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Evaluation of Period of PURPLE Crying, an Abusive Head Trauma Prevention Program

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ABSTRACT

The Period of PURPLE Crying program is used to educate parents and caregivers about normal infant crying and the dangers of infant shaking. We evaluated nurse-led, hospital-based implementation of the program using a nonexperimental, posttest-only design. New mothers rated the program as useful, and the program was effective in teaching mothers about normal infant crying, the dangers of infant shaking, and soothing and coping techniques. The findings support the feasibility and need for broad dissemination of the program.

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Pediatric abusive head trauma (AHT), a form of inflicted brain injury resulting from violent shaking or blunt impact, is a leading cause of death in children younger than age one year with mortality rates ranging from 15% to 38% (Stewart et al., 2011; Ward, Bennett, & King, 2004). The estimated annual incidence of AHT for infants younger than age one is between 29 and 39 per 100,000 infants, although the actual number of AHT cases is likely underreported. Pediatric AHT and AHT prevention have received increased attention, in part due to substantially higher rates during the recent economic recession in the United States (Berger et al., 2011). Although recent studies indicate the rates of AHT are no longer increasing, AHT remains a pressing public health issue (Niederkrotenthaler, Xu, Parks, & Sugerman, 2013).

Abusive Head Trauma

The Centers for Disease Control and Prevention (CDC) defined AHT as injury due to inflicted blunt impact and/or violent shaking that results in injury to the skull and/or brain (Parks, Annest, Hill, & Karch, 2012). Abusive head trauma is one of the most deadly forms of child abuse (Scribano, Makoroff, Feldman, & Berger, 2013). It often results in damage to the brain, retinal hemorrhages, and fractures (Shanahan, Zolotor, Parrish, Barr, & Runyan, 2013). Compared with infants who experience other forms of brain injury, infants who experience AHT are 5 times more likely to die and 8 times more likely to have long stays in the hospital following injury (Niederkrotenthaler et al., 2013). There is very limited recent information available about the long-term consequences of AHT, but early research suggests infants who experience AHT are more likely to have life-long disability including neurologic, cognitive, visual, and developmental impairment compared with infants who experience other forms of head trauma (Ewing-Cobbs et al., 1998). By the time they reach school age, children who experienced AHT often exhibit significant weaknesses in intelligence quotient (IQ), working memory, mental organization, and inhibition (Stipanicic, Nolin, Fortin, & Gobeil, 2008). Nearly all infants who survive AHT will require some form of ongoing care for the rest of their lives (King, MacKay, Sirnick, & Canadian Shaken Baby Study Group, 2003).

Period of PURPLE Crying

To prevent AHT, several parent-education programs have been developed and implemented among infant caregivers (Barr, Barr, et al., 2009;

Barr, Rivara, et al., 2009; Dias et al., 2005; Goulet et al., 2009; Stewart et al., 2011). The Period of PURPLE Crying is one parent education program that educates parents and caregivers about normal infant crying and the dangers of shaking an infant. The education program is based on a developmental framework that suggests that infants go through a unique developmental phase beginning at age 2 weeks through age 3 to 4 months. During this phase, infants may cry for hours despite efforts to soothe them. The crying may come and go without any discernable external or internal stimuli and last for more than 5 hours per day (Barr, 2013). The infants may look like they are in pain, even when they are not. Because soothing techniques are generally ineffective for this type of crying, parents may become very concerned and disappointed (Barr, 2013). The Period of PURPLE Crying intervention program was designed to educate parents about this unique developmental phase (Barr, 2013).

The program includes an education session with a trained health professional, educational brochure, 10-minute DVD, refrigerator magnet, bib, and caregiver checklist (National Center on Shaken Baby Syndrome, 2011). The acronym *PURPLE* is used to describe specific characteristics of an infant's crying: **P**eaks in crying that are **U**nexplained, **R**esists soothing, are accompanied by a **P**ain-like face, are **L**ong-lasting, and occur in the **E**vening and late afternoon (National Center on Shaken Baby Syndrome, 2011). It has been implemented in 49 states, eight Canadian provinces, and one territory. Results from a randomized controlled trial evaluating Period of PURPLE Crying showed mothers who completed the program were more knowledgeable about normal infant crying and the dangers of shaking an infant and were more likely to talk to their infant's other caregivers about the dangers of shaking an infant (Barr, Barr, et al., 2009). Researchers confirmed that mothers gained knowledge through the education session and found a high level of satisfaction among nurses implementing the program (Stewart et al., 2011).

Although the effectiveness of Period of PURPLE Crying has been demonstrated through randomized control trials that were conducted in relatively resource-rich infrastructures (Barr, Barr, et al., 2009; Barr, Rivara, et al., 2009), the program has not been evaluated following implementation in a community where a randomized trial may not be desirable or applicable. Measuring how Period of PURPLE Crying could be implemented in the community and the improvement in participating mothers' knowledge and use of soothing and coping techniques will facilitate broader program implementation and consequently reduce the rate of AHT. The aim of this study was to evaluate Period of PURPLE Crying as implemented in five birthing hospitals located around a Midwest city and to measure the effect of the program on mothers' knowledge of the dangers of shaking an infant and use of techniques for soothing and coping with infant crying.

Methods

Study Design and Participants

We used a nonexperimental, posttest-only design to evaluate the program. Five hospitals were selected and enrolled from a stratified sample pool of 12 hospitals located around a Midwest city. The selected hospitals had annual birth rates ranging from 600 to 3500. Participants included new mothers who received the Period of PURPLE Crying intervention and the nurses who delivered the program. Eligible mothers were those who gave birth in one of the enrolled hospitals from March 15 through August 10, 2011, received the Period of PURPLE Crying intervention, spoke and read English, and agreed to participate in the study through signed informed consent. Eligible nurses were those who received training and delivered the program to mothers during the study period.

Intervention

As part of a state mandate to provide voluntary AHT prevention programs to caregivers of infants and young children, The Period of PURPLE Crying intervention program was implemented in five birthing hospitals with the aim of reducing cases of AHT through a nurse-delivered, in-person, educational program for mothers in the hospital after giving birth (Barr, Barr, et al., 2009). Prior to discharge, all birthing mothers received the Period of PURPLE Crying intervention, including an education session from a trained nurse, a full-color 11-page booklet, and 10-minute DVD to take home. During the education session, nurses used the acronym *PURPLE* to describe characteristics of normal infant crying. Nurses also educated mothers about the dangers of shaking an infant, infant-soothing techniques, and methods for coping with infant crying. Nurses emphasized the importance of walking away when frustrated and educating the infant's other caregivers about the consequences of shaking an infant. After the 10-minute in-person education session, nurses

A high degree of agreement between mother's and nurse's ratings suggests that implementation of Period of PURPLE Crying in a community is feasible.

provided each mother with a booklet and DVD to review at home.

Data Collection and Study Measures

Prior to data collection, a member of the research team met with nursing staff in each of the participating hospitals to introduce the evaluation study and train eligible nurses on study protocol. In addition, the research team member communicated with the labor and delivery nurse manager at each participating hospital on a bi-weekly basis during the study period to answer questions and monitor evaluation progress.

For the implementation evaluation, the mothers and nurse educators completed a survey at the end of each nurse-delivered in-person education session. They were asked to rate how well the education session was delivered using eight questions on a 6-point Likert-type scale, with 1 (*strongly disagree*) and 6 (*strongly agree*). Study measures included the following four domains: (a) attitudes about the education session and AHT; (b) knowledge of normal infant crying, and dangers of shaking an infant; (c) techniques for coping with and soothing infant crying; and (d) intent to share the information with other care provider(s). In addition, mothers were asked to rate the overall usefulness of the education session; provide their demographic information including age, race, education, total number of children, and contact information; indicate whether they received program materials; and indicate whether they watched the DVD during their hospital stays.

For the outcome evaluation, mothers were contacted via phone 2 months after the intervention to measure their knowledge of the dangers of shaking an infant and use of techniques for soothing and coping with infant crying. The follow-up was done 2 months after discharge from the birthing hospital because infant crying and the incidence of AHT peaks around this time (Barr, Trent, & Cross, 2006; Lee, Barr, Catherine, & Wicks, 2007). During the phone interview, mothers were asked to recall coping and soothing techniques they learned in the program, the coping and soothing techniques they had used since discharge and the perceived effectiveness of those techniques, and whether they shared program materials with their child's other care provider(s). They were also asked about their knowledge of normal crying and dangers of shaking an infant using a modified shortened form of a previously developed knowledge scale (Barr, Rivara, et al., 2009).The study protocol and informed consent document were approved by the Iowa Health Des Moines Institutional Review Board prior to the study.

Data Analysis

Descriptive analysis was used to examine the demographic characteristics of mothers, their ratings of the intervention program, knowledge about normal crying and dangers of shaking an infant, and use of behavioral techniques to soothe and cope with infant crying. The percent agreement between mothers and nurses' rating of the intervention were compared across four evaluation domains. Finally, chi-squared tests or Fisher's exact tests were used to assess the associations between mothers' characteristics (e.g., mother's education, first-time mothers, and having watched the DVD) and several intervention outcomes (e.g., knowledge of the dangers of shaking an infant, recall and use of behavioral techniques for soothing and coping, and maternal sharing of program information with other caregivers). The statistical significant level was set at $\alpha = .05$. All analyses were conducted in STATA 11.

Results

A total of 211 mothers and 47 nurses participated in the study and completed the baseline survey. Of the 211 mothers who completed the baseline study,162 (76.8%) mothers were contacted and 68(42.0%) mothers completed the phone interview. Another 59 mothers were not contacted due to the study ending before reaching the 2-month follow-up dates. The average age of mothers was 28.1 years, with a range of 16 to 41 (Table 1). Nearly 70% of mothers were age 30 or younger. Almost three fourths (74.9%) of mothers reported completing at least some college. Nearly one half of participants (46.9%) were first-time mothers. All mothers reported they received the Period of PURPLE Crying education session from a nurse during hospitalization, and only one mother reported not receiving the DVD from the nurse.

Findings from Implementation Evaluation

When asked to rate the usefulness of the education session, 76% (160/211) of mothers rated the program a 9 or 10 on a scale of 1 to 10 with 10 as *very useful*. Only 9% (19/211) of the mothers rated the education session a 7 or less. In the additional

Table 1: Characteristics of Mothers Who Received Period of PURPLE Crying Education

	Baseline *n* (%)	Follow-Up *n* (%)
Total	211	68
Mothers' age, year[a]		
≤ 25	53(25.6)	12 (18.5)
26–30	91 (43.9)	28 (43.1)
31–35	48 (23.2)	17 (26.2)
>35	15 (7.3)	8 (12.3)
Education		
High school or less	53 (25.1)	10 (14.7)
Some college	36 (17.1)	13 (19.1)
Completed college	81 (38.4)	35 (51.5)
Graduate studies	41 (19.4)	10 (14.7)
Parity[a]		
First child	97 (46.9)	32 (47.1)
Not first child	110 (53.1)	36 (52.9)
Watching Video		
Watched in hospital	53 (26.4)	9 (13.2)
Did not watch in hospital	148 (73.6)	
Watched at home or other location	n/a	31 (45.6)
Did not watch video	n/a	28 (41.2)

Note. [a]Sums less than 211 for baseline data or 68 for follow-up data are due to missing values.

comments section, many mothers reflected an appreciation for the opportunity to openly discuss these issues and found the nurse educators to be very helpful and friendly.

There was a high degree of agreement between mother's and nurse's ratings of the program across three evaluation domains: attitudes, knowledge of normal crying and dangers of shaking, and soothing and coping techniques (Table 2). Mother's and nurse's ratings were exactly matched 83.9% of the time in attitudes, followed by knowledge of normal crying (83.4), knowledge of dangers of shaking (81.5%), and knowledge of techniques for soothing (80.0%).However, mother and nurse responses only matched 69.9% of the time regarding intent to share, with nurses rating their perception of mothers' intent to share the program with other caregivers higher than mothers' self-reported intent.

Findings from Outcome Evaluation

In regards to mothers' knowledge of the dangers of shaking an infant, more than one half of mothers (54.4%, 37/68) correctly answered all nine questions of the knowledge scale (Table 3). On the crying subscale, 57.4% (39/68) of mothers correctly answered six questions about normal infant crying. Nearly one fourth (23.5%) of mothers responded incorrectly to "Infants go through a stage around two months where they may cry for up to 5 hours a day," 22.1% missed "A good parent should be able to soothe his or her crying infant," and 17.7% missed "When an infant cries it is always a sign that something is wrong" (correct answers: true, false, false, respectively). On the shaking subscale, nearly all mothers (95.6%, 65/68) correctly answered all three items.

More than one half of mothers were able to recall (35/68, 51.5%) one or more techniques to soothe their infants' crying. More than one half of the mothers also reported trying (40/68, 58.8%) at least one soothing technique. However, fewer mothers were able to recall (28/68, 38.2%) or reported trying (18/68, 26.5%) one or more coping techniques (Table 4).

Table 2: Mother and Nurse Self-Reported Rating of Period of PURPLE Crying ($n = 211$ mothers and $n = 47$ nurses)

Program Domain	Mother Survey Item(s)	Mostly Agree or Strongly Agree (%)	Nurse Survey Item	Mostly Agree or Strongly Agree (%)	Exact Match Between Mother and Nurse(%)[a]
Attitudes[b]	•I felt comfortable talking with the nurse about the Period of PURPLE Crying.	99.0	•I felt confident educating this mother about the Period of PURPLE Crying.	98.1	83.9
	•I understand how to prevent shaken baby syndrome.				
Knowledge of Normal Crying/Dangers of Shaking	•The nurse taught me about normal infant crying.	96.2	•This mother seemed to understand what I told her about normal infant crying.	98.5	83.4
	•The nurse taught me about the dangers of shaking an infant.	98.1	• This mother seemed to understand the dangers of shaking an infant.	97.6	81.5
Techniques of Soothing/Coping[b]	•The nurse taught me ways to help soothe my infant's crying.	97.6	•I taught this mother ways to soothe her baby's crying and/or cope with her own frustration.	94.7	80.0
	•The nurse taught me ways to cope when I am feeling frustrated or overwhelmed by my infant's crying.				
	•I plan to try the soothing and coping techniques that the nurse explained.				
Plan of Sharing	•I plan to talk to my child's other caretakers about the Period of PURPLE Crying and the dangers of shaking an infant.	88.5	•This mother seemed motivated to tell her child's other caretakers about the Period of PURPLE Crying and the danger of shaking an infant.	92.2	69.9

Note. [a]For each domain, agreement was assessed by exactly matched ratings of *mostly agree* or *strongly agree*.
[b]Average rate of multiple items was used.

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Table 3: Mother's Knowledge of Infant Crying and Dangers of Shaking (*n* = 68)

	Correct Answers *n* (%)
Perfect Knowledge Scale Score	37 (54.4)
Crying Subscale	
Perfect Score on Crying Subscale	39 (57.4)
If an infant is healthy, it should not cry unexpectedly or without a reason.	61 (89.7)
Infants go through a stage around two months where they may cry for up to 5 hours a day	52 (76.5)
When an infant cries, it is always a sign that something is wrong.	56 (82.4)
A good parent should be able to soothe his or her crying infant	53 (77.9)
It is OK to walk away from a crying infant when his or her crying becomes very frustrating.	66 (97.1)
Crying is a normal stage of infant development.	67 (98.5)
Shaking Subscale	
Perfect score on Shaking Subscale	65 (95.6)
Shaking an infant usually happens because the parent or caregiver is frustrated with their child's crying.	66 (97.1)
Shaking a baby is a good way to help a baby stop crying.	67 (98.5)
It is the parents' responsibility to make sure that their infant's caregivers know that it is dangerous to shake a baby.	68 (100)

All mothers reported that it is the parents' responsibility to educate their infants' other caregivers about the dangers of shaking an infant. However, only 41% (28/68) of mothers reported sharing information about the dangers of shaking an infant with their child's other caregivers. The most common reasons mothers did not share information with other caregivers were mothers perceived

Table 4: Behavioral Outcomes of Mothers (*n* = 68)

	n (%)	
Soothing	Tried	Able to Recall
Carried	19 (27.9)	10 (14.7)
Comfort	17 (25.0)	10 (14.7)
Walk	25 (36.8)	21 (30.9)
Talk or sing to baby	22 (32.4)	19 (27.9)
Give baby a bath	7 (10.3)	2 (2.9)
Overall	40 (58.8)	35 (51.5)
Coping		
Put baby in a safe place and walk away	13 (19.1)	23 (33.8)
Call a friend, family member for help or support	10 (14.7)	9 (13.2)
Call a parent hotline for support	1 (1.5)	0 (0)
Overall	18 (26.5)	28 (38.2)

The in-person education session of Period of PURPLE Crying might affect mothers more than watching the video.

little risk of shaking because they left their infant with family or a qualified day care provider (39%, 14/36), the infant had no caregivers other than parents (22%, 8/36), or mothers didn't think about sharing or gave no reason (22%, 8/36).

In subgroup analysis, higher education (college degree or higher) was significantly associated with a perfect score on both overall knowledge (p = .02) and on knowledge of normal infant crying (p = .007). In addition, higher education was associated with increased ability to recall one or more techniques for coping with infant crying (p = .01) (Table 5). No significant differences were found between first-time versus multiparous mothers, or having viewed the DVD versus not with outcome measures.

Discussion

This study demonstrated the feasibility of implementing Period of PURPLE Crying in five hospitals in a Midwest state. Nurses reported feeling comfortable facilitating a brief education session about preventing AHT and provided nearly all mothers with a copy of the Period of PURPLE Crying DVD and education materials to take home. The program was well received by mothers in the five hospitals with 76% of mothers rating the education as very useful. Combined with rigorous studies that demonstrate the effectiveness of the program (Barr, Barr, et al., 2009; Barr, Rivara, et al., 2009), our findings support the feasibility and need for broad dissemination and implementation of Period of PURPLE Crying at birthing hospitals.

Despite positive reception of the program by participating mothers and nurses, only 41% of mothers shared program content with their infant's other care providers even though 70% of mothers reported that they intended to during the postintervention survey. One of main reasons that mothers did not share program content was due to low perceived risk for infant shaking by their children's other caregivers, who were described as the other parent, "family," or a "qualified day care provider." Previous research indicates the majority of perpetrators who violently shake an infant resulting in AHT are not mothers (Scribano et al., 2013), and that romantic partners of the infants father or mother perpetrate nearly one half of all AHT cases (Esernio-Jenssen, Tai, & Kodsi, 2011).This finding suggests it may be necessary to modify program content to improve awareness about characteristics of perpetrators, and develop specific strategies to reach other infant caregivers.

Future studies should explore dissemination in other settings, perhaps through multiple doses such as prior to discharge and during a home visit, or with the infant's other caregivers. Implementation of Period of PURPLE Crying in other community settings, such as day care centers, prenatal or postnatal parent education classes, during pediatric office visits, or as part of routine trainings for all day care providers, may be an effective way to reach other caregivers (Barr, Barr, et al., 2009; Barr, Rivara, et al., 2009; Flaherty, Stirling, & American Academy of Pediatrics Committee on Child Abuse and Neglect, 2010; Walls, 2006).

Watching the Period of PURPLE Crying DVD and being given a copy to take home was one component of the intervention program. The authors found watching the DVD, which was viewed by one fourth of mothers in the hospital and 60% of mothers at home, was not significantly associated with improved program outcomes. This is consistent with another video-based intervention study, where simply viewing a video at home did not affect mothers' self-report of reduced infant crying or increased duration of infant sleep (McRury & Zolotor, 2010). This finding suggests that the most important part of The Period of PURPLE Crying intervention is the in-person education session led by the hospital nurse rather than the video. In another study, nurse-led education was found to mitigate maternal stress and enhance knowledge among mothers whose infant was in a neonatal intensive care unit (Morey & Gregory, 2012). Future evaluations should include measures about mode of delivery (e.g., in-person vs. video education) when assessing intervention outcomes.

We found similar program outcomes for all mothers regardless of parity, which is consistent with prior evaluations of Period of PURPLE Crying (Barr, Barr, et al., 2009; Barr, Rivara, et al., 2009). Because multiparity did not result in improved program outcomes, and previous authors found parity was not a significant predictor of child abuse (Overpeck, Brenner, Trumble, Trifiletti, & Berendes, 1998; Windham et al., 2004), this program should be given to all birthing women, not just first-time mothers.

This study had a few limitations. The posttest-only design, with only 42.0% of mothers being

Table 5: Subgroup Analysis of Maternal Knowledge and Behavior Related to Abusive Head Trauma

Subgroup	Shared Y/N	Knowledge Scale Perfect Score/Not Perfect Score	Knowledge Scale: Crying Subscale Perfect Score/Not Perfect Score	Knowledge Scale: Shaking Subscale Perfect Score/Not Perfect Score	Soothing Behaviors: Recalled At least 1/None	Soothing Behaviors: Attempted At least 1/None	Coping Behaviors: Recalled At least 1/None	Coping Behaviors: Attempted At least 1/None
Education								
Less than a college degree	11/12	8/15	8/15	23/0	13/10	16/7	4/19	5/18
College degree or higher	17/28	29/16	31/14	42/3	22/23	24/21	22/23	13/32
$\chi^2(1)$:	$p = .42$	$p = .02$	$p = .007$	$p = .54$[a]	$p = .55$	$p = .20$	$p = .01$	$p = .53$
First Baby								
Yes	15/17	19/13	20/12	30/2	17/15	20/12	13/19	9/23
No	13/23	18/18	19/17	35/1	18/18	20/16	13/23	9/27
$\chi^2(1)$:	$p = .37$	$p = .44$	$p = .42$	$p = .60$[a]	$p = .80$	$p = .56$	$p = .70$	$p = .77$
Watched DVD								
Yes	19/21	22/18	24/16	37/3	23/17	27/13	19/21	13/27
No	9/19	15/13	15/13	28/0	12/16	13/15	7/21	5/23
$\chi^2(1)$:	$p = .21$	$p = .91$	$p = .60$	$p = .26$[a]	$p = .23$	$p = .08$	$p = .06$	$p = .18$

Note. [a] Fisher's Exact Test.

followed 2 months after the intervention, may lead to potential selection bias of our results. Because knowledge of infant crying, shaking behaviors, and techniques for soothing and coping with infant crying was not measured prior to the intervention, it was not possible to demonstrate causation between the education session or DVD and knowledge or behavior outcomes. In addition, the outcome measures used for this study were based on previous developed scale without retesting the reliability. These modifications may affect the accuracy of the study results. Finally, the small sample size of highly educated mothers may limit generalizability to all birthing mothers.

Despite these limitations, Period of PURPLE Crying was highly rated by participating mothers. Our results suggest that the program was effective in teaching mothers about normal infant crying, the dangers of shaking an infant, and soothing and coping techniques. High agreement between mother and nurse ratings of the program suggests the program was well delivered and well received. These findings support the importance of future broad dissemination and implementation of Period of PURPLE Crying to prevent AHT.

REFERENCES

Barr, M. (2013). *What is the period of PURPLE crying?* Retrieved from http://purplecrying.info/what-is-the-period-of-purple-crying.php

Barr, R. G. (2013). *Crying.* Retrieved from http://purplecrying.info/crying.php

Barr, R. G., Barr, M., Fujiwara, T., Conway, J., Catherine, N., & Brant, R. (2009). Do educational materials change knowledge and behaviour about crying and shaken baby syndrome? A randomized controlled trial. *Canadian Medical Association Journal*, *180*(7), 727–733. doi:10.1503/cmaj.081419; 10.1503/cmaj.081419

Barr, R. G., Rivara, F. P., Barr, M., Cummings, P., Taylor, J., Lengua, L. J., ... Meredith-Benitz, E. (2009). Effectiveness of educational materials designed to change knowledge and behaviors regarding crying and shaken-baby syndrome in mothers of newborns: A randomized, controlled trial. *Pediatrics*, *123*(3), 972–980.

Barr, R. G., Trent, R. B., & Cross, J. (2006). Age-related incidence curve of hospitalized shaken baby syndrome cases: Convergent evidence for crying as a trigger to shaking. *Child Abuse & Neglect*, *30*(1), 7–16. doi:10.1016/j.chiabu.2005.06.009

Berger, R. P., Fromkin, J. B., Stutz, H., Makoroff, K., Scribano, P. V., Feldman, K., ... Fabio, A. (2011). Abusive head trauma during a time of increased unemployment: A multicenter analysis. *Pediatrics*, *128*(4), 637–643.

Dias, M. S., Smith, K., DeGuehery, K., Mazur, P., Li, V., & Shaffer, M. L. (2005). Preventing abusive head trauma among infants and young children: A hospital-based, parent education program. *Pediatrics*, *115*(4), e470–e477. doi:10.1542/peds.2004-1896

Esernio-Jenssen, D., Tai, J., & Kodsi, S. (2011). Abusive head trauma in children: A comparison of male and female perpetrators. *Pediatrics*, *127*(4), 649–657. doi:10.1542/peds.2010-1770; 10.1542/peds.2010-1770

Ewing-Cobbs, L., Kramer, L., Prasad, M., Canales, D. N., Louis, P. T., Fletcher, J. M., ... Cheung, K. (1998). Neuroimaging, physical, and developmental findings after inflicted and noninflicted traumatic brain injury in young children. *Pediatrics*, *102*(2 Pt 1), 300–307.

Flaherty, E. G., Stirling, J., Jr, & American Academy of Pediatrics. Committee on Child Abuse and Neglect. (2010). Clinical report-the pediatrician's role in child maltreatment prevention. *Pediatrics*, *126*(4), 833–841.

Goulet, C., Frappier, J. Y., Fortin, S., Deziel, L., Lampron, A., & Boulanger, M. (2009). Development and evaluation of a shaken baby syndrome prevention program. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, *38*(1), 7–21. doi:10.1111/j.1552-6909.2008.00301.x; 10.1111/j.1552-6909.2008.00301.x

King, W. J., MacKay, M., Sirnick, A., & Canadian Shaken Baby Study Group. (2003). Shaken baby syndrome in Canada: Clinical characteristics and outcomes of hospital cases. *Canadian Medical Association Journal*, *168*(2), 155–159.

Lee, C., Barr, R. G., Catherine, N., & Wicks, A. (2007). Age-related incidence of publicly reported shaken baby syndrome cases: Is crying a trigger for shaking? *Journal of Developmental and Behavioral Pediatrics*, *28*(4), 288–293. doi:10.1097/DBP.0b013e3180327b55

McRury, J. M., & Zolotor, A. J. (2010). A randomized, controlled trial of a behavioral intervention to reduce crying among infants. *Journal of the American Board of Family Medicine*, *23*(3), 315–322.

Morey, J. A., & Gregory, K. (2012). Nurse-led education mitigates maternal stress and enhances knowledge in the NICU. *American Journal of Maternal Child Nursing*, *37*(3), 182–191. doi:10.1097/NMC.0b013e31824b4549; 10.1097/NMC.0b013e31824b4549

National Center on Shaken Baby Syndrome. (2011). *Jurisdiction-wide program summaries.* Retrieved from http://www.dontshake.org/sbs.php?topNavID=4&subNavID=35&navID=739

Niederkrotenthaler, T., Xu, L., Parks, S. E., & Sugerman, D. E. (2013). Descriptive factors of abusive head trauma in young children–united states, 2000–2009. *Child Abuse & Neglect*, *37*(7), 446–455. doi:10.1016/j.chiabu.2013.02.002; 10.1016/j.chiabu.2013.02.002

Overpeck, M. D., Brenner, R. A., Trumble, A. C., Trifiletti, L. B., & Berendes, H. W. (1998). Risk factors for infant homicide in the united states. *New England Journal of Medicine*, *339*(17), 1211–1216. doi:10.1056/NEJM199810223391706

Parks, S. E., Annest, J. L., Hill, H. A., & Karch, D. L. (2012). *Pediatric abusive head trauma: Recommended definitions for public health surveillance and research.* Atlanta, GA: Centers for Disease Control and Prevention.

Scribano, P. V., Makoroff, K. L., Feldman, K. W., & Berger, R. P. (2013). Association of perpetrator relationship to abusive head trauma clinical outcomes. *Child Abuse & Neglect*, *37*(10), 771–777. doi:10.1016/j.chiabu.2013.04.011; 10.1016/j.chiabu.2013.04.011

Shanahan, M. E., Zolotor, A. J., Parrish, J. W., Barr, R. G., & Runyan, D. K. (2013). National, regional, and state abusive head trauma: Application of the CDC algorithm. *Pediatrics*, *132*(6), e1546–e1553. doi:10.1542/peds.2013-2049; 10.1542/peds.2013-2049

Stewart, T. C., Polgar, D., Gilliland, J., Tanner, D. A., Girotti, M. J., Parry, N., ... Fraser, D. D. (2011). Shaken baby syndrome and a triple-dose strategy for its prevention. *Journal of Trauma*, *71*(6), 1801–1807. doi:10.1097/TA.0b013e31823c484a; 10.1097/TA.0b013e31823c484a

Stipanicic, A., Nolin, P., Fortin, G., & Gobeil, M. F. (2008). Comparative study of the cognitive sequelae of school-aged

victims of shaken baby syndrome. *Child Abuse & Neglect*, *32*(3), 415–428. doi:10.1016/j.chiabu.2007.07.008; 10.1016/j.chiabu.2007.07.008

Walls, C. (2006). Shaken baby syndrome education: A role for nurse practitioners working with families of small children. *Journal of Pediatric Health Care*, *20*(5), 304–310. doi:10.1016/j.pedhc.2006.02.002

Ward, M. G., Bennett, S., & King, W. J. (2004). Prevention of shaken baby syndrome: Never shake a baby. *Paediatrics & Child Health*, *9*(5), 319–321.

Windham, A. M., Rosenberg, L., Fuddy, L., McFarlane, E., Sia, C., & Duggan, A. K. (2004). Risk of mother-reported child abuse in the first 3 years of life. *Child Abuse & Neglect*, *28*(6), 645–667. doi:10.1016/j.chiabu.2004.01.003