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What is This?
Swaddling: Will It Get Babies Onto Their Backs for Sleep?

Rosalind P. Oden1, Carmin Powell, BS2, Alexandra Sims, BA3, Julie Weisman, BA3, Brandi L. Joyner, BS1, and Rachel Y. Moon, MD1,3

Abstract

Introduction. The supine sleep position is recommended to reduce sudden infant death syndrome risk. Swaddling may improve adherence with supine placement. Aim. To assess knowledge, attitudes, and practice regarding swaddling among adult caregivers of 0- to 3-month-old infants. Methods. Cross-sectional descriptive survey. Results. All 103 adults interviewed had swaddled their infant. Common reasons for swaddling included infant comfort and warmth. Almost 80% of those who swaddled their infant found it effective, 80% believed it to be comfortable, and ~90% believed swaddling to be safe. Parents who routinely used swaddling were more likely to find it effective and to place their infant supine when swaddled (P < .01). Conclusions. Parents often use swaddling to comfort the infant, and most find it effective. Parents who routinely use swaddling are more likely to place their infant supine if swaddled. Swaddling may be a strategy for parents of infants who have difficulty sleeping in the supine position.

Keywords

sleep position, swaddling, parental decision, decision making, SIDS

The supine position is recommended for healthy sleeping infants to reduce the risk of sudden infant death syndrome (SIDS). However, some infants arouse more readily and sleep for shorter periods of time when sleeping in the supine position, and some parents may therefore place their infants in the side or prone (ie, nonsupine) position for sleep. In the United States, approximately 25% of parents report routinely placing their infants in a nonsupine position for sleep.

Swaddling is a technique of wrapping the infant in a blanket, usually with the arms enclosed within the blanket. Physiologic studies demonstrate that swaddling can increase sleep efficiency and decrease spontaneous awakenings. It has been used for centuries to comfort and soothe young infants, and more recently it has been advocated as a strategy to encourage infants to sleep in the supine position. No published reports in the United States have described parental perspectives about swaddling. We therefore conducted a descriptive study to better understand parental knowledge, attitudes, and practices with regard to swaddling. Furthermore, we chose to recruit participants in an urban, majority African American, community where self-reported nonsupine positioning is common, to assure adequate numbers of parents who do not routinely use the supine position for their infant. Our objectives were to determine how common swaddling is practiced and to characterize the differences between those who routinely swaddle their infants and those who do not routinely use swaddling. We predicted that routine swaddlers would find swaddling more effective in helping infants sleep and would be more likely to place their infants supine when swaddled.

Methods

We recruited a consecutive sample of parents and guardians of infants 0 to 3 months of age to complete a staff-administered, 5- to 10-minute survey. Participants were recruited at well child visits to a hospital-based pediatric primary care site and a WIC (Special Supplemental Nutrition Program for Women, Infants, and Children) site in Washington, DC. Participants were initially shown a...
picture of an infant swaddled in a blanket and asked how they would describe this practice. They were then asked about sociodemographics, knowledge, attitudes, and practices regarding infant swaddling. Finally, they were asked about the sleep position that they usually placed their infant for sleep when the infant was not swaddled and, if swaddling was used, the sleep position that they usually placed their infant for sleep when the infant was swaddled. Routine swaddlers were defined as those who swaddled their infant at least daily; nonroutine swaddlers swaddled their infant less than once daily.

We estimated that 90% of the participants would use swaddling with their infants. Based on that estimate, we calculated that a sample size of 97 would provide us with a 5% margin of error and a confidence level of 90%. Furthermore, we calculated that a sample size of 96 would allow us to detect a 20% difference in perceived effectiveness of swaddling between routine swaddlers and nonroutine swaddlers. This study received exemption from the institutional review board of Children’s National Medical Center.

Results

A total of 103 parents or guardians (90 mothers, 11 fathers, and 2 grandparents) completed the survey. The mean age of the respondents was 25.8 years (range = 18-40 years), and the mean age of the infants was 4.9 weeks (range = 1-12 weeks). Almost 90% of parents were African American; 94% had at least a high school diploma or GED certification.

When parents were shown a picture of a swaddled infant, although only 67% were familiar with the term swaddling, all were familiar with the practice, which was also described by many as “wrapping.” Other descriptive names for the practice included “bundle,” “burrito,” “snuggled,” “cocoon,” and “beetle wrap.” All the 103 respondents had swaddled their infant at least once before. Of those, 86 (83.5%) were continuing to use swaddling. The most frequent sources of information about how to swaddle an infant were a physician or nurse at the birth hospital (63), family member (17), and friend (11).

Three participants learned how to swaddle from watching a YouTube video.

The most common reasons for swaddling were to comfort the infant (50, 45.0%) and keep the infant warm (45, 40.5%). The category of infant comfort included responses such as calming the infant, reducing crying, and helping the infant fall or stay asleep.

Almost 80% (77.7%) of the parents felt that swaddling was effective for the purpose that it was used. Eighty-two (79.6%) believed that swaddling was comfortable for the infant, and 94 (91.3%) believed it to be safe. Concerns expressed about swaddling included the possibility that the infant would have trouble breathing if swaddled too tightly, the risk of suffocation, the possibility of the infant rolling into prone and then not being able to roll back, the infant becoming unswaddled and becoming entrapped in the blanket, or the infant being uncomfortable.

Adults who used swaddling did so frequently. Of the 86 adults who were currently using swaddling, 75 (72.8%) reported swaddling at least once daily, and 38 (44%) reported swaddling more than twice a day. Infants spent various amounts of time swaddled, from 10 minutes to 20 hours per day. Almost 80% (67, 77.9%) of the 86 adults who were currently swaddling reported that they swaddled the infant for sleep. Of these, 88.2% placed the infant in the supine position for sleep, and 11.8% used the side position. This is in contrast to the self-reported sleep positions in which infants were placed when they were not swaddled: 84 (81.6%) were placed supine, 10 (9.7%) side, and 9 (8.7%) prone. Of note, there was a significant change in sleep positioning for the almost 20% of infants who were usually placed in a nonsupine position when unswaddled. Of these infants, 10 (52.6%) were placed in the supine position when swaddled (P = .02). However, 4 of the infants who were usually placed in the supine position when not swaddled were placed on the side when swaddled.

Routine swaddlers and nonroutine swaddlers were similar with regard to infant gender, parent age, and race/ethnicity. Routine swaddlers, however, were more likely to have received postsecondary school education. Routine swaddlers were more likely to swaddle to comfort the infant (P < .01), to find swaddling effective (P < .01), to perceive that the infant was comfortable when swaddled (P < .01), to use swaddling when the infant was going to sleep (P < .01), and to place the infant supine when swaddled (P < .01; Table 1).

Discussion

Swaddling has traditionally been used in many cultures as a strategy to calm infants. Its popularity has increased in the United States recently, and some have suggested that it may be an approach to increase supine positioning. We therefore conducted a study to ascertain knowledge, attitudes, and practices regarding infant swaddling in an urban population that is at high risk for SIDS and has high rates of nonsupine positioning. We found that swaddling is almost universally practiced in this study population and that many parents who would typically place their infant in the prone or side position for sleep and routine swaddlers would place their infant supine when swaddled.

The concept of swaddling was familiar to all the participants in our survey, although it was not always described as swaddling. However, although they were
familiar with swaddling, most parents had to learn the technique for swaddling. While most learned to swaddle from health professionals, family members, and friends, it is interesting to note that several learned how to swaddle by watching a YouTube video. A search using the term swaddling on the YouTube Web site resulted in 1460 videos. Although the Internet provides an unparalleled wealth of information,24,25 particularly when the Web site is not a health Web site.

Most of the participants in our study found that swaddling was effective in calming the infant and promoting sleep. This was particularly true for routine swaddlers. This is not surprising, as parents who find swaddling effective in calming the infant or promoting infant sleep are more likely to use the technique frequently than those who do not find it effective. Indeed, physiologic studies demonstrate that swaddling can increase sleep efficiency and decrease spontaneous awakenings.17,18

One of the most common reasons that parents continue to use the prone or side sleep position is because of the perception that the infant sleeps “better” (ie, longer or falls asleep more quickly) when not in the supine position.11-15,26-28 Many of these parents may have tried supine positioning initially but abandoned it because the infant did not sleep as well as the parents would have liked. Therefore, swaddling may encourage parents who perceive that their infants have difficulty sleeping in the supine position to use the supine position. In fact, routine swaddlers were more likely to use the supine sleep position when the infant was swaddled.

However, although parents found swaddling to be effective, there were concerns about the safety of swaddling. The most commonly cited concern was that the infant would have trouble breathing if the swaddle was too tight. Tight swaddling can result in an increased respiratory rate29 and may reduce the infant’s functional residual lung capacity.20,30,31 Other commonly mentioned

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Table 1. Characteristics of Adults Who Swaddle Routinely Versus Adults Who Do Not Swaddle Routinely

<table>
<thead>
<tr>
<th></th>
<th>Nonroutine Swaddlers (Less Than Once Daily), N = 28</th>
<th>Routine Swaddlers (at Least Once Daily), N = 75</th>
<th>PValue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever tried swaddling</td>
<td>28 (100%)</td>
<td>75 (100%)</td>
<td>NS</td>
</tr>
<tr>
<td>Reasons for swaddling*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIDS prevention</td>
<td>1 (3.6%)</td>
<td>2 (2.7%)</td>
<td>NS</td>
</tr>
<tr>
<td>Infant comfort</td>
<td>5 (17.9%)</td>
<td>37 (49.3%)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Keep infant warm</td>
<td>9 (32.1%)</td>
<td>36 (48.0%)</td>
<td>NS</td>
</tr>
<tr>
<td>Other</td>
<td>6 (21.4%)</td>
<td>16 (21.3%)</td>
<td>NS</td>
</tr>
<tr>
<td>Is swaddling effective?</td>
<td>Yes 13 (46.4%)</td>
<td>Yes 65 (86.7%)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Do you see any problems with swaddling?</td>
<td>Yes 10 (35.7%)</td>
<td>Yes 15 (20.0%)</td>
<td>NS</td>
</tr>
<tr>
<td>Is your baby comfortable when swaddled?</td>
<td>Yes 18 (64.3%)</td>
<td>Yes 66 (88.0%)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Infant sleep position when swaddled</td>
<td>Supine 19 (67.9%)</td>
<td>Supine 62 (82.7%)</td>
<td>NS</td>
</tr>
<tr>
<td>Usual length of time swaddled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1 hour</td>
<td>4 (14.3%)</td>
<td>30 (40.0%)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>1 hour or more</td>
<td>10 (35.7%)</td>
<td>44 (58.7%)</td>
<td>NS</td>
</tr>
<tr>
<td>Infant sleep position when not swaddled</td>
<td>Supine 21 (75.0%)</td>
<td>Supine 63 (84.0%)</td>
<td>NS</td>
</tr>
<tr>
<td>Relationship to infant</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>Mother</td>
<td>24 (85.7%)</td>
<td>66 (88.0%)</td>
<td></td>
</tr>
<tr>
<td>Father</td>
<td>2 (7.1%)</td>
<td>9 (12.0%)</td>
<td></td>
</tr>
<tr>
<td>Grandparent</td>
<td>2 (7.1%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>Infant gender</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>Female</td>
<td>14 (50.0%)</td>
<td>43 (57.3%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>14 (50.0%)</td>
<td>32 (42.7%)</td>
<td></td>
</tr>
<tr>
<td>Parent age (mean)</td>
<td>26.6 years</td>
<td>25.6 years</td>
<td>NS</td>
</tr>
<tr>
<td>Educational level of respondent</td>
<td></td>
<td></td>
<td>.03</td>
</tr>
<tr>
<td>High school graduate or less</td>
<td>19 (67.9%)</td>
<td>33 (44.0%)</td>
<td></td>
</tr>
<tr>
<td>More than high school graduate</td>
<td>9 (32.1%)</td>
<td>42 (56.0%)</td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity of respondent</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>African American</td>
<td>25 (89.3%)</td>
<td>65 (89.3%)</td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>0 (0%)</td>
<td>1 (1.3%)</td>
<td></td>
</tr>
<tr>
<td>Biracial or multiracial</td>
<td>3 (10.7%)</td>
<td>7 (9.3%)</td>
<td></td>
</tr>
</tbody>
</table>

*Because respondents could choose multiple responses, responses do not equal 100%.
concerns were that the infant could become unswaddled and suffocate or strangle against the loose blanket or that the infant might roll into the prone position while swaddled and not be able to roll back into the supine position. The American Academy of Pediatrics recommends that there should be no loose blankets in the infant’s sleep environment, so it would be prudent for adult caregivers to remove any swaddling blankets that have become loose. In addition, there is a substantial increase in SIDS risk if the infant is swaddled in the prone position. This is presumably because the upper body and arms of the swaddled infant are immobilized, making it difficult or impossible for the infant to escape from a rebreathing or asphyxiating situation. Indeed, while it is encouraging that more than half of the infants who routinely were placed in a nonsupine position for sleep were placed supine for sleep when swaddled, it is concerning that several infants were placed on the side for sleep while swaddled. The side position, even when swaddled, is an unstable position, and infants can more easily roll into the prone position. Swaddled infants should therefore be only placed in the supine position, and it may be wise to refrain from swaddling once the infant is able to roll over.

There are additional concerns about swaddling that were not mentioned by the participants in this survey. There have been several reports of hip dysplasia being exacerbated by tight swaddling, particularly when the hips are held in extension and adduction. It is therefore recommended that if infants are swaddled, the swaddle should be loose enough to allow hip movement. In addition, there has been concern that swaddling will increase the risk of overheating, especially when the head is covered or there is infection, as overheating and head covering are associated with increased SIDS risk. However, one recent study found no increase in abdominal skin temperature when infants were swaddled in a light cotton blanket from the shoulders down. It is yet unclear whether swaddling reduces the risk of SIDS. Epidemiologic studies of swaddling and SIDS have been inconsistent. One study demonstrated a decrease in SIDS rate when infants were swaddled and placed in the supine position but an increased SIDS rate when infants were swaddled and placed in the prone position. Another study reported a 31-fold increase in SIDS risk with swaddling but did not stratify the analysis by sleep position. Because impaired infant arousal is postulated to be a mechanism leading to SIDS, physiologic studies have investigated the relationship between swaddling and arousal. Swaddling results in decreased startle reflex, increased sleep duration, and decreased spontaneous awakenings. The effects of swaddling on arousal are less clear. One study has demonstrated decreased arousability with swaddling, particularly in infants who are easily arousable when not swaddled and infants who have not been routinely swaddled. However, another study has reported decreased arousal thresholds (ie, easier arousal) with swaddling.

We acknowledge that this study is limited by a relatively small sample size and restricted geographic distribution, which raises questions about generalizability of the findings. However, this study population was in a community where both nonsupine positioning and swaddling are common practices, and other findings from this community with regard to infant sleep practices have been similar to other samples. Therefore, we believe that these findings are likely generalizable to other communities in which nonsupine positioning is common. Nonetheless, it will be important to determine if similar results are found in other localities and with other racial and ethnic groups. In addition, participants may not have been forthcoming with actual sleep position practices, which may have skewed the results. However, we believe that participants would be more likely to deny nonsupine positioning when the infant was not swaddled than to deny nonsupine positioning when the infant was swaddled, since there are accepted recommendations for the former but not the latter. If this was the case, then the positive effect of swaddling on encouraging supine positioning would be an underestimate.

In conclusion, we found that adults often use swaddling to comfort or soothe infants, and most find that it is effective. Parents who usually place their infant in a nonsupine position and who routinely swaddle their infant are more likely to place their infant supine if swaddled. Although care should be taken to place swaddled infants only in the supine position, to avoid overheating, and to not swaddle so tightly as to compromise respirations and exacerbate hip dysplasia, swaddling may be a strategy to encourage supine placement for parents concerned that their infants have difficulty sleeping in the supine position.

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