

## Effect of Educational Materials on Mother's Awareness, Knowledge and Behavior Regarding the Dangers of Shaken Baby Syndrome.

Azza Ismail Ismail El Sayed<sup>1</sup>, Sanaa Ahmed MahmoudMohamed<sup>2</sup>.

Lecturer of Pediatric Nursing, Faculty of Nursing, Suez Canal University, Egypt.<sup>1</sup>  
Assistant Professor in Nursing Department, College of Applied Medical Sciences, Jouf University, Kingdom Of Saudi Arabia.<sup>1</sup>

Assistant Professor of Pediatric Nursing, Faculty of Nursing, Cairo University, Egypt<sup>2</sup>.  
Associate Professor in Nursing Department, College of Nursing, King Khaled University, Kingdom of Saudi Arabia.<sup>2</sup>

Corresponding Author: Azza Ismail Ismail El Sayed

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**Abstract: Background:** Shaken baby syndrome (SBS) is a very problematic form of physical violence endured by children. A violent shaking of a child occurs first, with excessive impact resulting in brain trauma and possibly eventual neurological squeals. **Aim:** This study aimed to evaluate the effect of educational materials on mother's awareness, knowledge and behavior regarding the dangers of shaking baby syndrome. **Design:** Aquazi experimental design pre/ post- test one group was utilized. **Sample:** A purposive sample of 50 mothers and their infants. **Tool of data collection:** A structured interview questionnaire sheet included questions about shaking baby syndrome. **Results:** Increased total mean of mother's knowledge and behavior after educational materials and there was a positive correlation with highly statistical significant relation between mother's knowledge and behavior regarding SBS post educational materials. **Conclusion:** Mother's awareness regarding the dangers of shaking baby syndrome improved after explanation of the educational materials. **Recommendation:** Include routinely services (awareness) to avoid shaking baby syndrome in all counseling programs for new parent preparations. Provide all new parents with written information and colored brochures on how to deal with a crying infant especially during the first months of life.

**Keywords:** Shaken baby syndrome, knowledge, behavior, awareness.

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### I. Introduction

Infant crying in the first few months of life is particularly frustrating for parents and the most common cause for shaking and violence (Fujiwara et al., 2012). Shaken baby syndrome (SBS) is a form of traumatic brain injury inflicted which occurs when a baby is shaken violently. The newborn has heavy, large head with a weak neck muscles. Shaking causes the delicate brain to bounce back and forth within the skull, causing bruising, swelling, and bleeding which can result in permanent, serious brain damage or death. Shaken baby injuries usually occur in children under the age of 2 but can be seen in children up to 5 years old (Cowley et al., 2018).

More recently, the American Academy of Pediatrics (AAP) has used the word abusive head trauma (AHT) to describe non-accidental head injury that is secondary to shaking, impact trauma or a combination of both (Mann et al., 2015). Abusive head trauma in infants occurs in developed countries in 24.6 to 39.8 per 100,000 infants (Allen, 2014). Although less frequent than other types of child abuse, such as neglect and witnessing family violence, AHT may lead to more serious outcomes; death occurs in 12% to 36% of cases and 13% to 60% of survivors are experiencing persistent motor visual, cognitive and behavioral problems (Ornstein et al., 2016).

Shaken Baby Syndrome accounts for 95 percent of serious head injuries in children under one year of age. It can happen fast, only 3 seconds of shaking can cause brain damage, paralysis, blindness, difficulties in learning and behavior or even death. Victims of SBS average age is 6 months. Problems of SBS are difficult to be detected due to under reporting and misdiagnosis. There is no established set of symptoms that indicate SBS (Lekarski et al., 2010). There is an increased risk of SBS in children with special needs, multiple siblings or illnesses such as colic. Boys are more likely to be victims of SBS than girls, and children from families living at or below poverty are at increased risk for these injuries and other forms of child abuse (Baratschat et al., 2015 & Valliammal & Ramachandra, 2016).

Symptoms of **SBS** include extreme irritability, lethargy, poor feeding, breathing problems, convulsions, vomiting, and pale or bluish skin **Mayoclinic(2019)**. While the characteristic injuries of SBS are subdural hemorrhages, retinal hemorrhages, damage to the spinal cord and neck, and fractures of the ribs and bones. Shaken baby injuries have a much worse prognosis. Blindness can occur due to damage to the retina of the eye. The majority of infants who survive severe shaking will have some forms of neurological or mental disability, such as cerebral palsy or mental retardation, which may not be fully apparent before 6 years of age; and they may require lifelong medical care **(Valliammal&Ramachandra, 2016)**.

The nurse is in a strategic position in a wide variety of clinical settings for early identification and intervention for families at risk for SBS. For a shaken baby, nurses can engage in emergency management, usually involving life-sustaining interventions such as respiratory support and surgery to stop internal bleeding, particularly in the brain. The only choice for infants at risk of SBS is prevention by parent, caregiver and community-wide education programs **(Altman et al., 2011)** SBS prevention is also the responsibility of every professional working with children and families, and of every individual caring for a baby or young child **(Susamma, 2016)**.

The nurse can help caregivers cope with a crying baby and prevent the irreversible harm of SBS **(Lekarski et al., 2010)** The key element of SBS prevention is the presentation on various occasions, of a clear, strong message by nurses to parents, particularly mothers: during pregnancy, at birth, and during medical follow-up visits. The nurse has a responsibility to educate parents, caregivers, health care professionals and the community about the risks of shaking; the normality of baby crying; a range of soothing and calming strategies for both child and care mothers; and learn how to safely alleviate the burden of caring for young children and additional support services **(Tasar et al., 2014)**.

## **II. Subjects and Methods**

**Aim:** This research aimed to evaluate the effect of educational materials on mother's awareness, knowledge and behavior regarding the dangers of shaking baby syndrome.

**Research hypothesis:**

- Mother's awareness regarding the dangers of shaking baby syndrome will be improved after explanation of the educational materials.

**Operational definitions:**

**Awareness:**-Is the consistency or state of consciousness: awareness and comprehension that something is occurring, or that something exists.

**Knowledge:**- The fact or condition of knowing something with familiarity gained through experience or association.

**Behavior:**-The way someone acts or conducts himself or behaves

**Design:**A pre-/post-test quazi experimental design (one group) was used to test hypothesis of the research.

**Setting:** Maternal and child health centers (El Salam, El Shaikh Zaid and ElKassasen health centers) in Ismailia Governorate.

**Subjects:** Infant's mothers and /or caregivers.

**Sampling and sample size:** From the study settings a purposeful selection of mothers meeting following criteria was recruited (50 mothers).

**Inclusion criteria:**

Mothers of infants who are:-

- 1- Free from congenital diseases.
- 2- Free from physical or mental disability.
- 3- Full-term babies.

**Tool of data collection:**

A standardized questionnaire sheet, developed by the researchers after extensive literature review and written in Arabic to suit the mothers' level of understanding. It was composed of six parts:

- 1- Personal data of mothers as age, education, residence, occupation, income and number of members of the family, and data concerning infants as age, gender and infant ranking.
- 2- Causes of infant's crying.
- 3- The behavior of a mother with crying babies.
- 4- Signs and symptoms of shaken baby syndrome.
- 5- Complications of shaken baby syndrome.
- 6- The ideal behaviors to manage constant crying.

**Scoring System:**

The awareness was divided into two items (knowledge and behavior). The total score of the mother's knowledge was calculated to be 46 against 46 questions. One point for each correct answer was given to the respondent, and zero for incorrect replies. As regards mother behavior towards child shaking, it has been divided into two parts; one part (standard and ideal behavior) has been scored 27 against 27 questions; the other part was scored against 3 questions was calculated to be 9, the respondent was given three points for agree response and two points for not sure response and one point for disagree response, zero for incorrect answers. The awareness score was scored 82 overall. A total score below 60% was deemed unsatisfactory while those equal to or above 60% were deemed satisfactory.

**Content validity:** A jury composed of three pediatric nursing experts to ensure the clarity and completeness of the tool was verified.

**Reliability:** It was done using Cronbach alpha coefficient to assess the internal consistency of the tool and its value was 0.837.

**Pilot Study:** In March 2018, a pilot study was conducted to check the applicability and feasibility of the data collection method, and to estimate the time required to complete the required form. It was carried out on 5 mothers, to evaluate the content of tool and to determine whether or not the items were understood by the mothers and they were excluded from the entire sample of research work. Some elements had to be modified; rephrased, omitted on the basis of the pilot study's results. The requisite changes were made, assuring that the method as a whole achieved the study's aim.

**Ethical consideration**

The researcher explained to the mothers the purpose and essence of the study for gaining cooperation. Oral affirmative consent was obtained from mothers to participate in the study and informed them about voluntary participation and about their right to withdraw at any time from the study. The topic of this study does not touch on religious, ethical, moral and cultural issues among the participants, mothers have been assured that all the information will be confidential.

**Procedure:**

The data collection began from April 2018 until the end of June 2018. This time expended for the collection of data was regulated by the time available for both the investigator and the respondents of the study. Data were collected from mothers who attended the mentioned centers for the purpose of vaccination or checkup of their infants. The researcher interviewed each mother individually. Mothers completed the questionnaire for pretest after a simple explanation of the aim of the study and obtaining approval from mothers, then the researcher explained the educational materials to each mother. This material included information about the meaning, causes, signs and symptoms and complications of the shaken baby syndrome. The materials also contained information about how to deal with infant's crying and avoid complications of shaken baby syndrome. After that, the mother completed the questionnaire again for the posttest. Every mother was interviewed individually for 30-45 minutes.

### III. Results

**Table (1): Percentage distribution of infants and mothers according to their socio-demographic characteristics of (n=50)**

Socio-demographic characteristics	Total participants (n=50)
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	N	%
<b>Child age(month)</b>		
<2	1	2
2-<4	12	24
4-<6	13	26
6-12	24	48
<b>Child gender</b>		
Male	25	50
Female	25	50
<b>Child ranking</b>		
First	19	38
Second	16	32
Third	12	24
Fourth, and more	3	6
<b>Mother Age (years)</b>		
<20years	1	2
20-<30 years	37	74
30-<40 years	11	22
>40 years	1	2
<b>Income</b>		
Adequate	24	48
Not adequate	26	52
<b>Family members</b>		
3-5	44	88
6-8	6	12
<b>Hearing about child shaking</b>		
Yes	10	20
No	40	80
<b>If yes (source of information)</b>		
Family and neighbors	4	8
Social media	3	6
Health care centers	2	4
Radio and TV	1	2
Newspapers and magazines	-	-

Table (1) describe socio demographic characteristics of infants and their mothers, where near one half of infants (48%) their ages were between 6- 12 month and morethan one third of infants (38%) ranked as the first child. three quarters of mothers (74%) their ages were between 20 < 30 years old. Regarding family members it was clear that, the majority of studied sample (88%) had families consisted of 3-5 members. Regarding shaking baby syndrome four fifths (80%) of studied mothers didn't hear about shaking baby syndrome.

**Table (2):** Total mean scores of mothers' knowledge regarding shaken baby syndrome (pre-post) educational materials explanation (n=50).

Knowledge item	Pre intervention	Post intervention	Test	
	Mean±SD	Mean±SD	T	P value
Causes	13.46 ±4.69	19.20±2.79	6.883	<.001
Signs and symptoms	5 ±2.96	11.94 ±2.12	11.875	<.001
Complications	3.56 ±4.05	11 ±2.51	11.462	<.001
Total knowledge	22.02± 4.47	42.14 ±5.82	12.317	<.001

Table (2) demonstrate lower total mean score of mother's knowledge regarding SBS pre educational materials explanation , while in the post test there is increase in the total mean score (22.02 ± 4.47 & 42.14 ± 5.82 respectively ).

**Table (3):** Total mean scores of mothers' behaviors toward shaken baby syndrome (pre-post) educational materials explanation (n=50).

Behavior item	Pre intervention	Post intervention	Test	
	Mean± SD	Mean± SD	T test	P value
Standard mother behavior	9.70± 2.86	14.22±1.31	9.751	<.001
Ideal mother behavior	6.78 ±1.95	9.64 ±1.67	8.313	<.001
General mother's behavior or attitude toward child shaking	6.14 ±1.60	7.96 ±.879	6.317	<.001
Total behavior	22.62±4.86	31.82± 2.84	11.084	<.001

Table (3) show lower total mean score of mother's behavior regarding SBS pre intervention, while in post intervention there is increase in the total mean score (22.62 ±4.86 & 31.82 ± 2.84 respectively).

**Table (4)** Association between mean (pre-post) intervention of mother's awareness regarding SBS(n=50)

Item	Pre- awareness	Post- awareness	Confidence interval(CI)		T test	P value
			lower	Upper		
Mean	44.64±11.61	93.96±7.69	25.10	33.53	13.98	.000***
Mean difference	49.32±14.82					

P value is significant <.05& t :paired sample t test

As shown in table (4) there is high increase in the total mean scores of mother's awareness regarding SBS pre/post intervention (44.64±11.61 & 93.96±7.69 respectively) with highly statistical significant differences.

**Table (5)** Correlation between mother's knowledge with mother's behavior (pre-post) intervention (n=50)

Items	Pre-behavior		Post behavior	
	Pearson Correlation (r test)	Sig. (2-tailed)	Pearson Correlation (r test)	Sig. (2-tailed)
Pre knowledge	.233	.104		
Post knowledge			.521	.000***

P value is significant <.05

From table (5) it is evident that, there was a positive correlation with highly statistical significant relation between mother's knowledge and behavior regarding SBS in post intervention.

#### IV. Discussion

Lack of awareness and educational programs for mothers can explain increased numbers of shaken babies. And educating mothers as the primary caregiver would increase awareness of SBS hazards and decrease complications and SBS frequency. This study was planned and conducted from this point on to shed light on the effect of educational materials on the awareness of mothers about SBS hazards. Results came as expected and results from this study confirmed the research hypothesis that mother's understanding of the risks of shaking baby syndrome increased after the educational materials were explained.

Regarding mothers' age, the current findings of the study revealed that the vast majority of mothers (96 %) were between 20-40 years of age. There were only 2 mothers under the age of 20. This result is in line with **Mann et al., 2015** who studied "Assessment of parental awareness of the shaken baby syndrome in Ireland", and found that the majority, 72.73 %, of the mothers were between 26 and 35 years of age and only 2 mothers were below 20 years old. This result also concurrent with **Fujiwara et al., 2016** who studied "self-reported prevalence and risk factors for shaking and smothering among mothers of 4-month-old infants in Japan", and found most women (87.5%) were 25–39 years old. Moreover **Alshahrani et al., 2018** who studied "Evaluation of knowledge regarding shaken baby syndrome among parents in Tabuk city", reported that near two-thirds of the studied sample were between 20-40 years old. With regard to infant's age, the findings of the current study showed that 48% of infants were between 6-12 months of age. The outcome is in line with **Stewart et al., 2011** who studied "Shaken baby syndrome and a triple-dose strategy for its prevention", and found that the mean age of infants was 6.7 months.

The findings of the current study revealed that most mothers (80 %) did not hear anything about SBS, while they were heard by the minority (20 %). Of those mothers who had heard for SBS, few had received this information from a health care provider (4 %) and most of those mothers had learned about SBS from sources outside of health care workers. These sources included family and neighbors and social media. These results were supported by **Alshahrani et al., 2018** who found that 70% of studied parents didn't hear about SBS. In the same context **Mann et al., 2015** found Fifty-four percent of participants had never heard of SBS. And of those who had heard media was the commonest source and less than 1 % of participants obtained information through a health care provider.

On the other hand **Simonnet et al., 2014** who studied "Parents' behavior in response to infant crying: abusive head trauma education", found that about three-quarters of mothers (73%) were heard about SBS. Moreover **Marcinkowska et al., 2016** who studied "Evaluation of knowledge regarding Shaken Baby Syndrome among parents and medical staff", and found more than half of participants (57%) have heard about SBS.

These results demonstrated that there is a serious lack of awareness among mothers about SBS. It is a significant factor in implementing mother's SBS prevention programs, as mothers play an active role in SBS prevention. In the program planned by the 'Shaken Baby Syndrome National Center', it was reported that non-

accidental head traumas decreased by 47% in a three-year period in New York with giving information about SBS in the hospital to all parents who had newborn babies **CDC, 2013**.

Concerning the mother's knowledge about SBS, study results showed that there is a difference between mean and standard deviation regarding causes, signs and symptoms and complications of SBS pre/ post-intervention. In addition, there is also a lower overall mean score of mother's knowledge of SBS during pre-intervention, while there was an increase in overall mean score after intervention with highly statistically significant variations between pre-/post intervention. These results are consistent with the findings of **Stewart et al., 2011**, who concluded that the educational program improved knowledge of the vast majority of participants. Also **Simonet et al., 2014** found that Parents' knowledge improved significantly post program intervention.

On the other hand **Barr et al., 2009**, in a study titled "Do educational materials change knowledge and behavior about crying and shaken baby syndrome? A randomized controlled trial", who found that the difference in the scores for shaking knowledge was not significant between the studied groups (84.0 points v. 83.2 points, difference 0.8 points, 95% CI -0.4 to 1.9 points,  $p = 0.20$ )

Regarding the behavior of the mother, findings from the study revealed that the mean score of the behavior of the mother improved after the educational materials, and the difference was statistically significant. Such findings are in accordance with **Fujiwara, 2015** who searched "Effectiveness of public health practices against shaken baby syndrome/abusive head trauma in Japan" who reported that crying and shaking knowledge was significantly higher among women exposed to the intervention program.

The findings of the current study showed that the average mean scores of the mother's awareness of SBS pre / post-intervention increased significantly ( $44.64 \pm 11.61$  &  $93.96 \pm 7.69$  respectively). Such findings were confirmed by **Tasar et al., 2014** who studied "Long-term outcomes of the shaken baby syndrome prevention program: Turkey's experience" and found that awareness was significantly higher among mothers who were educated compared to mothers who were not educated ( $p=0.001$ )

In the same context an article by **Heather et al., 2010**, who studied "A case-control study to evaluate Utah's shaken baby prevention program", they found that postpartum maternal education is more effective in reducing AHT. They also reported after the intervention, participants had increased awareness of shaken baby syndrome and the potential effects of shaking babies and had learned strategies to control the crying child. Moreover **Krestin et al., 2011** who studied "Impact of an educational intervention on caregivers beliefs about infant crying and knowledge of shaken baby syndrome" they found that this focused postpartum intervention integrated into newborn anticipatory guidance can affect caregivers' beliefs about infant crying and knowledge of SBS.

It is clear from the findings of the current study that there was a positive correlation in post-intervention with a highly statistically significant relationship between the knowledge and behavior of mother about SBS. These results supported by **Fujiwara et al., 2012** in a study titled "Effectiveness of educational materials designed to change knowledge and behavior about crying and shaken baby syndrome: a replication of a randomized controlled trial in Japan" Who stated that awareness within the intervention group was significantly higher than control groups (56.1 vs. 53.1; difference = 3.0, 95%,  $p < 0.005$ ).

As SBS is a preventable problem, it can be prevented by teaching mothers about the dangers and harmful consequences of shaking baby syndrome and avoiding harmful consequences. Finally, the findings of this study confirmed the research hypothesis that the awareness of mothers about the hazards of shaking baby syndrome increased after the educational materials were explained.

## V. Conclusion

The present study concluded that there is a positive correlation with a highly statistical significant relation between mother's knowledge and behavior regarding SBS in post-intervention and mother's awareness regarding the dangers of shaking baby syndrome improved after explanation of the educational materials.

## Recommendations

- 1- Include routinely services (awareness) to avoid shaking baby syndrome in all counseling programs for new parent preparations.
- 2- Provide all new parents with written information and colored brochures on how to deal with a crying infant especially during the first months of life.
- 3- Ensure that all health care workers are aware of the SBS signs and symptoms.

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