Infant Sleep Position: A Randomized Clinical Trial of an Educational Intervention in the Maternity Ward in Porto Alegre, Brazil

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ABSTRACT: Background: *Few studies in Brazil have been published about sudden infant death syndrome (SIDS), and none has addressed the mother's orientation about placing the infant to sleep in the supine position. The aim of this study was to evaluate the effect on mothers of an individual educational intervention in the maternity ward about infant sleep position.* **Methods:** *A randomized clinical trial was conducted with a study sample of 228 mother-infant pairs assigned to an intervention or a control group. The intervention consisted of an individual orientation session at the maternity ward, at which folders and an oral explanation were given to mothers at discharge about the importance of the supine position as a preventive measure for SIDS. The outcome was the sleeping position at 3 months of age assessed during a home visit. The variables with* $p < 0.2$ *at a bivariate analysis were included in a logistic regression model.* **Results:** *Among mothers in the intervention group, 42.9 percent put their infants to sleep in a supine position at the 3-month visit, compared with 24 percent of mothers in the control group (*$p = 0.009$*). In a multivariate analysis, the intervention at the hospital was the only variable that influenced maternal practices with respect to infant sleep positioning (OR 2.22; 95% CI 1.17–4.19).* **Conclusions:** *An individual educational session in the maternity ward about infant sleep position significantly increased the prevalence of supine position for sleeping in the infant's third month. Nevertheless, the intervention was not sufficient to guarantee that most mothers would put their infants to sleep in the recommended position. (BIRTH 36:2 June 2009)*

Key words: *sudden infant death syndrome, sleep position, child health*

Sudden infant death syndrome (SIDS) is defined as "the sudden death of an infant under 1 year of age, which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history" (1).

Few studies in Brazil have been published that relate to SIDS. A study in Pelotas, a town in the state of Rio Grande do Sul, Brazil, where the infant mortality rate was 38.8 per 1,000 live births in the years 1982 to 1983, reported that the infant mortality rate attributed to SIDS was approximately 1.6 per 1,000 live births (4% of the total) (2). Other studies in Porto Alegre and Passo Fundo, cities in the same state, estimated that the infant mortality rates due to SIDS were 0.45 per 1,000 and 1.75 per 1,000 live births, respectively (3,4).

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The risk factors shown to be related to SIDS include young maternal age, low maternal education, maternal smoking during pregnancy, infant age 2 to 4 months, male infants, prematurity, low birthweight, and prone sleeping position (5–8). Because infant sleep position is a risk factor that is easily modifiable in comparison with other factors, interventions aimed at motivating mothers to put their infants to sleep in a supine position have had a significant effect on decreasing infant mortality rates due to SIDS in New Zealand, Australia, United States, Norway, Sweden, and Great Britain (9–14). Since 1992, the American Academy of Pediatrics has recommended that infants should be placed to sleep in the supine position (15), which is the only position currently recommended (16).

In Brazil, however, even in teaching hospitals, which offer pediatric residency programs, the supine position for infant sleep is not routinely recommended, either during the hospital stay or at discharge (17). Unfortunately, government policies and public campaigns for the population in general about SIDS are lacking. In addition, health professionals have little knowledge and practice concerning SIDS prevention. The aim of this study was to verify the effect of an individual educational intervention about infant sleeping position that was given to mothers after delivery and during their hospital stay.

Methods

A randomized clinical trial was conducted to determine whether individual education about infant sleep position given to postpartum women in the maternity ward would change their practice at home. The study participants were mothers and their infants living in a previously selected area of Porto Alegre who were born from September 2005 to September 2006. The mother-infant pairs were selected at the maternity ward of the Hospital de Clínicas in Porto Alegre, a large teaching hospital located in the capital of Rio Grande do Sul, a city with approximately 1.4 million inhabitants. Approximately 90 percent of the hospital admissions are covered by the Government Health Care and Insurance Program.

The area from which the mothers were selected was limited by convenience. It is a more central region of the town, easily accessible and with lower urban violence rates, which is home to approximately 40 percent of the population, including districts with diverse socioeconomic status (18). Mothers with severe physical handicap or mental health problems (e.g., profound depression or overt schizophrenia) were excluded from the study sample. After signing a consent form, the mothers were assigned to the intervention or control group.

The randomization was performed for each week (by tossing a coin), in blocks of four consecutive weeks at a time (monthly blocks), establishing the study groups (intervention or control). The study participants were included in the sample only from Mondays to Fridays (excluding weekends) to avoid contact between the two groups and minimize the possible effect of contamination. The study was approved by the Ethics Review Board of Hospital de Clínicas de Porto Alegre.

In the maternity ward on the morning of hospital discharge, the mothers answered a questionnaire about socioeconomic and demographic data, prenatal care information, and their knowledge and attitudes about the infant's sleeping position. Using a baby doll model, the mothers of both groups showed their favorite position to put the infant to sleep. Mothers of the intervention group were then given a one-on-one education session by the maternity bed and a folder with information about infant sleep positioning. Mothers of both groups received routine orientation from the health care team during their hospital stay. Immediately after collecting the information, the questionnaires were sealed with a tag and signed by the interviewer. This tag was opened by the coordinator of the study at the end of the follow-up period.

When infants were 3 and 6 months of age, home visits were conducted by previously trained medical students. The interviewers were blind with respect to the groups to which mothers were assigned. During this visit, the mothers answered another questionnaire about routine habits related to their infant's sleep (place and position to sleep) and other issues about the care of the infant (breastfeeding, weaning, food introduction schedule, and other health care practices). On arrival at the home, the interviewer observed the position of the infant if he or she was sleeping. Again using the baby doll model, the mothers showed which position they usually put their infants to sleep, which was considered to be the main outcome of the study. We indicated "recommended position" when the mothers put their infants to sleep just in the supine position.

Data Analysis

To estimate the sample size, a previous study performed in Passo Fundo was considered, which showed a prevalence of supine position to sleep of approximately 5 percent (4). Projecting an increase of 20 percent in the prevalence of this practice after the intervention, with a 90 percent power and an alpha error (α) of 0.05, a sample of 100 mothers for each group was estimated. Considering the probability of 15 percent of loss in the study follow-up, the total sample needed was calculated to be 230 mothers.

To test the association between the study variables and the main outcome, the Student t test or chi-square test was used for continuous or categorical variables. Results

with a $p < 0.05$ were considered to be statistically significant. Those variables with $p < 0.2$ in the bivariate analysis were included in a multiple logistic regression model. This analysis was based on the results of the visits after infants had reached 3 months of age, because this period was considered to represent the greatest prevalence of SIDS (6,8,16).

Results

Of 233 mother-newborn pairs selected for the study, 5 mothers refused to take part, leaving 228 mothers. From these mothers, 112 were allocated randomly to the intervention group and 116 to the control group. Figure 1 shows the flow diagram with the sample of mothers of each group at three different periods of the study. Table 1 shows the comparison of both groups with the variables analyzed at the beginning of the study. The groups were similar, except for the marital status of the mothers. In the intervention group, the proportion of women who were married or living with a partner was greater, but this variable was not associated with supine sleep position of the infant.

Approximately 51 percent of the mothers (116/228) received some education about infant sleep position before delivery. The side-lying position was mentioned in 88 percent of the cases (102/116). The main sources of information were family members or friends (82%). Only 20 percent of the mothers (45/228) in both intervention and control groups indicated that they had received education previously from the maternity ward health team about the baby's sleep position. From those, 91 percent (41/45) were advised to put their baby in a side-lying position and 6.7 percent (3/45) in a supine position. Of the whole sample, just 1.3 percent of the mothers were informed about the correct sleeping position recommended for the infant.

During the 3-month visit, only 26 percent of the mothers (50/191) said they had received some information about how to position the infant to sleep, although

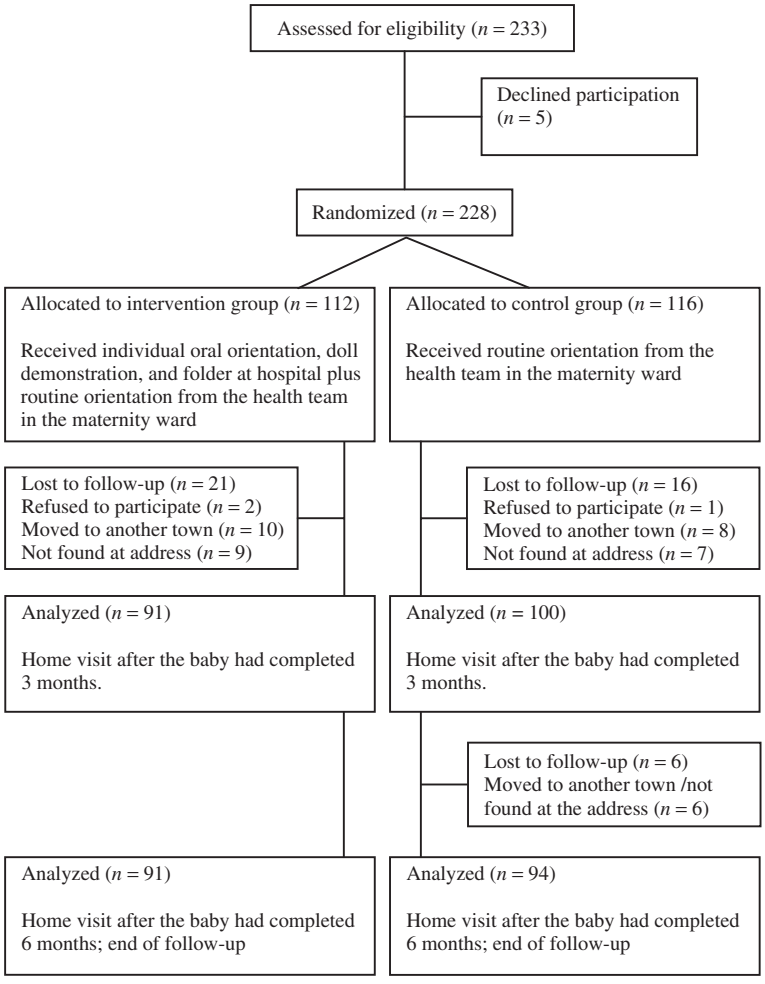

Fig. 1. Flow diagram of mother-infant progress to the trial.

Table 1. Comparison of Intervention and Control Groups: Characteristics of Participants

Variable	*Intervention Group**	*Control Group**
Baby		
Birthweight (g)	3,277.72 (424.28)	3,289.14 (472.97)
Gender		
Male	63 (56.3)	66 (56.9)
Female	49 (43.8)	50 (43.1)
Mother's age (yr)		
≤ 19	19 (17.0)	21 (18.1)
>19	93 (83.0)	95 (81.9)
Race		
White	74 (49.3)	76 (50.7)
Nonwhite	38 (48.7)	40 (51.3)
Marital status		
Married/with partner	92 (82.1)	80 (69.0)
Without partner	20 (17.9)	36 (31.0)
Educational level		
≤ 8th grade	35 (31.3)	42 (36.2)
> 8th grade	77 (68.8)	74 (63.8)
Parity		
Primiparous	67 (59.8)	70 (60.3)
Multiparous	45 (40.2)	46 (39.7)
Prenatal appointments		
<6	17 (15.2)	17 (14.7)
≥ 6	95 (84.8)	99 (85.3)
Orientation about baby's sleep position before birth		
Yes	61 (54.5)	55 (47.4)
No	51 (45.5)	61 (52.6)
Orientation about baby's sleep position by health care team		
Yes	22 (19.6)	23 (19.8)
No	90 (80.4)	93 (80.2)

**Values are expressed as median (standard deviation) or "No. (%)."*

most (80%, 152/191) had received an appointment with a physician during this period. Family members and friends were again the main source of information. From those who received information from their physicians (15/191), almost one-half (7/15) were told to put their infants to sleep in a side-lying position.

In the third postpartum month, 42.9 percent of the mothers of the intervention group put their infants to sleep in the recommended position (supine), compared with 24 percent of the control group ($p = 0.009$). In 45.5 percent of all visits (87/191), the infants were observed while sleeping. At those visits, 33 mothers reported that they put their infants in the supine position, and among these infants 31 (93.9%) were actually sleeping in that position. In the sixth postpartum month, these values were 41.8 and 19.1, respectively ($p = 0.001$).

In total, 178 of the mother-infant pairs were visited at both 3 and 6 months. Of those, 151 (84.8%) of the pairs mentioned the same position at both visits. Eighteen mothers reported changing from the recommended position at 3 months to a inadequate position (i.e., any position other than supine) at 6 months. Nine mothers, however, adopted the recommended position only at the 6-month visit.

Table 2 shows the results of the bivariate analysis, comparing the study factors with the main outcome. For the multiple logistic regression model, the following variables, which showed association with the main outcome in the infant's third month ($p < 0.2$), were selected: group (intervention or control), education before birth about infant positioning to sleep, mother's educational level, mother's parity, and exclusive breastfeeding at the third postpartum month (Table 3). With this model, the intervention at the hospital remained as the only variable that was associated with the mothers' practices in relation to the infants' sleeping position. The likelihood of putting the infant to sleep in the supine position was 2.2-fold greater in the intervention group.

Discussion

This study was the first in Brazil in which an educational intervention was evaluated for the purpose of recommending that mothers should adopt the supine sleep position for their infants. We observed that 42 percent of the mothers who received the intervention put their infants to sleep in the supine position in the third month, compared with 24 percent of the control group. In the multiple logistic regression model, the mothers of the intervention group had a twofold greater chance of putting the infant in the supine position at the third month compared with those of the control group.

In our study, a simple and low-cost strategy was used, with an emphasis on individual education for the mothers in the maternity ward just before their hospital discharge. Other studies with the same purpose showed similar results. In North America, the information received from a physician significantly increased the prevalence of the supine position and decreased prevalence of the prone positioning (19). When the authors analyzed the combined effects of health professionals' orientation, written material, and media campaigns, the effect was even greater (19). In a study with primiparous

Table 2. Study Variables and Recommended Position at Third Month

Variable	*Recommended Position at Third Month*		
	*Yes**	*No**	p
Intervention at the hospital			
Yes	39 (42.9)	52 (57.1)	0.009
No	24 (24.0)	76 (76.0)	
Gender of the baby			
Male	34 (31.2)	75 (68.8)	0.651
Female	29 (35.4)	53 (64.6)	
Mother's age (yr)			
≤ 19	7 (24.1)	22 (75.9)	0.376
>19	56 (34.6)	106 (65.4)	
Mother's race			
White	44 (35.2)	81 (64.8)	0.463
Nonwhite	19 (28.8)	47 (71.2)	
Marital status			
Married/with partner	48 (32.9)	98 (67.1)	1.000
Without partner	15 (33.3)	30 (66.7)	
Educational level			
≤ 8th grade	15 (25.4)	44 (74.6)	0.187
>8th grade	48 (36.4)	84 (63.6)	
Presence of maternal grandmother			
Yes	22 (29.7)	52 (70.3)	0.547
No	41 (35.0)	76 (65.0)	
Parity			
Primiparous	44 (37.6)	73 (62.4)	0.121
Multiparous	19 (25.7)	55 (74.3)	
Prenatal appointments			
≥ 6	51 (31.1)	113 (68.9)	0.252
<6	12 (44.4)	15 (55.6)	
Smoking during gestation			
Yes	14 (31.8)	30 (69.2)	0.996
No	49 (33.3)	98 (66.7)	
Orientation about baby's sleep position before birth			
Yes	38 (38.0)	62 (62.0)	0.164
No	25 (27.5)	66 (72.5)	
Orientation about baby's sleep position by health care team			
Yes	14 (35.9)	25 (64.1)	0.808
No	49 (32.2)	103 (67.8)	
Orientation about baby's sleep position after discharge			
Yes	18 (36.0)	32 (64.0)	0.724
No	45 (31.9)	96 (68.1)	
Baby sleeping at night on parents' bed			
Yes	18 (30.0)	42 (70.3)	0.660
No	45 (34.4)	86 (65.6)	
Exclusive breastfeeding at third month			
Yes	35 (40.7)	51 (59.3)	0.058
No	28 (26.7)	77 (73.3)	

**Values are expressed as "No. (%)."*

women in Wyoming, USA, mothers in the maternity ward observed a demonstration of the recommended sleeping position (supine) performed by a nurse with their own infants (20). After the first week following discharge, mothers who observed the intervention put their infants to sleep in the supine position in a significantly higher proportion than those who did not.

In our study, we observed that the intervention caused a significant increase in the prevalence of the supine position at the 3-month visit, and this condition still existed at the 6-month visit. In the multivariate analysis, the single factor that influenced this finding was the study intervention. Similar findings have been described in other studies (19,21). Some research has shown that placing the infant to sleep in the supine position during routine care at the hospital, together with orientation received from nurses and physicians, was the main factor that made parents choose this position for their infants at home (22–24). It is possible that the same factors may have been operating in our study.

In our study, however, most health practitioners suggested the side-lying position to sleep. This situation also occurred in studies in other countries and also in Brazil, where the orientation of parents was different from that recommended (25–27). During the home visit, we also observed that health practitioners provided conflicting information to the community. Among parents and health practitioners, fear of possible aspiration by infants sleeping in the supine position seemed to be great. Some studies have shown that aspiration did not occur after the recommendation to put the infants to sleep in supine position (28–30). The 1992 recommendation from the American Academy of Pediatrics, however, mentioned that infants should be "placed down for sleep on either their side or back" (15), which may be ambiguous. This recommendation is no longer current, because it was observed that infants who were

Table 3. Factors Influencing the Recommended Sleep Position at 3 months of age; Multivariate Analysis Model

Variable	*Odds Ratio*	*95%* CI	p
Received intervention at the hospital	2.22	1.17–4.19	0.014
Received orientation before birth	1.44	0.76–2.74	0.259
Mother's educational level > 8th grade	1.40	0.68–2.88	0.362
Primiparous mother	0.60	0.30–1.17	0.131
Exclusive breastfeeding at age 3 mo	1.76	0.93–3.31	0.080

put to sleep on their sides had a higher likelihood of spontaneously turning to prone and presented a higher risk of dying from SIDS (31,32). It is possible that conflicting information that was different from the intervention offered to the mothers by health practitioners at ambulatory appointments after discharge may have resulted in a less significant effect than expected.

An original aspect of our study was the use of the baby doll model in the maternity ward and in home visits. The use of mannequins as a teaching resource is common in many areas of medicine (33,34), and in experimental studies related to SIDS (35,36). The doll models were specially manufactured for this study and had different "gender" and "race" features, providing an interesting and amusing element in the study. It is possible that mothers, by using the doll model to position the infant to sleep, used the same practice in their daily lives, suggesting that our findings are reliable.

The fact that mothers who exclusively breastfed by 3 months had a 76 percent greater chance of putting their infants to sleep in the supine position should be considered. It is possible that mothers who follow the recommendation of exclusive breastfeeding during the first months of life (infrequently adopted in Brazil) would be more receptive to follow other health recommendations, such as which sleep position to use for the infant.

Implications for Hospitals in Brazil and Latin America

Some countries have promoted nationwide campaigns to increase the prevalence of the supine position to sleep (13,21), resulting in a drop in the infant mortality rate due to SIDS (19,31,37).

Since 2006, parents of all newborn infants in Brazil receive the *Infant Health Booklet*, published and freely distributed by the Ministry of Health. This booklet recommends putting the baby to sleep "on his back" (38). This educational item is possibly the only national preventive practice policy to prevent SIDS and strictly directed toward the lay public in Brazil.

Brazil and Latin America indicate little awareness about the risk factors for SIDS. The lack of adequate training of the health care teams who attend mothers may explain the low prevalence of use of the supine position for infant sleep in different countries, including Brazil, and in our study.

Although our study was conducted in the maternity ward of a large teaching hospital in southern Brazil, recommendations about the baby's sleep position, both in the maternity ward and at hospital discharge, are not emphasized among health practitioners. Similar findings were observed in another study of 55 teaching hospitals in Brazil (17), and in a multicenter study of 213 hospitals in 16 countries in Latin America and the Caribbean (39), in which the most recommended sleep position was the side-lying position.

On the basis of our results, we suggest that the implementation of joint action involving health professionals, government agencies, and communication media in Brazil and in other Latin America countries might produce a twofold beneficial result: first, a decrease in the prevalence of the prone position for infant sleep and an increase in the supine position, and second, a decrease in the infant mortality rate due to SIDS.

Conclusions

This study reported that routine education about infant sleep position is not adequate in the maternity ward of a teaching hospital in Porto Alegre, Brazil. A simple and low-cost educational intervention can promote changes in the mothers' practices about the sleep position they choose for their infants. Further interventions, such as the education of pediatricians and nurses about the recommended sleep position for infants, in addition to enrollment by media and health agencies in actions related to SIDS prevention, might also increase the number of infants who sleep in the supine position.

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