

# Grandparent Knowledge of Infant Safe Sleep

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## Introduction

Sleep-related deaths, including sudden infant death syndrome (SIDS) and accidental suffocation or asphyxia in bed, account for nearly 3500 infant deaths per year. Between the mid-1990s and early 2000s, a dramatic decrease in deaths was observed.<sup>1</sup> This may have been due, in part, to infant caregivers following the American Academy of Pediatrics (AAP) Safe Sleep Guidelines, which were first introduced in 1994.<sup>2</sup> The most current guidelines outline the following steps to reduce the risk of sleep-related death: infants should sleep alone, supine, in a safety-approved crib, portable crib, or bassinet in close proximity to the caregivers.<sup>3</sup> The sleep environment should include a firm mattress and fitted sheet, but be free of loose blankets and bedding, including bumper pads. Other recommendations include a smoke-free environment and breastfeeding, among others.

Many interventions have worked to increase knowledge or implementation of the AAP guidelines by primary caregivers of infants.<sup>4</sup> However, grandparents often influence parental decisions regarding infant sleep. Mosley et al<sup>5</sup> identified many parents received advice for non-supine position from older relatives, while Moon and Omron<sup>6</sup> found infants were nearly 3 times more likely to be placed prone if there was a grandparent in the home.

Beyond advising primary caregivers, grandparents are often responsible for providing direct care for infants. Aitken et al<sup>7</sup> found only 58% of grandmothers reported placing infants supine to sleep on an appropriate sleep surface at the mother's house. This reduced even further to 45% when the infant was at the grandmother's house. As many as 20% of infant deaths occur outside the care of primary caregivers, of those, over 17% were in the care of relatives.<sup>8</sup> As such, better understanding is needed of grandparents' knowledge of risk reduction strategies for infant sleep. Furthermore, few associations have been identified regarding personal characteristics of grandparents that affect safe sleep

knowledge and practice, though one study found grandmothers who were white were more likely to follow the guidelines.<sup>7</sup> Therefore, the purpose of this study was to assess grandparents' perceptions of infant sleep in order to better understand perceptions and to help develop future interventions to promote the AAP guidelines with this group.

## Methods

This was a cross-sectional observational study. Participants were recruited through flyers at various community locations in Sedgwick County, Kansas. Participants also provided information to others who might be interested in participating. Eligibility criteria included English-speaking adults aged 18 years or older who were currently a grandparent and able to provide informed consent.

Participants were shown a random series of 7 photos exhibiting different infant sleep positions and environments. Photos were selected from existing promotion and education photos provided by the Kansas Infant Death and SIDS (KIDS) Network. The Medical Society of Sedgwick County Safe Sleep Task Force served as an expert panel to evaluate and select appropriate photos. A safe environment (Figure 1A) depicted an infant asleep, on his back, in a clutter-free crib or portable crib. Unsafe environments (Figure 1B) showed a combination of unsafe qualities, including prone position and 8 unsafe objects (blankets, burp cloths, bumper pad, nose suction bulb, breastfeeding pillow, standard pillow, diapers/

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**Figure 1.** Photo examples exhibiting infant sleep positions and environment: (A) safe sleep environment and (B) unsafe sleep environment.

wipes, and stuffed animals). Items were depicted in multiple photographs to assess consistency across photos and to allow objects to be included in different ways (ie, loose blanket over side of crib vs loose blanket over infant's chest and legs).

Participants were asked a series of questions about each photo: (1) Does this picture demonstrate a safe sleep environment? (2) Please describe anything that is unsafe. (3) Are there any items missing from this sleep environment? Responses were documented. Participants also completed a brief demographic survey. At completion of the study, each participant received the Safe Sleep for your Grandbaby brochure.<sup>9</sup>

Demographic characteristics were assessed using frequencies and percentages. For the photo analysis, 2 independent coders assessed the text responses from each participant. Coders first rated the accuracy of participants in assessing overall sleep environment as safe or unsafe. A priori, 2 photos were identified as representing safe environments and 5 as containing unsafe elements. Coders then rated the accuracy of responses for individual items across all photos. To be considered correct, an individual had to accurately identify an

element across all 7 photos (ie, remove bumper pads when pictured and no comments to add bumper pads when not pictured). Proportions were calculated. Interrater reliability between coders was high,  $\kappa = 0.98$ , and  $P < .001$ . Accuracy and participant characteristics (sex, income, and age) were compared using  $\chi^2$  test and 1-way analysis of variance in SPSS version 23.0.<sup>10</sup> Education level violated test assumptions even when categories were combined (high school diploma or less, some college, college degree or higher), and therefore, results are not presented.

## Ethical Approval and Informed Consent

This study was approved by the Wichita State University Institutional Review Board (Approval No. 3675). Written informed consent was obtained from all participants prior to enrollment in the study.

## Results

### Participant Demographics

The majority of the 34 participants were female (68%), earning \$90 000 or more annually (53%), with some college (35%). Average age was 63 years (SD = 11). The number of grandchildren ranged from 1 to 20 (Table 1).

Only 56% of participants correctly identified supine position. Those who provided reasoning for prone or side placement cited concerns for choking or suffocation when prone. One participant stated, "Baby needs to be on its side to not choke."

Less than a quarter (24%) correctly assessed all 8 variables depicted as unsafe; 9% did not correctly identify any of the variables. Proportions of participants who correctly identified individual items as unsafe ranged from 38% for blankets to 79% for standard pillows (Table 2). Some participants identified strategies to further reduce the risk of sleep-related death, such as adding a pacifier, narrowing the distance between crib slats, assessing the firmness of the mattress, and checking the height of the crib rails. Others recommended changes in opposition to the AAP guidelines, such as "add a blanket," "need pillows to prevent baby from rolling," "baby shouldn't be in the same room; too noisy for them to sleep with other occupants," and "put bumpers around the crib."

Women (61%) were more likely than men (18%) to recognize a burp cloth should not be in the sleeping environment ( $\chi^2[1] = 5.44, P = .02$ ). Sex did not affect overall accuracy or knowledge of any other specific factors, nor did age. Household income over \$90 000 annually was a significant predictor of number of items

**Table 1.** Participant Demographics.

Age, years (mean, SD)	63 (11)
Number of grandchildren (mean, SD)	4 (4)
Number of individuals in home (mean, SD)	2 (0.8)
Sex (f, %)	
Female	23 (67.6)
Male	11 (32.4)
Annual income (f, %)	
\$90 000 or less	16 (47.1)
>\$90 000	18 (52.9)
Education (f, %)	
High school graduate or less	9 (26.5)
Some college, no degree	12 (35.3)
College graduate	8 (23.5)
Advanced degree (master's/doctorate)	5 (14.7)

**Table 2.** Percent of Participants Able to Accurately Categorize Safety of Items Across All 7 Photos.

Unsafe Item in Crib	% Correct
Blanket	38%
Burp cloth	47%
Bumper pad	50%
Nose suction bulb	56%
Breastfeeding pillow	62%
Diapers/wipes	68%
Stuffed animals	68%
Standard pillow	79%

accurately categorized ( $F[1.31] = 4.87, P = .035$ ). Specifically, higher income was a significant predictor of knowledge of supine position as safe (76% vs 38%;  $\chi^2[1] = 5.13, P = .024$ ), and the following items in the sleep environment as unsafe: breastfeeding pillow (82% vs 44%;  $\chi^2[1] = 5.31, P = .021$ ), stuffed animals (82% vs 50%;  $\chi^2[1] = 3.88, P = .049$ ), and nose suction bulb (76% vs 38%;  $\chi^2[1] = 5.13, P = .024$ ).

In examining responses by individual participants, 5 (15%) were able to accurately identify an infant sleeping on a standard pillow as unsafe but inaccurately identified an infant sleeping on a nursing pillow as safe. Five (15%) identified a loose blanket over the side of the crib as unsafe but failed to identify a loose blanket draped across the infant as unsafe.

A few participants seemed knowledgeable about the AAP guidelines but did not understand underlying reasoning. One reported, "I know bumpers aren't okay now, but I still think they are needed to make the crib safe so I would still use them." While another said,

For my grandbaby, okay, so what I do exactly what my daughter wants me to do. They keep changing the guidelines

for safe sleep . . . the baby face up. You know back to sleep. . . . I'd make the baby was dressed warm enough so there was no blanket in the crib.

## Discussion

The results of this study suggest grandparents have inconsistent, and often inaccurate, perceptions of safe infant sleep position and environment. Less than a quarter (24%) demonstrated clear knowledge of infant safe sleep by correctly categorizing all photographs in accordance with the AAP guidelines. Many (44%) failed to recognize supine position as safest for infants and expressed misconceptions over infants' ability to choke while supine. This is consistent with a previous report, where 40% of grandmothers chose prone position and a key predictor was fear of choking.<sup>7</sup> Grandmothers' perceptions of risks of supine sleep may also influence parent choices. Colson et al<sup>11</sup> found advice from a female friend or relative to use prone positioning significantly decreased the probability the mother would choose supine position. Interventions to promote supine position should address myths regarding choking while supine.

The characteristic most strongly associated with knowledge of infant safe sleep position and environment was household income. Grandparents with high income (>\$90 000) were more likely to correctly categorize supine as safe, and correctly recommend removal of the breastfeeding pillow, stuffed animals, and nose suction bulb. Grandparents with higher income may have more resources to access information regarding safe infant care.

In terms of infant sleep environment, familial tradition or cultural practices may also contribute to items perceived as necessary.<sup>7</sup> Our findings support this, as the most confusion seemed to surround traditional items such as bumpers and loose blankets, with 50% and 62% identifying them as safe, respectively. A local study of parents found that while 80% of infants were placed supine to sleep, only 37% were in environments free of clutter, with loose blankets being the most commonly reported item.<sup>12</sup> Interventions that honor the traditional use of these items while educating on new research and knowledge may help families better understand and employ risk reduction advice around these items.

Though some respondents reported knowledge of AAP recommendations, several reported failing to understand the reasoning behind the recommendation leading to lack of confidence in the recommendation. If not properly educated on the most recent guidelines, caregivers may be confused due to changes in advice provided by experts,<sup>5</sup> especially if counseling on sleep

position was received before 1992. Furthermore, some participants seemed unable to extrapolate recommendations to similar items (eg, pillow is unsafe but breastfeeding pillow is safe). This suggests future interventions should work with families to build an understanding of the reasons underlying the recommendations. Furthermore, programs that enhance grandparents' ability to critically assess items in the infant sleep environment are needed.

This study was limited by small sample size, homogeneity of participants, and at risk for social desirability bias, which may affect the generalizability of the results. Future studies should consider assessing sleep location, as new research suggests infants who died under nonparental care are significantly more likely to be placed on a couch or adult bed, or to bed share.<sup>13</sup>

## Conclusion

This study demonstrates that many grandparents do not know the safest sleep choices for infants. Further research is needed with grandparents to determine most impactful methods of information dissemination to increase safe sleep knowledge and behavior in this influential group.

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## Author Contributions

Dr. Chesser contributed to the study idea, data collection, data analysis, data interpretation, writing the first draft, manuscript revisions and final approval of the manuscript. Dr. Ahlers-Schmidt contributed to the study idea, data analysis, data interpretation, manuscript revisions and final approval of the manuscript. Ms. Schunn contributed to the study idea, data interpretation, manuscript revisions and final approval of the manuscript.

## Declaration of Conflicting Interests

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