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Medine Ayşin Taşar*
Yıldız Dallar Bilge
Department of Pediatrics, Ankara Education and Research Hospital, Ankara, Turkey

Figen Şahin
Aysu Çamurdan
Ufuk Beyazova
Department of Social Pediatrics, Gazi University School of Medicine Hospital, Ankara, Turkey

Selda Polat
Social Pediatrics Unit, Mersin University School of Medicine, Mersin, Turkey

Mustafa N. İlhan
Department of Public Health, Gazi University School of Medicine, Ankara, Turkey

Shaken Baby Syndrome Prevention Programme: A Pilot Study in Turkey

The purpose of this study is to evaluate the effectiveness of the training materials of a shaken baby syndrome (SBS) prevention programme produced in Western Sydney, Australia, when used with parents in Turkey, and to evaluate the best timing for this training. In this intervention study, a total of 545 mothers, 39.8 per cent of whom were in the first 48 hours after birth (group 1), 43.1 per cent three to seven days after birth (group 2) and 17.1 per cent pregnant (group 3), were tested before and after watching the educational film, for evaluation of their perception, and knowledge of and attitudes towards SBS. The total points measuring the levels of knowledge of shaking hazards changed from an average of 5.0 ± 2.2 pre-intervention to 6.4 ± 1.7 post-intervention ($p = 0.001$). There was no statistically significant difference between the groups in the pre-test score, whereas in the post-test score group one was significantly lower than the other groups ($p = 0.001$). In conclusion, training using the SBS Prevention Program was useful for mothers; their level of knowledge about the dangers of shaking increased. Education given prior to the birth and three to seven days after the birth was found to be more useful than during the immediate postnatal period. Copyright © 2014 John Wiley & Sons, Ltd.

Key Practitioner Messages:

- Training in the SBS Prevention Program was useful for mothers.
- Their level of knowledge about the dangers of shaking increased.
- Education given before birth and in the postnatal three to seven days was found to be more useful compared to that given in the immediate postnatal period.

Key Words: shaken baby syndrome; non-accidental head injury; abusive head trauma; education programme; prevention programme; Turkey

'Prior to the birth and three to seven days after the birth was found to be more useful than during the immediate postnatal period'

Shaken baby syndrome (SBS), which is one of the causes of serious brain injury especially in children under one year of age, features recurrent acceleration and deceleration movements of the infant's head and induces severe health problems or even death. This syndrome has been described using many terms including whiplash injury, shaking impact syndrome, abusive head trauma, inflicted head trauma or non-accidental head trauma. SBS is characterised by injuries that most often include subdural and/or subarachnoid haemorrhage with varying degrees of neurological signs and symptoms and retinal haemorrhages. Rib fractures, resulting from the chest being squeezed, and metaphyseal long bone

Correspondence to: Associate Prof. Medine Ayşin Taşar, Department of Pediatrics, Ankara Research and Education Hospital, Cebeci, Ankara, Turkey 06200. E-mail: aysintasar@yahoo.com

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fractures may also occur (American Academy of Pediatrics (AAP): Committee on Child Abuse and Neglect, 2001; Chiesa and Duhaime, 2009).

In epidemiological studies, the incidence of SBS is reported as 14–33.8 per 100 000 infants under one year, but these figures may underestimate the actual number of cases because of underdiagnosis and under-reporting (Barlow and Minns, 2000; Bennett *et al*., 2011; Fanconi and Lips, 2010; Kelly and Farrant, 2008; Minns *et al*., 2008).

SBS has a poor prognosis with less than 35 per cent of victims assessed as normal. Most of the survivors continue to live with sequelae such as learning disabilities, behavioural problems, severe cognitive and developmental delays, paralysis and blindness (AAP: Committee on Child Abuse and Neglect, 2001; Bennett *et al*., 2011; Chiesa, and Duhaime, 2009; Jacobi *et al*., 2010; King *et al*., 2003). Twenty-five per cent of SBS children die, often several days after trauma (Chiesa and Duhaime, 2009).

'Twenty-five per cent of SBS children die, often several days after trauma'

SBS is a preventable problem. As it is too late to intervene adequately after the children are shaken and abused, prevention is essential. Many researchers emphasise the importance of early intervention (Barr *et al*., 2009a, 2009b; Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, 2011; Dias *et al*., 2005; Russell *et al*., 2008). In these educational programmes, providing information about normal crying patterns at the developmental stages of infants, teaching some methods of coping during this difficult period in parenting and calming the baby, and giving information about SBS are very important (Bailey *et al*., 2008; Carbaugh, 2004; Deyo *et al*., 2008; Dias *et al*., 2005; Showers, 1992). One of the programmes used in many countries around the world is the Shaken Baby Prevention Project in Western Sydney, which is a joint project of the Children's Hospital at Westmead and Western Sydney Local Health District in Australia. The training materials consist of a three-minute animated film and a brochure giving information about responding to the baby's crying and about the dangers of shaking a baby. The aim of this programme is to improve the ability of parents to cope with the problem, and to provide them in a non-threatening way with information and education on the harm caused by shaking. The target population is young parents, future parents, caregivers, school children and other members of their families (Tolliday *et al*., 2010).

In Turkey, child abuse is a recently recognised topic. In general, there are very few data about SBS with the exception of a few case reports and a pilot prevalence study (Beyaztaş *et al*., 2009; Tehli *et al*., 2011; Yagmur *et al*., 2010). To our knowledge, this is the first example of a SBS prevention programme in Turkey. This study seeks to determine the validity of these training materials for a Turkish population. The study sought to provide data on what the parents thought were the reasons for their infant's crying, their coping methods and the level of their knowledge about SBS. It also aims to explore the best timing for SBS training, for example, is it better during antenatal visits in pregnancy, in the postnatal period, 48 hours before discharge from hospital, or at the first well-child visit in a paediatric setting?

'In Turkey, child abuse is a recently recognised topic'

Material and Methods

This study was conducted between March and June 2010 in two hospitals (a state hospital and a university hospital) which serve different socio-cultural populations in the city of Ankara, Turkey.

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'The mothers were divided into three groups according to the time when training about SBS was given'

Study Group

The study group consisted of mothers having full-term (≥ 37 weeks) healthy infants who either gave birth or brought their infants for well-child care at the two hospitals. The mothers were divided into three groups according to the time when training about SBS was given:

- *Group one*: Mothers who gave birth in the study hospitals and responded to the survey in the first 48 hours before discharge. A total of 249 mothers were approached, 217 (87.1%) agreed to participate in the study.
- *Group two*: Mothers who attended the study hospitals for a well-child visit three to seven days after delivery. A total of 263 mothers were approached, 235 (89.3%) agreed to participate in the study.
- *Group three*: Pregnant women who were in their third trimester and who came to their last antenatal visit before the birth. A total of 98 mothers were approached, 93 (94.9%) agreed to participate in the study.

Procedure and Intervention

'A parent education-focused animated film produced by the Shaken Baby Prevention Project in Western Sydney was shown to participants'

Training Material

A parent education-focused animated film produced by the Shaken Baby Prevention Project in Western Sydney was shown to participants. The film was translated and 'dubbed' in Turkish. It lasts for three minutes and includes messages such as 'Healthy infants may cry for 2–3 hours in a day, it is normal', 'If you cannot cope with excessive crying of your infant leave her/him in a room securely and call your doctor or a relative, and ask for help', 'Do not shake your infant, shaking damages the baby's brain and might cause death', 'Remember no matter how upset you feel, shaking a baby is just not the deal'.

Questionnaire

A questionnaire asking for the socio-demographic characteristics of the families was completed by the parents. A pre-test questionnaire, trialled and validated by the Australian project team (Tolliday *et al*., 2010), was given to the parents. It included questions which measured the parents' knowledge of the reasons for infant crying, methods of soothing the infants and the dangers of shaking. In this part of the questionnaire, mothers were allowed to choose more than one item if appropriate. In the next part, the questionnaire included statements such as, 'A healthy infant may cry for 2–3 hours in a day', 'looking after an infant might be troublesome', 'shaking has harmful effects on infants'; the parents were asked to mark one of the options of 'I completely agree', 'I agree', 'I have no idea', 'I disagree' and 'I completely disagree' on a Likert scale. While measuring the level of their knowledge on SBS, the mothers were asked to respond to eight questions about the harmful effects of shaking. True answers were scored with one point, false answers with zero. In this part, a mother could get a score between zero and eight, higher scores correlating with greater knowledge of the harmful effects of shaking.

'The questions were designed to test whether the key messages were known by the participants and later recalled after viewing the film'

The questions were designed to test whether the key messages were known by the participants and later recalled after viewing the film. The messages were designed to assist parents and carers in understanding those factors that contribute to the stress of parenting, particularly when there is an unsettled or crying baby. Pre- and post-testing is frequently used in education evaluations to help understand the effectiveness of information transmission. The questions were trialled and designed and redeveloped by the Australian project

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team, and variations have been used by colleagues who have also translated the film and are using it in many different settings. It is recognised that cultural differences exist for responding to a crying baby; it was hoped that use of these generic questions would assist with understanding these differences in Turkey.

'It is recognised that cultural differences exist for responding to a crying baby'

Procedure

All mothers included in the study were asked to complete the socio-demographic and pre-intervention questionnaires before training. After watching the training film, a post-intervention questionnaire was given to the mothers, which included the same questions as the pre-intervention questionnaire and additional questions about their opinions on the film. The pre- and post-intervention answers were compared statistically to assess the effectiveness of training (pre- and post-intervention differences in the levels of knowledge of all mothers) and to identify whether there were any differences dependent on the timing of the delivery (difference between the three groups).

Statistical Analysis

Statistical analysis was performed using SPSS software (Version 15.0). For ordinal variables, chi-square test; for continuous variables, Mann-Whitney U and Kruskall-Wallis variance analysis were used. p-Values < 0.05 were considered to be statistically significant. In order to assess compliance to the normal distribution of continuous variables, age, years of marriage, number of pregnancies, number of household contacts and pre-/post-intervention results were tested with the Kolmogorov-Smirnow Z test. As the variables did not comply with a normal distribution, non-parametric tests were used. In order to find differences between the education-level groups of mothers, Bonferroni-corrected post-hoc tests were used.

'Pre-/post-intervention results were tested with the Kolmogorov-Smirnow Z test'

Ethical Issues

Informed consent was obtained from all the participants, and the ethics committee of the Ministry of Health, Ankara Education and Research Hospital approved the study.

Results

A total of 545 mothers were included in the study. Three hundred and sixty five (67%) of the mothers were from the Ministry of Health, Ankara Education and Research Hospital and 180 (33%) mothers were from Gazi University School of Medicine Hospital. The mean age of the mothers was 27.6 ± 5.5 years; they mostly had two children. Educational levels were as follows: 51.2 per cent were primary school graduates, 28.3 per cent high school graduates and 20.5 per cent university graduates. There were 217 (39.8%) mothers in group one, 235 (43.1%) in group two and 93 (17.1%) in group three. The mothers in these three groups were similar statistically in terms of age, educational level and the number of children. All mothers were asked if they knew about SBS. Fifty-two mothers (9.5%) answered that they had already heard about SBS but more than

'A total of 545 mothers were included in the study'

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'59.8 per cent of the mothers thought that shaking an infant might be harmful'

90 per cent were unaware of such a syndrome. However, 59.8 per cent of the mothers thought that shaking an infant might be harmful.

Measuring the Efficacy of Training

Mothers' answers about the reasons for an infant crying and methods of soothing before and after training are shown in Table 1. These answers clearly show that leaving the crying infant in a secure room and asking for help were not traditionally acceptable for mothers, especially before training. Although these behaviours significantly increased after training, they were still very low. The assessment of the responses given by the mothers to the main messages of the training material is shown in Table 2. The mean score for mothers' knowledge of the harmful effects of shaking increased from 5.0 ± 2.2 pre-intervention to 6.4 ± 1.7 post-intervention ($p = 0.001$). The results showed a statistically significant difference based on the educational level of the mothers, and the highest scores came from graduate degree/university-graduated mothers.

'The highest scores came from graduate degree/university-graduated mothers'

After the education programme, the mothers were asked about the effect of the film (Table 3). Of the 545 mothers, 495 (90.8%) stated that the training material was useful. When compared according to their educational level, university graduates' answers about the effectiveness of the training material were significantly higher than those of less educated mothers ($p < 0.05$).

Assessing the Effectiveness of the Timing of Education

'The total pre-intervention scores on knowledge about the harmful effects of shaking were similar in all groups'

The total pre-intervention scores on knowledge about the harmful effects of shaking were similar in all groups. The post-intervention scores of group one were lower than group two and group three ($p = 0.003$ and $p = 0.002$, respectively) (Figure 1). After training, within each group, total scores showed statistically significant increases compared to pre-intervention scores ($p = 0.001$). Knowledge about the main messages of the training video was also lower in group one mothers compared to groups two and three ($p < 0.01$). The number of group one mothers who stated that the video was helpful in providing reasons for infant crying was lower than the other groups ($p = 0.015$).

Table 1. Comparison of mothers' pre- and post-training answers about the reasons for babies crying and soothing methods

	Pre-training n (%)	Post-training n (%)	*p*
What could be the reason if a baby cries?			
He/she may be hungry	509 (93.4)	523 (96.0)	0.001
He/she may be soiled	502 (92.1)	524 (96.1)	0.001
He/she may have pain	456 (83.7)	490 (89.9)	0.001
What would you do if your infant's crying persists?			
I change his/her diaper	363 (66.6)	316 (58.0)	0.001
I breastfeed the baby	426 (78.2)	399 (73.2)	0.001
I try to make him/her burp	221 (40.6)	160 (29.4)	0.001
I massage him/her or give a bath	22 (4.0)	39 (7.2)	0.001
I talk or sing a song	26 (4.8)	56 (10.3)	0.001
I take him/her for a walk in the open air	28 (5.2)	58 (10.6)	0.001
I leave him/her in a secure room	5 (0.9)	31 (5.7)	0.001
I ask for help	3 (0.6)	40 (7.3)	0.015

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Table 2. The proportion of the mothers who agreed with the main messages of training

	Pre-training n (%)	Post-training n (%)	*p*
A healthy infant may cry 2–3 hours in a day	250 (45.9)	427 (78.4)	0.001
Looking after an infant might be troublesome	104 (19.1)	269 (49.3)	0.001
Shaking is harmful for infants	326 (59.8)	413 (75.8)	0.042

Table 3. The opinion of the mothers on the efficacy of the education material

	I agree n (%)	I am neutral n (%)	I disagree n (%)
I gained knowledge about the reasons for infant crying	475 (87.2)	28 (5.1)	42 (7.7)
I learnt some methods for coping with infant crying	484 (88.8)	30 (5.5)	31 (5.7)
I realised why infants should not be shaken	467 (85.7)	44 (8.1)	34 (6.2)
This film is effective	495 (90.8)	32 (5.9)	18 (3.3)

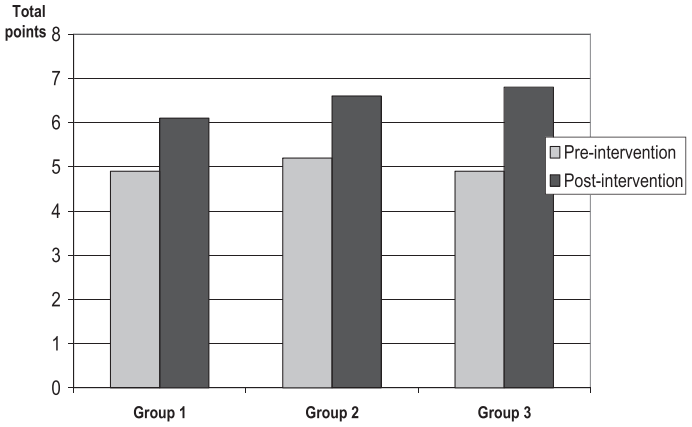

Figure 1. Distribution of the mean knowledge of the mothers on shaking according to group. See the text for a description of the groups.

Discussion

SBS is a serious threat to infant health, causing deaths in one-quarter of cases and high morbidity in most survivors. In many developed countries, protection programmes are implemented, primarily in the 'postnatal primary protection education' modality (Barr *et al*., 2009a, 2009b; Deyo *et al*., 2008; Dias *et al*., 2005; Goulet *et al*., 2009; Showers, 1992).

The main objectives of SBS prevention programmes are: to inform parents on the reasons why infants cry; to teach them how to cope with the problem and how to manage their own anger; and to increase their knowledge on the harm associated with shaking (Goulet *et al*., 2009). In a study conducted in the USA, 50–75 per cent of the young people declared that they had not heard anything about SBS (Matschke *et al*., 2009). In another research study consisting of young women, 62 per cent university graduate parents, 96 per cent of them said that they had already heard about SBS (Deyo *et al*., 2008). In this study, only 9.5 per cent of the mothers stated that they had heard of SBS, and no relation was found between education levels and having previous information. This result underlines the lack of knowledge about SBS in Turkey, even among the highly

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educated. Though hearing about SBS was low at every educational level, after training, knowledge of SBS increased and the highest scores were demonstrated by graduate degree/university-graduated mothers. This may be a consequence of a difference in their capacity for learning, and considering this difference, mothers with a lower education might benefit from more intense or repeated courses.

'Highest scores were demonstrated by graduate degree/ university-graduated mothers'

In this study, the proportion of correct answers to the questions relating to the harmful effects of shaking and agreement with the main messages/statements of the education programme increased following training. Similar rates were reported in the Australian study using the same training video (Tolliday *et al*., 2010). After the education programme, the mothers who agreed with the statement 'to look after an infant might be troublesome' increased from 19.1 per cent to 49.3 per cent. In our cultural context, looking after babies is viewed as the mothers' primary mission. Thinking the opposite is unacceptable, and although understanding that 'this is a normal feeling' is enhanced by training, it is still less than in other countries. In this study, 88.8 per cent of the mothers stated that they learned about methods of coping with their infant's crying, whereas this percentage was 94 per cent in the Australian study (Tolliday *et al*., 2010).

The results of another study (Russell *et al*., 2008) indicate that the addition of video materials, and in particular material focusing on teaching alternative behaviours, significantly increases the likelihood of positive changes in SBS awareness compared to interventions which use only a brochure. In almost all studies, including our study, visual methods are shown to be effective (Barr *et al*., 2009a, 2009b; Deyo *et al*., 2008; Tolliday *et al*., 2010).

'Introducing prevention programmes before high-frequency crying periods occur is important'

SBS incidence increases parallel the crying bouts of infants, and crying is accepted as a triggering mechanism (Barr *et al*., 2006; Reijneveld *et al*., 2004), therefore introducing prevention programmes before high-frequency crying periods occur is important. Many authors believe that the best timing is immediately before discharge from hospital (Barr *et al*., 2009a, 2009b; Deyo *et al*., 2008; Dias *et al*., 2005). But in our study, the group that was given the education programme within the 48-hour period after birth achieved the lowest scores among the groups. In this period, the mothers' concentration and willingness to embrace the education programme may be low because of other distractions such as pain, problems with breastfeeding and trying to understand the new baby's needs. So, although this may be the easiest time to reach all mothers, the effectiveness of an education programme given during this period must be re-evaluated. In another study, the understanding and willingness of parents were shown to be lower during the postnatal 48 hours (Goulet *et al*., 2009).

'Providing the education programme during pregnancy or in the first well-child care visits is more effective than in the first 48 hours after birth.'

The number of mothers indicating an increase in their knowledge of the reasons for infant crying was higher in the pregnant group. Probably, in this period, the mothers' feelings of anxiety about infant crying are reduced and they can focus more clearly on the messages of training. The results of this study demonstrate that providing the education programme during pregnancy or in the first well-child care visits is more effective than in the first 48 hours after birth. To our knowledge, there are no similar studies conducted to evaluate the best timing for delivering prevention training.

Comparing the efficacy of different SBS prevention programmes is very difficult as the training methods, materials, protocols and data-collecting methods vary (Deyo *et al*., 2008). Further studies are needed to identify similarities or differences between SBS prevention programmes and the best timing for implementing an education programme. As males are the most

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frequent abusers in SBS cases, incorporating fathers is recommended in different training models (Carbaugh, 2004; Holden and Jenny, 1995; Overpeck *et al*., 1998). In this study, because of the hospital conditions, mothers were trained on their own, and only females participated in the study. Not being able to include fathers may be considered as a limitation of this study.

The main aim of SBS prevention programmes is to decrease the incidence of SBS. It is reported that after informing all fairly recent parents in New York hospitals about SBS that non-accidental head traumas declined by 47 per cent (Dias *et al*., 2005; National Center on SBS). The effect of training on the incidence of SBS could not be determined in this study as the incidence of SBS in Turkey is unknown, and long-term surveillance was not performed. Another limitation is the fact that this is a research process that identifies knowledge obtained by the recipients. It cannot establish whether the knowledge is translated into action by the participant. It is recognised that there may be overriding psychosocial stressors which were deemed as inappropriate to test for in this evaluation process. Further studies are needed in Turkey to assess the incidence and change in incidence following the implementation of prevention programmes.

In conclusion, this study demonstrated that the SBS Prevention Program was useful for mothers in Turkey; their level of knowledge about the dangers of shaking was increased; and the best times for training were during the first well-child care visits or in the last months of pregnancy. In order to judge the actual efficacy of the training programme, it is essential to be able to measure the real incidence of SBS in Turkey using a countrywide-reporting system and thereby determine any decline in the number of cases following national prevention programme initiatives.

‘Further studies are needed …. to assess the incidence and change in incidence following the implementation of prevention programmes’

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