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# Prevalence of Prone Sleeping Position and Selected Infant Care Practices of North Dakota Infants: a Comparison of Whites and Native Americans

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## Synopsis .....

*A cross-sectional prevalence study was done in four primary care clinics (two rural and two urban sites) and four Native American clinics serving members of the Chippewa, Sioux, Hidasta, Arikara, and Mandan tribes, all in North Dakota, to determine the prevalence of prone, supine, and side sleeping position in white and Native American infants. Questionnaires for 325 infants (259 whites and 66*

*Native Americans) between birth and 6 months of age were completed by the infants' mothers.*

*They reported that 69 percent of the infants slept prone, 17 percent slept supine, and 14 percent slept on their side. Native American infants, who are at 3.2 times the risk of Sudden Infant Death Syndrome compared with other North Dakota infants, slept prone 46.9 percent of the time compared with 74.4 percent of white infants ( $\chi^2 = 23.61$ ; 1 df;  $P < .0001$ ).*

*No differences were observed in the prevalence of the side sleeping position. Eighteen percent of the infants slept in the position reported due to advice from a physician or nurse, 8 percent of the infants slept with more than two blankets, and 5 percent slept with a pillow. Native American infants in North Dakota did not have a higher prevalence of exposure to prone sleeping position.*

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A 1992 position paper from the American Academy of Pediatrics concluded that infants in the United States who sleep in the prone position (face down) are at increased risk for Sudden Infant Death Syndrome (SIDS)(1). That paper was followed by a critical review of published evidence on the risk of SIDS for infants sleeping prone; the review's authors concluded with a recommendation that parents avoid the prone sleeping position for infants unless there is a specific medical indication for prone sleeping (2). These recommendations were based on research primarily from The Netherlands, Great Britain, Australia, New Zealand, and Tasmania (3-8).

There are three published studies on the prevalence of infants' prone sleeping in the United States. Hoffman and Hillman, in a 1978-79 study, found that 576 of 752 control infants (77 percent) slept prone, and 580 of 716 SIDS infants (81 percent) were prone (9). The risk ratio from a comparison of infants dying from SIDS with the control group was 1.39 with a 95 percent confidence interval from 1.1 to 1.7—which was statistically significant.

In King County, WA, during the period 1965-70, 85 of 153 (56 percent) of SIDS infants were found prone (10). Guntheroth and Spiers reported that 40 percent of 100 infants attending their clinic slept

prone (2). There are no studies of the sleeping positions of Native American infants.

In North Dakota, Native American infants have a relative risk for SIDS (confirmed by autopsy) of 3.2 compared with white infants (11). In addition to prone sleeping position, several other infant care practices have been identified as potential SIDS risk factors. These risks included the use of certain kinds of pillows, mattresses, and overdressing (12-17). In 1991 a study was designed to determine the prevalence of exposure to prone sleeping position, the number of blankets, layers of clothing, and pillows used in a sample of living Native American and white infants from North Dakota.

## Methods

In November and December 1991, the questionnaire was piloted in two Native American communities and two white communities to determine (a) do mothers readily recall the sleeping position of their infant? (b) do they accurately recall for the previous night the number of layers of clothing their infants wore and the crib environment, including use of a pillow and the number of layers of bedding?

Ten questions were deleted based on the results of

the pilot study; two were related to the contents and type of pillows and two dealt with mother's estimate of the temperature in the infant's room. Mothers either indicated they did not know this information or, after they checked at home, they found their answers to be inaccurate, or the topics were too complex to be covered in the limited space on the questionnaire.

The final 10 questionnaire items were date of birth, age, sex, race, most common sleeping position (three choices), why this position was chosen, number of blankets used last night, number of layers of clothing used last night (do not count diapers), and does this child sleep on a pillow—if yes, how thick. The interview could be completed in about 3 minutes, a satisfactory interval given the time constraints in the settings where the questionnaire was to be administered.

Five questions were posed: What is the prevalence of sleeping in the prone, supine, and side position? How many layers of clothing are worn by infants in North Dakota? How many blankets are used for North Dakota infants? How many infants sleep with a pillow? Are there differences by race in answers to questions 1–4?

## Sampling Frame

The study sites were selected to represent the geographic areas of North Dakota, each reservation, and the distribution of births in the State. To control for possible duplication, each mother was asked if she had completed the questionnaire previously. Persons who refused to complete the questionnaire were also counted. In February and March 1992, the eight sites were provided the questionnaires for a 4-week period. To increase the sample size for the Native American communities, the study ran 6 weeks in those four sites.

In 1991 there were 8,830 total births in North Dakota; there were 7,509 white and 1,094 Native American births according to North Dakota Department of Vital Records in 1992. The study was restricted to infants' from birth to 6 months, since after 6 months infants are more capable of choosing their own sleeping position. Approximately 3,755 white infants and about 547 Native American infants would have been 6 months of age or younger during the study period.

## Results

At the end of the study, 335 questionnaires were completed for children 6 months of age or younger.

*'In North Dakota, Native American infants have a relative risk for SIDS (confirmed by autopsy) of 3.2 compared with white infants. In addition to prone sleeping position, several other infant care practices have been identified as potential SIDS risk factors.'*

The mean age for the 259 white infants (135 males and 120 females) was 89 days and for the 66 Native American infants (32 males and 33 females), 91 days. A *t*-test for differences in age by race was not significant at the 0.5 level.

Completed questionnaires on approximately 7.0 percent of white infants and 12 percent of Native American infants in the original cohort of live births in North Dakota were obtained. The refusal rate was reported to be less than 1 percent. Since the numbers of infants in the race categories of Hispanic and Other were small ( $N = 20$ ), these infants were deleted from further analysis.

Of the study sample of 325 infants, 223 (68.8 percent) were reported to sleep prone, 56 (17.3 percent) supine, and 45 (13.9 percent) on their side. Information on race and sleeping position was available from 324 questionnaires and is presented in the table.

Large and significant differences in the prevalence of prone and supine sleeping between white and Native American infants were found. For white infants, 192 (74.4 percent) slept prone; Native American infants, 31 (46.9 percent) slept prone. This difference was highly significant,  $\chi^2 = 26.37$ ; 1 *df*;  $P < .0001$ . No differences by sex in the sleeping position of any of the groups were observed.

The table presents the mothers' reports on why they chose a particular sleeping position for their infant. Nine percent of all mothers reported that infants slept in this position because of the suggestion of their physician. The two most frequent responses to this item were that other children slept in this position (29.8 percent) and the "other or undefined" category (50.3 percent). The differences between response categories was not significant at the .05 level,  $\chi^2 = 7.516$ ; 4 *df*;  $P =$  not significant (NS).

Several mothers of Native American infants did report that they put their infants in a supine position so they could nurse from a bottle at night. Since this information was not specifically studied on the questionnaire, a comparison with white infants could not be made.

Data from the questionnaire study of sleeping position and crib environment of 259 North Dakota white and 66 Native American infants

Survey question	Native American		White	
	Number	Percent	Number	Percent
<b>Sleeping position:</b>				
Prone.....	31	46.9	192	74.4
Supine.....	25	37.9	31	12.0
Side.....	10	15.2	35	13.6
<b>Reason for choosing this position:</b>				
Physician's advice.....	6	9.1	23	8.9
Nurse's advice.....	5	7.6	24	9.3
Neighbor's advice.....	0	0	6	2.3
Other children slept this way.....	13	19.7	83	32.4
Other reason.....	42	63.9	120	46.9
<b>Blankets used last night:</b>				
One.....	30	46.2	89	34.5
Two.....	26	40.0	149	57.8
Three.....	7	10.8	17	6.6
Four.....	2	3.1	3	1.2
<b>Layers of clothing used last night:</b>				
Zero.....	1	1.5	0	0
One.....	12	18.2	64	24.7
Two.....	48	72.7	189	73.0
Three.....	5	7.6	6	2.3
Four.....	0	0	0	0
<b>Used pillow last night?:</b>				
Yes.....	13	20.0	4	1.5
No.....	51	80.0	255	98.5

*'In addition to prone sleeping position, several other infant care practices have been identified as potential SIDS risk factors. These risks included the use of certain kinds of pillows, mattresses, and overdressing.'*

The differences by race for infants who were covered with one blanket compared with those covered with more than one were not significant  $\chi^2 = 3.032$ , 1 *df*, *P* = NS. No differences between Native American and white infants were found on the layers of clothing used the night before the questionnaire was completed. A difference was observed in the race of infants who used a pillow last night  $\chi^2 = 36.14$ ; 1 *df*; *P* < .0001. Less than 2 percent of white infants slept with a pillow on the night before the questionnaire was completed, but 21 percent of

Native American infants did. Of the infants who slept on pillows, 7 of the pillows were 1 inch and 10 were 2 or more inches thick.

## Discussion

This study of a sample of 324 infants, who represent a 7.5 percent sample of the total eligible cohort of living infants in North Dakota, ages birth through 6 months (*N* = 4,300). The sample was collected from all four Native American reservations and four sites across the State.

The results for this current North Dakota sample are very similar to the rates of infants sleeping prone from a multisite sample in the United States in a study done 15 years ago by Hoffman and Hillman (9). The results of this study differ from the prone sleeping rates reported from a single clinic in Seattle, WA, with 29 percent more North Dakota infants sleeping prone (2).

During 1989 and 1990, the all-races SIDS rate in King County (Seattle), WA, was 2.46 per 1,000 live births (*N* = 497). The rate for white infants was 2.31, and for Native American infants, 4.15 (King County-Seattle Department of Health, 1992). In North Dakota, the all-races SIDS rate for 1989 and 1990 was 1.9 (*N* = 35), the rate for whites was 1.6 (*N* = 26), and the rate for Native American infants was 3.1 (*N* = 8) (North Dakota Department of Maternal and Child Health, 1992). These SIDS deaths were confirmed by autopsy.

This disparity in rates between Native American and white infants for the years 1989 and 1990 is representative of North Dakota SIDS rates for the past 12 years when the SIDS rate for Native American infants has consistently been from two to three times that of white infants. Since the prevalence of exposure to prone sleeping is twice as frequent in white infants as in Native American infants, the role of other SIDS risk factors previously identified in North Dakota Native American infants may require further study (11).

The data in this study were collected before the extensive publicity generated by the May 6, 1992, news conference of the American Academy of Pediatrics and the review article (2), which was widely publicized in newspapers and by the network news programs in North Dakota. As a result of this extensive publicity future samples may be skewed, and the prevalence of prone sleeping position in subsequent studies may reflect this publicity.

The potential for change in rates due to public education may be substantial. In New Zealand after a public education program, the prevalence of prone

sleeping position decreased from 48 percent to 2 percent in a period of only 1 year (18).

### Limitations of the Study

This study did not examine the rate of prone sleeping in a population of infants who died from SIDS. As a result, the study cannot determine the role of prone sleeping position as a risk factor for SIDS in North Dakota.

The questionnaire was completed in only eight locations in North Dakota. It is unlikely but possible that a larger sample may change the findings reported earlier. While the percent of the total cohort sampled (7.5 percent) was high, the total number of Native American infants sampled ( $N = 66$ ) was small, and a larger sample may alter the conclusions of this study.

The characteristics of the sample may not be representative of the population of North Dakota infants to the extent that infants attending well-child clinics or going to physicians' offices during the study period may differ from the larger population of North Dakota infants.

### Future Research

The large differences in prevalence rates of prone sleeping position in Seattle and North Dakota and the difference in rates for different ethnic groups suggest that further research is necessary to determine the role of prone sleeping position as a risk factor for SIDS in North Dakota. Future research on sleeping position as a risk factor should include studies of U.S. infants with high and low rates of SIDS from a variety of ethnic groups. The expansion of SIDS data bases to include sleeping position, layers of clothing, use of pillows, and the number of blankets combined with information about temperature in the room where the death occurred will be helpful in understanding the importance of these risk factors in SIDS deaths in the United States.

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