Both implementation agencies should continue to use the Period of PURPLE Crying. The NFP RNs felt that the subjects were more visual learners and that the DVD and pamphlet the subjects watched and kept enhanced their learning and retention of the education.

The ND clinic should continue to utilize the Period of PURPLE Crying education. The infant caregivers’ post-education surveys showed an increase in knowledge related to normal infant-crying patterns. Being prepared for the normal period of increased crying can help the infant caregivers, providing them with consoling strategies and ways to stay calm, and inform them about the dangers of shaking an infant. The NP from the clinic expressed her desire to continue using the curriculum with her infant-caregiver patients. The ND clinic is associated with the Catholic Health Initiative healthcare organization. Perhaps, the organization could implement the SBS prevention education nationwide. The ND clinic may be able to get the

Period of PURPLE Crying materials for free, or at a very limited cost, through Prevent Child Abuse North Dakota.

Implication for Practice

The most important thing to understand about SBS is that the condition is preventable. NPs who provide primary care to infants and children are in the ideal position to address the risks and long-term effects of SBS because they are able to both diagnose injuries and, more importantly, educate parents about the dangers of shaking an infant (Reynolds, 2008).

NPs working with new parents need to provide thorough teaching and counseling related to the inconsolable crying periods that infants sometimes have. Parents may feel inadequate and need to be assured that the increased crying is normal and that neither the parent nor the infant is at fault (Nash et al., 2008). The Period of PURPLE Crying program can be very helpful to guide the caregivers in recognizing that this occurrence is normal and that they are not doing anything wrong. Perhaps, the most important thing to reiterate is that the period of increased crying comes to an end and does not last forever (R. G. Barr, Barr, Fujiwara, et al., 2009).

Dissemination

The project's results will be shared with the NFP and the ND clinic. The PIP results will also be presented at a poster presentation this spring at North Dakota State University. The PIP's findings will be summarized in a journal article format and submitted to approximately three journals. The journal summary will also be shared on the local North Dakota SBS prevention group's (Stop the Shake) Facebook page.

Implications for Future Research

The sole NP who participated in the entirety of the 3-month implementation expressed very positive results related to the SBS prevention program utilized. No studies examining the

Period of PURPLE Crying program and healthcare providers' comfort level providing the education were found during the literature review. Further research may examine the success of prescribed SBS prevention education versus the original education given by healthcare providers. Does the curriculum actually make it easier to deliver education related to SBS?

Application to Other DNP Roles

The Doctor of Nursing Practice (DNP) must be able to critically analyze data and evidence for improving advanced nursing practice. The PIP generated new data related to the Period of PURPLE Crying. The DNP must be able to develop new practice approaches based on the gathered data (Thomas et al., 2011). In the case of this PIP, the DNP must decipher whether the SBS prevention education is worthwhile and successful in the NFP and family medicine clinic settings. Based on the survey results from infant caregivers, the curriculum is beneficial in both arenas. The DNP must possess leadership qualities (Thomas et al., 2011). An example of leadership would be the NP from the ND clinic communicating her practice knowledge related to the Period of PURPLE Crying and advocating for the SBS prevention program to be included in all 2-week well-child visits.

Conclusion

The public needs to be informed about the seriousness of SBS as well as the implications that the problem has for individuals and society. Healthcare providers need to familiarize themselves with the etiology behind SBS and need to embrace prevention strategies. Parents and caregivers need to be educated and informed about how to cope with the stresses of a crying infant. The healthcare provider should actively teach parenting skills, educate parents about normal infant development, and assist parents in finding ways to manage their own frustrations when caring for an inconsolable infant. Prevention strategies that have been suggested include

incorporating SBS prevention programs into well-child visits, child-development education, and stress-management education. Educating caregivers about the triggers of infant shaking and strategies to deal with frustration and exhaustion have also been suggested as prevention techniques (Franklin Carbaugh, 2004). The PIP utilizing the Period of PURPLE Crying showed an increase in the infant caregivers' and healthcare providers' knowledge about normal infant-crying patterns, calming techniques, strategies to cope with stressful crying bouts, and the dangers of shaking an infant.

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APPENDIX A. REVIEW OF LITERATURE ARTICLES

Authors & Date of Publication	Population/Sample Size & Methods	Results	Implications	Levels of Evidence/ Study Limitations	Identifying Rules of Inference
R. G. Barr, Barr, et al. (2009)	N=1,279 mothers A randomized control trial (RCT) was utilized. At 5 weeks, a diary was completed by the mothers in regard to their behavior and the infant's behavior. Two months after birth, a telephone survey assessed their knowledge and behavior.	The mean score for knowledge about infant crying was increased among mothers who received PURPLE materials (63.8 points) vs. control group (58.4 points). Also, the PURPLE mothers, more often, shared about walking away when frustrated (13% difference), descriptions of crying (13% difference), and the dangers of shaking (13% difference).	The receipt of the Period of PURPLE Crying materials led to higher maternal scores for knowledge about infant crying and for some behaviors considered to be imperative for the prevention of shaking.	The RCT is a level-one design (UCSF-Stanford University, 2001). Limitations are that only mothers were studied, even though men are the most common shaking perpetrators. The number of control participants and PURPLE participants differed by 19. Also, outcome measures were based on maternal reports, not direct observations.	The authors determined that 1,052-4,058 participants were needed to achieve 90% power to detect a mean difference of 10% between PURPLE participants and the control group, using $\alpha=0.05$ for a 2-sided test with equal members in each group; 1,279 mothers were utilized, but each group was not equal. The mean difference between groups was estimated by using a <i>t</i> test.
R. G. Barr, Rivara, et al. (2009)	RCT conducted in prenatal classes, maternity wards, and pediatric practices. N=1,374 mothers of newborns randomly assigned to the PURPLE intervention were given a period of PURPLE education materials. N=1,364 mothers assigned to the control group. Primary outcomes were measured by telephone calls 2 months after delivery when 5 scales related to the dangers of shaking and behavioral responses were covered in addition to 3 more questions about the topic.	Mean infant-crying knowledge score was greater for the PURPLE group (69.5) than the control (63.5). Mean shaking knowledge was greater for intervention subjects (84.8) than the control (83.5).	The prevention materials produced an increase in knowledge which may be relevant to reducing SBS.	Level-one design. Only mothers' knowledge and behavior change were assessed, not fathers'. Many subjects failed to provide outcome data, restricting analysis to persons with complete data which can produce biased estimates. The outcomes were not direct observations.	Baseline intervention and control subject characteristics were compared using X^2 tests. Least squares regression was used to estimate the mean differences between intervention and control subjects. Negative binomial regression estimated incidence-rate ratios for diary events or office-visit counts.

Authors & Date of Publication	Population/Sample Size & Methods	Results	Implications	Levels of Evidence/ Study Limitations	Identifying Rules of Inference
Berger et al. (2006)	Prospective case-control study conducted of 98 well-appearing infants who presented with nonspecific symptoms and no history of trauma. Biomarkers of neuro-specific enolase (NSE), S100B, and myelin-basic protein (MBP) found in serum and cerebral spinal fluid (CSF) are sensitive and specific for inflicted traumatic brain injury (iTBI). The study measured these values in the subjects.	14 patients received a diagnosis of iTBI. NSE was 77% sensitive and 66% specific. MBP was 36% sensitive and 100% specific for iTBI. S100B was neither sensitive nor specific for iTBI. 4 patients not identified as iTBI had increased NSE and were identified as possible victims of abuse.	NSE and MBP concentrations may be useful as a screening test to identify infants who are at increased risk for iTBI and would benefit from additional evaluation of a head computed tomography (CT) scan. The limit for the delayed diagnosis of iTBI may decrease morbidity and mortality.	This case-control study is a level-three design (UCSF-Stanford University, 2001). Not all patients had a CT to evaluate for iTBI, and the diagnosis of no brain injury (NBI) was based on clinical judgment. CT is the gold standard for diagnosing iTBI, so there may have been false-negative and false-positive rates in conjunction with the use of biomarkers. Patients were part of a convenience sample.	All <i>P</i> values were 2-sided, and <i>P</i> < .05 was considered statistically significant. Pearson's X^2 was used to compare categorical variables. Normally distributed, continuous variables were compared using <i>t</i> tests. Skewed data were compared using Mann-Whitney. Spearman's ρ examined correlations among markers. Receiver-operator characteristic curves were constructed for each biomarker, and an area under the curve was calculated.
Bohr, Halpert, Chan, Lishak, & Brightling (2010)	N=22 caregiver-child dyads, where children's ages were between 4 and 41 months. The study examined the effectiveness of an attachment-focused, parent-group training program that was based on an empirically validated parenting course (Right from the Start) which was adapted for use in a children's mental-health clinic with a diverse client population.	Following completion of the intervention, parenting stress had decreased; parenting confidence had improved; and caregivers' cognitive-growth fostering skills had increased. The program did not meet its primary goal of improving maternal sensitivity.	The study showed importance for continuously assessing whether interventions are retaining efficacy and whether diverse caregivers are benefiting from the intervention. This study proved that further work is needed to reach the goals of fostering caregiver skills.	The observation study without controls was a level-four design. Limitations were the relatively small number of participants and the lack of a control group. The study and intervention were performed in English. English was a second language for a number of caregivers who attended the program.	Pearson correlations were used to examine demographic variables and the number of sessions attended in relation to pre-test measures to determine covariates. Paired samples, two-tailed <i>t</i> tests compared pre- and post-intervention scores for caregiver sensitivity, parenting stress, parenting confidence, and cognitive-growth fostering. A Bonferroni adjustment was used to control for multiple comparisons. Alpha was set at .01.

Authors & Date of Publication	Population/Sample Size & Methods	Results	Implications	Levels of Evidence/ Study Limitations	Identifying Rules of Inference
Bugental & Schwartz (2009)	N=102 primarily Latino mothers. The effectiveness of a home-visitation program for enhancing the early parenting history of infants born at medical risk, a population that is at risk for mistreatment, was examined. The Healthy Start home visitation program (HV) was compared to the Healthy Start home visitation program which used a cognitively based reframing intervention (HV+).	With the HV+ condition, a lower use of corporal punishment was observed as well as greater safety maintenance in the home and fewer reported child injuries.	Parents who felt higher control over caregiving outcomes were less likely to mistreat their children than parents who felt low control. An intervention focused on parent empowerment served as a systematic means of reducing mistreatment.	This RCT was a level-one design. Limitations were that the sample is ethnically biased. The self-report measures posed a potential for error.	The authors identified the Conflict Tactics Scale (CTS) as having a modest reliability at $r=.62$. Internal consistency information was found to be relatively low within this population (α coefficient $=.45$). The reliability of the measure for child injuries was low ($\alpha=.37$). An <i>F</i> test evaluated the manipulation check, as well as parental mistreatment, and safety neglect.
Choi et al. (2010)	N=414 participants in Japan where data were collected at baby check-ups. Participants completed an original questionnaire, the Zung Self-rating Depression Scale (ZSDS), the Parental Bonding Instrument, and the Childcare Anxiety Scale (CAS).	14.5% of the mothers showed higher than moderate levels of depression. Depression was strongly influenced by “worry about parenting” but was not associated with “abusive behavior.” Low “maternal care” had the most influence on “difficulty bonding,” and “difficulty of bonding” only affected “abusive behavior.”	Excessive worrying related to postpartum depression, “fear of being abusive,” and bonding difficulty were the primary predictors of child abuse. The correlation between postpartum depression and abusive behavior identified in previous reports may have been influenced by bonding difficulties.	The study was a level-four design. Limitations were that the study was performed in a limited geographical region. Reliability of replies to a self-administered questionnaire can be concerning. The participants who completed the questionnaire may not accurately reflect the maternal population.	Covariance structural analyses were performed to examine interconnections among the Parental Bonding Instrument subscales, CAS subscales, and ZSDS.

Authors & Date of Publication	Population/Sample Size & Methods	Results	Implications	Levels of Evidence/ Study Limitations	Identifying Rules of Inference
Dias et al. (2005)	N=65,205 Commitment Statements (CSs) All hospitals in an 8-county region of western New York state participated in a program to educate parents about violent infant shaking. They provided both parents with information about the dangers of shaking, providing alternative responses to persistent infant crying, and had both parents voluntarily sign a CS affirming their receipt and understanding of the materials.	65,205 CSs were recorded, representing 69% of the 94,409 live births during the study period. 96% of the CSs were signed by mothers and 76% by fathers/father figure. Follow-up surveys 7 months later suggested >95% of parents remembered receiving the information. The incidence of abusive head injuries decreased by 47% during the 5.5-year study period.	A coordinated, hospital-based parent education program targeting parents of all newborn infants can significantly reduce the incidence of abusive head injuries among infants and children.	This study was a level-three control design. This study was not a randomized, controlled trial which raises the possibility that confounding variables had an effect on the outcome.	Poison regression analyses with a type I error rate of 0.05 contrasted the regional incidence of abusive head injuries among infants in the study group and the historical control group.
Esernio-Jenssen, Tai, & Kodsi (2011)	N=34 cases of abusive head trauma (AHT). A retrospective chart review of AHT from 1998 to 2008 examined patients' clinical data and information regarding the perpetrator's legal outcome. The relationship of brain injury, retinal hemorrhages, and differences in categorical variables of perpetrator gender were compared.	Male perpetrators were younger, more likely to confess, and more likely to be convicted. Victims of male perpetrators had more serious, acute presentations and neurosurgical intervention, suffering worse clinical outcomes.	This study differed from previous ones because female and male perpetrators were equal. Additional research is needed to determine if perpetrator disparities for victim presentation and outcomes are gender dependent or, rather, attributable to the physical size of the perpetrator.	This study was a level-four design. Limitations included data only being collected from a single institution; a small sample size; possible selection bias; and reliance on perpetrator confessions, which may not be completely accurate.	Fisher's exact test examined categorical variables of perpetrator gender. Differences in continuous variables between perpetrator genders were compared by using the Mann-Whitney test.
Gill et al. (2009)	N=59 deaths due to injuries in children younger than 2 years during a 9-year period were retrospectively reviewed. The review included autopsy, toxicology, microscopy, neuropathology, and police and investigators' reports.	There were 46 homicides, 8 accidents, and 1 undetermined death from blunt-impact injury of the head. In 10 of the homicides, there was no impact injury to the head, and the cause of death was whiplash shaking.	The autopsy findings and circumstances were diagnostic of a nonimpact, shaking mechanism as the cause of death. Fatal, accidental head injuries in children younger than 2 years are rare.	The retrospective chart review was a level-four design. A limitation was the lower level of evidence.	Descriptive statistics described the study's findings. The statistics was appropriate and uncomplicated.

Authors & Date of Publication	Population/Sample Size & Methods	Results	Implications	Levels of Evidence/ Study Limitations	Identifying Rules of Inference
Goulet et al. (2009)	N=263 parents (73.8% mothers, 26.3% fathers) who received the intervention after their child's birth and 69 nurses who administered the intervention. This qualitative and quantitative assessment was performed by using interviews and questionnaires. Parents' and nurses' opinions regarding the adequacy of an educational program on Shaken Baby Syndrome, the Perinatal Shaken Baby Syndrome Prevention Program (PSBSPP), was reviewed.	Both parents and nurses supported this initiative. Most parents appreciated the usefulness of the information. Nurses believed the program was adequate, and their training to deliver the program was satisfactory. All participants reported that the program was highly relevant for new parents.	The PSBSPP achieved the goals of increasing parents' knowledge about infant crying, anger, and SBS. Parents found help identifying the coping strategies. Introducing the PSBSPP at all birthing institutions was supported.	This study was a level-four design. The study had some limitations. There was low nurse participation at one site. Parents' readiness and receptivity could have been less than optimal at 24 to 48 hours after birth when the intervention was performed. The study did not evaluate actual knowledge, merely perceived knowledge.	Descriptive statistics were used for the demographic profile to show trends. Bivariate analyses also allowed for the study of relationships among parity, parent gender, and responses. Descriptive data from the interviews and direct quotes were used to analyze interviews.
Hartman et al. (2008)	N=68 population and hospital discharge data since 2001 from all of the healthcare referral regions in 6 U.S. states (FL, MA, NJ, NY, TX, and VA). Children with severe TBI were identified by specific classification tools. High-level centers were described as either level I or pediatric trauma centers. Areas were considered to be well regionalized if $\geq 90\%$ of severe traumatic brain injury hospitalizations were at high-level centers.	Of 2,117 admissions for severe TBI, 67.3% were at high-level centers, and 87.3% were at either high-level or level II centers. Only 2 states, MA and VA, were well regionalized. Only 19.1% of healthcare referral regions were well regionalized.	Almost 1/3 of the children with severe TBI failed to receive care at high-level trauma centers. The study highlighted problems with current pediatric trauma care that can serve as a basis for additional research and healthcare policy.	This study was a level-four design. The use of administrative data was a limitation. Limited clinical information was evident in the analysis. The geographic location of patient injury could not be accurately defined.	Differences in proportions were tested using binomial and X^2 tests. The correlation between state rates and the age in years of their trauma system assessed whether rates of care at high-level centers were associated with maturity of the statewide trauma centers. Multivariate analyses using generalized estimating equations analyzed the independent contribution of potential predictors of admission to a high-level center.

Authors & Date of Publication	Population/Sample Size & Methods	Results	Implications	Levels of Evidence/ Study Limitations	Identifying Rules of Inference
Lang, Gartstein, Rodgers, & Lebeck (2010)	N=44 female participants. To be included in the study, women had to be pregnant with a single child, be over 18, and be able to speak English. The childhood Trauma Questionnaire (CTQ), State-Trait Anxiety Inventory (STAI), Beck Depression Inventory II (BDI-II), PTSD Checklist Civilian Version (PCL-C), Infant Behavior Questionnaire-Revised (IBQ-R), Parenting Sense of Competence Scale (PSOC), and Parenting Stress Index-Short Form (PSI-SF) were used for the study. The women initially completed the questionnaires and were followed via 3 telephone calls during their pregnancy. Follow-up occurred shortly after the child's birth and after the child's first birthday.	Maternal childhood maltreatment was related to the quality of the mother-child relationship and maternal perceptions of infant temperament. However, the two are not interconnected in infancy. Maternal history of emotional abuse was predictive of a higher level of parent-child interactional dysfunction; however, physical abuse was associated with lower levels of mother-child interactional difficulties.	This study added to evidence that the impact of childhood maltreatment extends across generations. Results of the study had clinical implications for service providers working with parents and infants. Interventions could be developed to offset the negative effects, thus interrupting the cross-generational impact of abuse.	This study was a level-four design. Limitations included the maternal history of childhood neglect not being examined, a limited sample size, and study information relying entirely on the mother.	Average scores from the questionnaires were computed along with the standard deviation observed. Hierarchical Multiple Regression analyses were performed to address the hypotheses.
Nash, Morris, & Goodman (2008)	N=24 parents of infants attending one of two child-health clinics between January 20 th and February 15 th , 2004 (22 mothers and 2 fathers). The aim of the study was to describe mothers'/fathers' opinions about the crying behavior of infants under 1 year of age to establish some baseline information that could be utilized to design preventative programs and parent education.	Parents feel responsible if their baby cannot be consoled. Fathers cope with a crying infant by passing the care back to the mother. Parents indicated that they felt infants cry because they want attention, which could lead to parents feeling resentful. Infants will cry as a reaction to parental stress. Parental tiredness was shown to lead to irritability and a reduced level of patience with a crying infant.	Professionals working with new parents need to be aware of such factors and to give straightforward messages to parents about how long infants may cry, that infants often seem to cry for no apparent reasons, and that neither the parent nor the infant is at fault.	A descriptive, qualitative study was undertaken using Blumer's (1969) principles of symbolic interaction as the basis for analysis. This study was a level-four design.	The interview transcripts were subjected to a constant comparative analysis based on Blumer's underlying principles. Themes were identified, and a coding grid was compiled, indicating where and how often the themes were found.

Authors & Date of Publication	Population/Sample Size & Methods	Results	Implications	Levels of Evidence/ Study Limitations	Identifying Rules of Inference
Olds (2008)	3 trials. N=400 (Elmira sample, primarily white). N=1,138 (Memphis sample, pregnancy phase, primarily black). N=743 (Memphis sample, infancy phase, primarily black). N=735 (Denver, primarily Hispanic). The paper summarized a 30-year program of research, the Nurse-Family Partnership, which is designed for low-income mothers who have had no previous live births. The home-visiting nurse works to improve the outcomes of pregnancy by improving prenatal health; to improve the child's health and development by helping parents provide more sensitive and competent care of the child; and to improve the parental life-course by helping parents plan future pregnancies, complete their education, and find work.	In Elmira, nurses visited children born to low-income, unmarried. After the regular visits, teens had 80% fewer verified cases of child abuse and neglect than the control group. At 6 months of age, nurse-visited unmarried teens reported that their 6 month old infants were less irritable and fussy than did the control group. In Memphis, the nurse-visited group had fewer subsequent pregnancies, fewer dependent children and food stamps, and higher rates of living with the biological father of the child. Denver results were similar to Elmira and Memphis.	The Washington State Institute for Public Policy conducted a thorough economic analysis of prevention programs. The report summed the findings across all 3 NFP trials and estimated a savings of \$17,000 per family.	This study was a level-one design. A limitation of the study was the slight lack of geographic variety.	Two-tailed tests were used to assess for significance. Values were considered significant at $P < 0.05$.
Russell & Britner (2006)	N=288 undergraduate students (pilot study). N=264 community participants/adults (current study). Participants were given educational materials after the baseline assessment, and then follow-up surveys were mailed to participants 2, 6, and 12 weeks after the date of their enrollment.	Over 80% of the sample reported that they had heard of SBS previously.	The Awareness Assessment can offer reliable measures of attitudes towards infant caregiving. The short amount of time taken to complete the assessment tool could be an easy way to measure caregiver education concerning the care of infants younger than 2 years.	This study was a level-four design. Given the lack of details provided in the responses to certain items, discussions about self-regulation and coping skills might be better suited to an interview format which would allow for additional details to ensure comprehension and more authentic, reflective responses.	The factor analysis and internal consistency methods were used to examine the structure and reliability of the awareness measure. Independent <i>t</i> -tests were useful in examining red-flag group membership, caregiver status, whether participants had heard of SBS previously, and sex as independent variables. One-way ANOVAs analyzed open-ended responses, participant age, income, ethnicity, and education.

Authors & Date of Publication	Population/Sample Size & Methods	Results	Implications	Levels of Evidence/ Study Limitations	Identifying Rules of Inference
Talvik, Alexander, & Talvik (2008)	N=26 head-injury cases diagnosed at 2 tertiary centers for children in Estonia between 1997 to 1999 retrospectively reviewed to determine whether they met study criteria for SBS. All head injuries from 1997 to 2003 were reviewed by the same pediatric neurologist.	5/26 children were identified in the retrospective study group, and 21/26 were identified in the prospective study from 2000-2003. The incidence of SBS was 28.7 per 100,000 children under age 1 during the entire study period in Estonia. In the retrospective study, incidence was 13.5 per 100,000 children under age 1, and it was 40.5 per 100,000 in the prospective study. The mean age at admission was 3.9 months while the highest minutes of crying per day in infants occurred between 4 and 10-12 weeks of age. Outpatient records showed almost all parents in the study group (23/26) had contacted their family physicians because of the baby's excessive crying or irritability prior to the admission with SBS or death.	The slight time lag between peak crying episodes and SBS admissions shows that there is time for medical professionals to provide counseling to families in need.	This level-four design had a limitation of only looking at a small sample size in Estonia.	The authors made inferences using confidence intervals and described the data with descriptive statistics.

Authors & Date of Publication	Population/Sample Size & Methods	Results	Implications	Levels of Evidence/ Study Limitations	Identifying Rules of Inference
Talvik et al. (2007)	N=22 survivors of SBS in Estonia. N=95 healthy children with normal development who were matched by age, sex, and native language to the Estonia survivors. The purpose was identifying long-term neurological and developmental outcomes for children with iTBI.	2 of 22 survivors had no developmental problems; 20 or 22 children were having different developmental problems; among them, 3 of 22 were severely handicapped. Epilepsy was found in 7 of 22; serious motor problems were identified in 5 of 22. The most important predictor of an adverse outcome was young age at the time of injury	Prevention of SBS was the key because the 22 children were potentially healthy prior to the injury.	This level-two design had a limitation of a large difference in the number of SBS (22) subjects and the control group (95). Also, only children in Estonia were analyzed.	Continuous variables were presented as mean values (95% CI), and qualitative variables were presented as absolute and relative frequencies. The Kolmogorov-Smirnov criterion was used for the assessment of normality. The nonparametric Mann-Whitney U test studied the differences between SBS and control groups.
Trokel, Waddimba, Griffith, & Sege (2006)	N=2,253 weighted cases of patients <1 year old with TBI and femur fractures. Children were excluded if they were not admitted through the emergency department or if they were injured by a motor vehicle, gunshot, or knife stabbing. The study examined the role of hospital type in observed variations and the frequency of diagnosing child physical abuse among children with high-risk injuries.	The proportion of patients with a medical diagnosis of child abuse varied widely between hospital types: 29% of the cases were diagnosed as abuse at children's hospitals compared with 13% at general hospitals. An estimated 178 infants with these specific injuries would have been identified as abused had they been treated at children's hospitals rather than general hospitals.	Quality improvement programs may be needed at general hospitals, where the majority of injured U.S. children receive emergent medical care.	This study was a level-four design. The limitation of this study was that the definitive diagnosis of child abuse is difficult to ascertain; this study used clinical diagnosis of child abuse as defined by each institution. The diagnosis may be incorrect, and the diagnosis may have been missed. There could be misclassification bias because of these errors.	A regression model estimated the number of abuse cases that would have been diagnosed if all hospitals identified abuse as frequently as observed at pediatric specialty hospitals.

APPENDIX B. NDSU IRB APPROVAL



Tuesday, July 09, 2013

FederalWide Assurance FWA00002439

Molly Secor-Turner
Nursing
222J Sudro Hall

Re: IRB Certification of Exempt Human Subjects Research:
Protocol #PH13287, "Evaluating an Evidence-Based Prevention Program: The Period of
PURPLE Crying: An Abusive Head Trauma Prevention Program"

Co-investigator(s) and research team: Jenna Stout

Certification Date: 7/9/2013 Expiration Date: 7/8/2016
Study site(s): varied
Funding: n/a

The above referenced human subjects research project has been certified as exempt (category # 1) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, *Protection of Human Subjects*). This determination is based on protocol materials (received 7/1/2013).

Please also note the following:

- If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
- Conduct the study as described in the approved protocol. If you wish to make changes, obtain approval from the IRB prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Report any significant new findings that may affect the risks and benefits to the participants and the IRB.
- Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.

Sincerely,

A handwritten signature in cursive script that reads "Kristy Shirley".

Kristy Shirley, CIP, Research Compliance Administrator

INSTITUTIONAL REVIEW BOARD

NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8995 | Fax 701.231.8098 | ndsu.edu/irb

Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo, ND 58102

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APPENDIX C. IMPLEMENTATION PROTOCOL

- Identify subject population (any parent or guardian of an infant (less than 6 months of age). The parents/guardians may be with their infant for a well-child visit, episodic complaint visit, or in-home visit. Note: *no pregnant women may participate in the surveys, due to IRB regulations in an effort to protect vulnerable populations.*
- Approach subjects about participating in the project. *Read script:* We are working with a local graduate nursing student who is assessing current knowledge related to normal infant development and crying patterns, as well as knowledge about Shaken Baby Syndrome. You were selected as a possible participant as you are the parent or guardian of an infant. The process would involve taking a short pre-education survey, viewing a 10 minute DVD which is yours to keep, reviewing the educational pamphlet, again which is yours to keep, and finally taking the post-education survey. Please consider participating.
- Hand the subjects the stapled packet of papers. Instruct the subjects to read the project description including risks/benefits of participating. Their verbal consent is all that is needed to participate. Note the first page of consent information, the second pre-education survey page, and final post-survey page.
- If in agreement to participate:
 1. Instruct the subjects to fill out the pre-education survey.
 2. Give the Period of PURPLE Crying educational DVD/pamphlet bundle to subjects. Provide the portable DVD player, or laptop in which the subjects will view the 10-minute PURPLE DVD.

3. Briefly review the pamphlet with the subjects emphasizing (this can be done in as little as three minutes depending on your desire):
 - PURPLE Acronym
 - Early increased crying is normal
 - Ways to comfort your crying baby
 - Important action steps
 - Why crying is frustrating
 - Why shaking is dangerous
 - Be sure to tell others
 4. Instruct subjects to fill out the post-educational survey after visit is concluded.
 5. Place stapled packet of papers in the manila envelope provided, and later in sealed green designated box.
- Implementation will last approximately three months. If you have any questions during this time, please call me at 701-893-8180. I can also be reached at jenna.stout@my.ndsu.edu.
- Thank you for helping me with my project!

APPENDIX D. HEALTHCARE PROVIDER CONSENT AND SURVEYS



Title of Research Study: Evaluating an Evidence-Based Prevention Program: The Period of PURPLE Crying: An Abusive Head Trauma Prevention Program

Dear medical staff providing care for parents and guardians of infants:

My name is Jenna Stout. I am a graduate student in Nursing at North Dakota State University, and I am conducting a research project to assess current knowledge related to normal infant development and crying patterns, as well as knowledge about shaken baby syndrome. It is my hope, that with this research, we will learn more about the ways to educate parents about normal infant crying patterns, ways to sooth an inconsolable infant, how to cope with an inconsolable infant, and the dangers of shaking an infant.

Because you work closely with infants and their caregivers, you are invited to take part in this research project. Your participation is entirely your choice, and you may change your mind or quit participating at any time, with no penalty to you.

It is not possible to identify all potential risks in research procedures, but we have taken reasonable safeguards to minimize any known risks. These known risks include loss of confidentiality, and emotional or psychological distress.

By taking part in this research, you may benefit by learning about the Period of PURPLE crying and strategies to educate caretakers of infants about how to keep their infant safe. However, you may not get any benefit from being in this study. Benefits to others are likely to include knowledge shared about the dangers of shaking an infant.

It will take about 10 minutes to complete an open-ended question pre-survey related to your current knowledge and practice in providing education about shaken baby syndrome. At the completion of the project (in approximately three months' time) a post-survey of open ended questions will be conducted to assess the knowledge gained from your stand point and your experiences with implementing the Period of PURPLE Crying education. During a three month time period healthcare professionals including yourself (registered nurses, family nurse practitioners, and physician assistants) will be administering the Period of PURPLE Crying education to parents and guardians of infants in the outpatient rural clinic setting and in home setting through the Nurse Family Partnership.

This study is anonymous. That means that no one, not even members of the research team, will know that the information you give comes from you.

Your participation in this survey indicates you have read and understand the consent information provided to you.

If you have any questions about this project, please contact me at (cell) 701-893-8180 or jenna.stout@my.ndsu.edu, or contact my advisor Molly Secor-Turner at molly.secor-turner@ndsu.edu or 701-231-7517.

You have rights as a research participant. If you have questions about your rights or complaints about this research, you may talk to the researcher or contact the NDSU Human Research Protection Program at 701.231.8908, toll-free at 1-855-800-6717, by email at ndsu.irb@ndsu.edu, or by mail at: NDSU HRPP Office, NDSU Dept. 4000, P.O. Box 6050, Fargo, ND 58108-6050.

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Pre-Survey for Healthcare Providers of Infants: Period of PURPLE Crying Education Implementation

1. Please describe your current practice of providing education about infant crying patterns and or the dangers of Shaken Baby Syndrome.
2. Describe your comfort level with talking with parents/guardians or infants about the dangers of shaking a baby.
3. Do you feel currently there is enough time spent on Shaken Baby Syndrome (SBS) prevention education?
4. In simple terms, describe your knowledge of SBS.

Post-Survey for Healthcare Providers of Infants: Period of PURPLE Crying Education Implementation

1. Describe your feelings related to providing the PERIOD of PURPLE Crying education with parents and guardians of infants.
2. How have your views related to SBS changed or stayed the same.
3. Are you considering changing your strategy or delivery of SBS prevention education after experiencing the PERIOD of PURPLE Crying educational tools?
4. Please list any other comments or concerns related to your involvement in this project.

APPENDIX E. INFANT CAREGIVER CONSENT AND SURVEYS



Title of Research Study: Evaluating an Evidence-Based Prevention Program: The
Period of PURPLE Crying:
An Abusive Head Trauma Prevention Program

Dear parent of guardian of an infant:

My name is Jenna Stout. I am a graduate student in Nursing at North Dakota State University, and I am conducting a research project to assess current knowledge related to normal infant development and crying patterns, as well as knowledge about shaken baby syndrome. It is my hope, that with this research, we will learn more about the ways to educate parents about the dangers of shaking an infant, normal crying patterns in infants, ways to sooth an inconsolable infant, and how to cope with a crying infant.

Because you are the parent or guardian of an infant, you are invited to take part in this research project. Your participation is entirely your choice, and you may change your mind or quit participating at any time, with no penalty to you.

It is not possible to identify all potential risks in research procedures, but we have taken reasonable safeguards to minimize any known risks. These known risks include loss of confidentiality, and emotional or psychological distress.

By taking part in this research, you may benefit by learning about normal infant development and crying patterns, and how to keep your infant safe. However, you may not get any benefit from being in this study. Benefits to others are likely to include knowledge shared about the dangers of shaking an infant.

It will take about five minutes for you to complete a survey related to your current knowledge about infant crying and shaken baby syndrome. It should take about 10 minutes to watch the Period of PURPLE Crying DVD. Next your healthcare provider or nurse will talk with you about the Period of PURPLE Crying and review the pamphlet provided. The Period of PURPLE Crying educational pamphlet and DVD are yours to keep. Finally, you will complete a post-education survey related to your possible gained knowledge about shaken baby syndrome and infant crying patterns.

This study is anonymous. That means that no one, not even members of the research team, will know that the information you give comes from you.

Your participation in this survey indicates you have read and understand the consent information provided to you.

If you have any questions about this project, please contact me at (cell) 701-893-8180 or jenna.stout@my.ndsu.edu, or contact my advisor Molly Secor-Turner at molly.secor-turner@ndsu.edu or 701-231-7517.

You have rights as a research participant. If you have questions about your rights or complaints about this research, you may talk to the researcher or contact the NDSU Human Research Protection Program at 701.231.8908, toll-free at 1-855-800-6717, by email at ndsu.irb@ndsu.edu, or by mail at: NDSU HRPP Office, NDSU Dept. 4000, P.O. Box 6050, Fargo, ND 58108-6050.

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Pre-Survey and Post-Survey

Period of PURPLE Crying Survey for Consenting Parents and Guardians of Infants

How much do you agree with each statement about an infant's behaviors and needs in the first few months of life? Score each statement below with your level of agreement.

Infants cry more often in the late afternoon and evening.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral
Infant crying increases in the first few weeks of life and reaches a peak in the first 2 or 3 months before getting less.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral
If an infant is healthy, it should not cry unexpectedly or without a clear reason.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral
When an infant cries it is always a sign that something is wrong.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral
Sometimes a crying infant can look like she/he is in pain even when they are not.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral
Sometimes healthy infants can cry for 5 or more hours a day.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral
A good parent should be able to soothe his or her crying infant.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral
It is ok to walk away from a crying infant when his or her crying becomes very frustrating.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral



One important role for parents is to protect their infant by making sure people who take care of their infant know about the dangers of shaking an infant.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral
Shaking an infant can cause serious health problems or even death.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral
Shaking a baby is a good way to help a baby stop crying.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral
Sometimes infant crying can be so frustrating or upsetting that I can see how someone might shake or hurt an infant.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral
Shaking a baby can be very dangerous and can cause serious injuries.				
Strongly Agree	Agree	Strongly Disagree	Disagree	Don't Know/Neutral

Describe two appropriate techniques to help soothe an infant.

- 1.
- 2.

Describe two ways to stay calm when caring for an inconsolable infant.

- 1.
- 2.

APPENDIX F. EXECUTIVE SUMMARY

Introduction

Shaken Baby Syndrome (SBS) is an abusive head injury where an infant is submitted to severe, repetitive acceleration-deceleration forces with or without blunt impact to the head (Centers for Disease Control and Prevention, 2012). Thirteen to thirty percent of infants diagnosed with abusive head trauma die as a result of their injuries (Dart, 2009). Fifty to ninety percent of survivors are left with varying degrees of disabilities, ranging from serious behavioral disorders and learning disabilities to paralysis, blindness, and permanent vegetative states (Reece, 2008).

Project Purpose

The purpose of the dissertation was to increase knowledge about Shaken Baby Syndrome (SBS) and to help prevent future occurrences. A family medicine clinic in rural North Dakota and the Nurse Family Partnership of Cass County, ND, participated in the project.

SBS Educational Tool Utilized

The Period of PURPLE Crying, an SBS prevention campaign, was utilized to educate infant caregivers, as well as the registered nurses and family nurse practitioners delivering the education. The program utilizes a 10-minute DVD and a pamphlet to deliver the education. The acronym PURPLE describes the normal characteristics of infant crying. The education stresses how frustrating infant crying can be. The caregivers learn ways to console an infant, ways for the caregiver to stay calm, and how dangerous it is to shake an infant.

Project Description

The targets of the evaluation were infant caregivers and the healthcare providers implementing the education. Pre-surveys utilizing a Likert scale and four short-listing questions

assessed infant caregivers' knowledge and beliefs about SBS. A post-survey utilizing the same questions was then used to assess any changes in knowledge and beliefs about SBS.

The healthcare providers' knowledge and current practices for educating about SBS were evaluated with a free-response pre-survey. After the Period of PURPLE Crying was implemented for 3 months, a post-survey assessed what the providers had learned and how they felt about the educational tool, again utilizing free-response questions. Response themes were compiled; the majority of the healthcare providers' feedback was positive in relation to their experience implementing the program.

Results

After the Period of PURPLE Crying education, there was increased knowledge related to normal infant crying patterns among both the infant caregivers and the healthcare providers. The infant caregivers also showed an understanding about how dangerous shaking can be. The Period of PURPLE Crying is a sound curriculum to provide SBS prevention education.

Table F1

Period of PURPLE Crying Survey for Consenting Parents and Guardians of Infants

	ND Clinic Pre- Survey	ND Clinic Post- Survey	NFP Pre- Survey	NFP Post- Survey
	Mean			
Evening Crying	3.6	4.6	3.6	3.9
Increase/Peak of Crying	2.6	4.2	3.6	4.4
Healthy Infants Crying	2.4	2.4	2.9	2.0
Crying Indicates a Problem	2.8	1.6	2.9	1.8
Crying Indicating Pain	3.6	4.4	3.1	3.9
Crying 5 Hours/Day	3.2	4.0	2.3	3.9
Good Parents	2.4	2.0	3.3	2.5
Walking Away	4.4	4.8	4.4	4.8
Telling Others	4.8	4.8	4.9	4.9
Shaking Causes Injuries	5.0	5.0	4.9	4.4
Shaking Stops Crying	1.0	1.0	1.1	1.1
Frustration	3.6	3.6	2.4	2.4
Shaking and Serious Injuries	5.0	4.0	5.0	4.5

Table F1. *Period of PURPLE Crying Survey for Consenting Parents and Guardians of Infants (continued)*

	ND Clinic Pre- Survey	ND Clinic Post- Survey	NFP Pre- Survey	NFP Post- Survey
Techniques to Soothe Infant	N			
Rocking	4	1	3	3
Verbal Soothing	2	3	3	4
Physical Soothing	3	5	4	4
Riding in Car	1	-	-	-
Pacifier	-	-	1	2
Feed	-	-	1	1
Swaddling	-	-	1	-
Put Baby in Crib	-	-	-	1
White Noise	-	-	-	1
Unanswered	-	1	1	-
Ways to stay calm when caring for an inconsolable infant	N			
Talk with Spouse	1	-	-	-
Take a Time Out/Walk Away	5	4	6	9
Count to 10	1	-	-	-
Deep Breathing	1	-	1	-
Ask for Help	2	2	1	2
Distract Yourself	-	-	1	-
Putting it into Perspective	-	-	3	2
Sing	-	1	-	-
Moving	-	-	-	1
Holding	-	-	-	1
Rocking Baby in Chair	-	-	-	1
Unanswered	-	2	1	-

Table F2

Rural North Dakota Clinic Family Nurse Practitioner Survey Responses (N=1)

Pre-Survey	
Current practice of providing education about infant crying patterns and or the dangers of shaken baby syndrome.	“Generally discuss it with parents at their first well child visit.”
Comfort level talking with parents/guardians of infants about the dangers of shaking a baby.	“Not very comfortable discussing this topic.”
Is enough time spent on SBS prevention education?	“No, they should have education on the topic before they leave the hospital and again at the well child visits.”
Describe your knowledge of SBS.	“SBS can cause brain damage and even death.”

Table F2. *Rural North Dakota Clinic Family Nurse Practitioner Survey Responses (N=1)*
(continued)

Post-Survey	
Feelings about providing the Period of PURPLE Crying education.	“Excellent education piece for and most parents were willing to watch the video and review the materials provided.”
How have your views changed related to SBS?	“Was unaware that it was normal for infants to have an increased level of crying, that it is not necessarily colic or that they are in pain.”
Are you considering changing your strategy or delivery of SBS prevention education after experiencing the Period of PURPLE Crying educational tools?	“Yes, we will continue to show the video to new parents during their well child visits.”
Other comments.	“Thank you for providing us with this excellent education piece.”

Table F3

Nurse Family Partnership’s Registered Nurse Survey Responses (N = 7)

Pre-Survey	
Current practice of providing education about infant crying patterns and or the dangers of shaken baby syndrome.	NFP curriculum consists of prenatal mom home visits during the 3rd trimester. They utilize brochures, handouts (Never Shake a Baby, Five Calming Reflexes), and a DVD (The Happiest Baby on the Block) to provide education. They talk some about ways to cope with a crying baby. Review crying and soothing a few weeks after the infant is born. “It is normal for an infant to cry it seems to peak around six weeks; I give parents a SBS brochure and also handouts from our NFP guidelines.”
Comfort level talking with parents/guardians of infants about the dangers of shaking a baby.	Four RNs felt they were very comfortable about talking with parents about SBS prevention. Two stated that they were comfortable, and one felt “pretty comfortable.”
Is enough time spent on SBS prevention education?	Four of the surveyed RNs felt there is not enough education about SBS. Two felt that NFP does a good job providing education but were not sure other prenatal populations were receiving enough education. “I think increasing awareness can only help.”
Describe your knowledge of SBS.	The nurses reported that SBS can happen when caregivers are frustrated by crying and do not understand they can lay the child down and take a break; they get upset and shake the infant to stop the crying. The shaking can cause blindness, paralysis, and death. The RNs’ understanding of the condition is largely from their NFP curriculum and other North Dakota state pamphlets they receive. “I know it is on the increase in our area and needs further addressing.”

Table F3. *Nurse Family Partnership's Registered Nurse Survey Responses (N = 7) (continued)*

Post-Survey	
Feelings about providing the Period of PURPLE Crying education.	All positive reviews obtained related to implementing the Period of PURPLE Crying. No negative feedback was obtained. "I love it; any skills we can provide for parents to support them in parenting is good." "It is very worthwhile, the education is a must."
How have your views changed related to SBS?	Three of the RNs felt their views had not changed after implementing the Period of PURPLE Crying for 3 months. Two RNs commented how they learned it can be normal for babies to cry for long periods on end, a risk factor for SBS. "I learned from the 30 minute educational power point that crying is normal and that it starts, peaks, and diminishes. I had some knowledge, but now I am more prepared to talk with families about the subject."
Are you considering changing your strategy or delivery of SBS prevention education after experiencing the Period of PURPLE Crying educational tools?	Three of the RNs will not continue to use the Period of PURPLE Crying education during their third-trimester SBS prevention education. They will continue to use what they are familiar with, i.e., the 5 calming reflexes. Four of the nurses stated they will continue to use the Period of PURPLE Crying educational tools. "Yes! Even after the three month trial I would like to continue with this curriculum at Fargo Cass Family Health."
Other comments.	"I love the video, most of our clients are visual learners and this helps them understand better." "I wish swaddling was shown in the crying, soothing, and coping session." "My clients who received the DVD in the hospital had not watched it at home. Clients found it helpful after watching it."

Implication for Practice

The most important thing to understand about SBS is that the condition is preventable. NPs who provide primary care to infants and children are in the ideal position to address the risks and long-term effects of SBS because they are able to both diagnose injuries and, more importantly, educate parents about the dangers of shaking an infant (Reynolds, 2008).

NPs working with new parents need to provide thorough teaching and counseling related to the inconsolable crying periods that infants sometimes have. Parents may feel inadequate and need to be assured that the increased crying is normal and that neither the parent nor the infant is at fault (Nash et al., 2008). The Period of PURPLE Crying program can be very helpful to guide

the caregivers in recognizing that this occurrence is normal and that they are not doing anything wrong. Perhaps, the most important thing to reiterate is that the period of increased crying comes to an end and does not last forever (R. G. Barr, Barr, Fujiwara, et al., 2009).

Implications for Future Research

The sole NP who participated in the entirety of the 3-month implementation expressed very positive results related to the SBS prevention program utilized. No studies examining the Period of PURPLE Crying program and healthcare providers' comfort level providing the education were found during the literature review. Further research may examine the success of prescribed SBS prevention education versus the original education given by healthcare providers. Does the curriculum actually make it easier to deliver education related to SBS?

Conclusion

Healthcare providers need to familiarize themselves with the etiology behind SBS and need to embrace prevention strategies. Parents and caregivers need to be educated and informed about how to cope with the stresses of a crying infant. The PIP utilizing the Period of PURPLE Crying showed an increase in the infant caregivers' and healthcare providers' knowledge about normal infant-crying patterns, calming techniques, strategies to cope with stressful crying bouts, and the dangers of shaking an infant.