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Neonatal Nurses' and Therapists' Perceptions of Positioning for Preterm Infants in the Neonatal Intensive Care Unit

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Abstract

Purpose—Determine perceptions about positioning for preterm infants in the NICU.

Design—Twenty-item survey

Sample—Neonatal nurses (n=68) and speech, physical, and occupational therapists (n=8).

Main Outcome Variable—Perceptions about positioning were obtained, and differences in perceptions between nurses and therapists were explored.

Results—Ninety-nine percent of respondents agreed that positioning is important for the well-being of the infant. Sixty-two percent of nurses and 86% of therapists identified the Dandle Roo as the ideal method of neonatal positioning. Forty-four percent of nurses and 57% of therapists reported the Dandle Roo is the easiest positioning method to use in the NICU. Some perceptions differed: therapists were more likely to report the Sleep Sack does not hold the infant in good

alignment. Nurses were more likely to report the infant does not sleep well in traditional positioning.

Although survival rates of preterm infants have increased in the past two decades,^{1,2} the risk for disability and developmental impairment remains high³⁻⁵. Subsequently, implementing strategies to optimize outcome in the neonatal intensive care unit (NICU) and following discharge are critical. Many of the interventions that speech therapists, physical therapists, occupational therapists, as well as neonatal nurses, use during the vulnerable time in the NICU are environmental strategies. Minimizing stimuli and providing containment and support to the fragile preterm infant body through positioning are common interventions used in the NICU^{6,7}.

Infants born preterm are deprived of the uterine crowding during the third trimester of pregnancy. This trimester encourages the development of physiologic flexion, a position characterized by shoulder flexion, scapular protraction, hip and knee flexion, and posterior pelvic tilt. The late stages of pregnancy also encourage midline orientation⁶. This position prepares the infant for later function, supports neurodevelopment, and promotes self-soothing⁸. As preterm infants are deprived of this critical experience, in addition to having neurological immaturity, they often lack adequate muscle tone and strength at birth. This often causes them to maintain their bodies in extended positions^{3,9}. This suboptimal position can impact development, and can inhibit self-regulation¹⁰. These influences on development can impact future and immediate skill acquisition, such as feeding¹¹ and can interfere with their ability to interact and attach with their caregivers.

To minimize these sequelae of prematurity, NICU professionals attempt to encourage flexed position using various methods¹². Swaddling the infant in a receiving blanket, as well as using blankets and cloth rolls to create boundaries or a “nest” around the infant, are a few of the methods that have been commonly used in the NICU to achieve optimal positioning. Swaddling has been shown to positively impact neuromuscular development¹³ decrease neurobehavioral startles, improve sleep and self-regulation during handling, and decrease stress¹⁴. Other methods, including cloth boundaries, have also been shown to improve motor performance and postural development and improve movement across midline^{11,15,16}. There are also many commercially available devices used in the NICU to achieve optimal positioning. These devices often include:

- Snuggle Up by Respironics: a device with a cloth boundary for the infant to brace their feet and straps to contain the arms (found at: <http://www.healthcare.philips.com>),
- Bendy Bumper by Phillips: a bendable cylinder used around the infant’s body for containment (found at: <http://www.healthcare.philips.com/>),
- Sleep Sack by Halo: a swaddle blanket attached to a fleece onesie (found at: <http://www.halosleep.com>),
- Dandle Roo by Dandle Lion: a device made of stretchable cotton that provides containment allowing the infant to move the extremities into extension followed by recoil to flexion and midline orientation (found at: <http://www.dandlelionmedical.com/products/>), and
- Dandle Wrap by Dandle Lion: a device similar to the Dandle Roo, but used with infants following transition out of the isolette (found at: <http://www.dandlelionmedical.com/products/>).

These and other devices are in widespread use throughout NICUs, however little research exists examining neonatal nurse and therapist perceptions about their effectiveness.

Neonatal nurses and therapists both play an essential role in ensuring proper positioning of the high-risk infant. Neonatal therapists are concerned with optimal positioning to ensure proper joint alignment, promotion of self regulation, and positioning that will foster developmental skills. Because neonatal nurses manage many facets of an infant's care, positioning devices and methods that require little effort by the nurse, while providing effective and developmentally supportive care to the infant are crucial. There is a paucity of research investigating perceptions of the best positioning methods for preterm infants. These perceptions about positioning are important, as they influence what strategies are used in the NICU, and can influence the development of new positioning devices for use with high-risk infants. The purpose of this study was to identify neonatal nurses' (RN) neonatal therapists' (speech, physical and occupational) perceptions about different methods of positioning used in the study site NICU.

Methods

This survey was approved through the Human Research Protection Office (HRPO) of the study site. A survey was designed and sent by email to 242 neonatal nurses (registered nurses), and 16 neonatal therapists (speech, physical, and occupational), in a 75 bed Level III NICU in St. Louis, Missouri. The Dandle Roo, a positioning device used to promote physiological flexion in neonates during their stay in the NICU, was introduced and used in this NICU one year prior to the survey and was investigated during a randomized clinical trial in this unit. In the randomized clinical trial, the Dandle Roo was compared to 'traditional positioning', which included the use of the swaddling, nesting, Bendy Bumper, Snuggle Up, and the Sleep Sack. Respondents did not know the results of the clinical trial at the time of the survey. Twenty questions (Figure 1) geared toward determining neonatal nurses' and therapists' perceptions of the importance and effect of neonatal positioning, and what is considered to be the most optimal positioning, were created and compiled into a survey following the trial.

Survey Monkey, an online survey generator, was used for the survey. A link to the survey was distributed by email and was open for a 3 month period, from November 2011 to January 2012. Implied consent was obtained when nurses and therapists completed the voluntary survey. Response choices indicating level of agreement to each of the 20 questions (see figure 1) on the survey, unless otherwise specified, included: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree and Strongly Disagree. Positioning response choices for survey question 16 and 17, investigating the most beneficial positioning method in the NICU as well as the easiest positioning method to use included: Dandle Roo, boundaries, nesting, and swaddling, and Sleep Sack. Responses for questions 18 and 19 (investigating how the Dandle Roo is beneficial and how traditional positioning methods, such as boundaries, Sleep Sack, nesting, and swaddling, are beneficial to the infant) included: infant is comfortable, infant's heart rate, respiratory rate, and oxygen saturations remain stable, infant is held in an acceptable degree of flexion, infant sleeps well, infant's development is maximized, and Dandle Roo/traditional positioning is not beneficial. Neonatal nurses and therapists were instructed to check any answers that they felt applied to questions 18 and 19. Open-ended responses on perceptions of neonatal positioning were encouraged and gained through question 20 of the survey, which asked for other comments regarding neonatal positioning.

Descriptive statistics were run on all questions. Significant differences in responses among therapists and neonatal nurses, for questions 1–15, were analyzed using chi-square analysis after dichotomizing answers into agree (including strongly agree and agree) or disagree (including disagree and strongly disagree), with neutral responses omitted. Chi-square analysis was also used to investigate differences between nurses and therapists for questions

16–19. Free responses from the 20 questions were analyzed by the research team. Responses were grouped together by similarity to analyze themes within free-response questions.

Results

Out of 258 neonatal nurses and therapists, 76 participants (50% of therapists, $n=8$ and 28% of nurses, $n=68$) completed the survey. Forty-one percent ($n=31$) had more than 20 years of experience. Eighty-nine percent ($n=68$) of the respondents were neonatal nurses and 11% ($n=8$) were therapists.

Results from the survey (question 1) indicated that 99% ($n=75$) of the respondents agreed that positioning is important for the well-being of the infant. Ninety nine percent ($n=75$) agreed that research demonstrates the benefits of positioning for the high-risk infant (question 2). There were no significant differences between nurses' and therapists' perceptions on these two questions.

From questions 3–7, there were differences in nurses' (98%, $n=67$) and therapists' (75%, $n=6$) responses on whether research clearly demonstrated the benefits of the Sleep Sack ($\chi^2=4.74$; $p=0.029$), with no differences in whether research clearly demonstrates the benefits of Dandle Wrap, swaddling, boundaries, and Snuggle Up.

Responses between neonatal nurses' and therapists' perceptions regarding how different positioning methods achieve good alignment (question 8–15) are reported in Table 1. There were no significant differences between therapists and nurses on perceptions about alignment, except for alignment related to the Sleep Sack in which 69% ($n=47$) of neonatal nurses agreed the Sleep Sack puts the infant in good alignment, while none ($n=8$) of the therapists agreed ($\chi^2=9.06$; $p=0.03$). There were no significant differences between neonatal nurses' and therapists' perceptions regarding alignment and Dandle Wrap, swaddling, boundaries, Snuggle Up, and lying flat.

See Figure 2 for the distribution of responses regarding which positioning method is the most beneficial to the preterm infant in the NICU (question 16), with the Dandle Roo receiving 62% ($n=47$) of the votes. When analyzing results for the most beneficial type of positioning, neonatal nurses responded as follows: 62% ($n=42$) selected the Dandle Roo, 18% ($n=12$) selected nesting, 4% ($n=3$) selected swaddling, and 15% ($n=10$) the use of boundaries. Among therapists, the most beneficial type of positioning reported was as follows: 86% ($n=7$) selected the Dandle Roo, 0% selected nesting, 14% ($n=1$) selected swaddling, and 0% selected the use of boundaries. See figure 3 for the distribution of responses on which positioning method is easiest to use. When examining which positioning devices are easiest to use (question 17), 45% ($n=34$) of respondents indicated the Dandle Roo. Nurses responses included 44% ($n=29$), 8% ($n=5$) chose nesting, 24% ($n=16$) selected swaddling, and 8% ($n=5$) selected the use of boundaries, and 17% ($n=11$) selected the Sleep Sack. In comparison, 57% ($n=4$) of therapists chose the Dandle Roo, 0% selected nesting, 29% ($n=2$) chose swaddling, and 0% chose the use of boundaries. There were no significant differences between therapists and nurses on what the most beneficial positioning method is as well as which one is easiest to use.

See Figure 4 for which perceived benefits there are to Dandle Roo positioning (question 18). There were no significant differences between nurses and therapist responses on question number 18. See figure 5 for perceived benefits of traditional positioning (question 19). There were significant differences in how therapists and nurses responded to the question about traditional positioning and whether it helped the infant sleep well ($\chi^2=4.69$, $p=0.03$), with 53% ($n=36$) of nurses reporting that the infant does not sleep well in traditional positioning

compared to 13% of therapists (n=1). No other differences in nurses and therapists responses were observed on question 19.

Years of experience were also explored for associations with responses on the survey. There were no significant associations between years of experience and perceptions about neonatal positioning on any of the survey items.

Free Response

Free responses ranged from comments about the like and dislike of the Dandle Roo, the need for education on how to use positioning methods, and how the best positioning method is based on the needs of the infant. Among nurses who responded with free responses (n=31), most (n=7) responses about the Dandle Roo were favorable, while some (n=4) were unfavorable or contained suggestions for product improvement. Suggestions included the need for a better way to contain infants, specifically in relation to the velcro not holding, and that a product that can be used with phototherapy will enable infants to have the containment needed during this intervention. Some nurses wrote concerns about what the effects of not being able to stretch out may be in the Dandle Roo (n=2). Other comments (n=3) focused on improper and inconsistent use of positioning methods to achieve desired results and the need for more education (n=6). Other comments (n=5) indicated that positioning methods are not the same across all infants and that positioning methods should be individualized based on the infant needs. Additional comments (n=4) were about the ease of use of the Dandle Roo (n=2) and the benefits and ease of use of swaddling (n=2). Therapist responses (n=2) indicated the need to individualize positioning based on the infant's needs (n=1) as well as the ability of the Dandle Roo to take the "guess work" out of positioning with a standard way to position (n=1).

Discussion

This study defined nursing and therapist perceptions about neonatal positioning through a survey in a level III NICU in the Midwestern United States. Results demonstrated that both neonatal nurses and therapists agree that positioning is important for the well-being of preterm infants. Nurses and therapists differed in their perceptions about the use of the Sleep Sack for preterm infants in the NICU and whether infants sleep well in traditional methods, however, the number of years of experience was not associated with perceptions about neonatal positioning. The Dandle Roo was reported to be the positioning method that was most beneficial for use in the NICU, the easiest to use, and best at placing the infant in good alignment.

Neonatal nurses and therapists differed in their responses to the Sleep Sack regarding both that research has shown the benefits for this device and whether or not this device holds the infant in good alignment. Significant differences between neonatal nurses' and therapists' responses on these survey items may be due to their areas of focus in patient care. Therapeutic positioning is a major source of referral and treatment for therapists, while neonatal nurses are responsible for multiple aspects of care, including temperature regulation of the infant and ensuring safe sleep practices prior to discharge. Nurses responses to the benefits of the Sleep Sack may have been reported based on aiding temperature regulation or with providing a safe sleep atmosphere, which are common themes in marketing materials for the Sleep Sack (Halo Innovations Inc). In contrast, 100% of therapists reported that the Sleep Sack does not put the infant in good alignment, which is an area of focus of the neonatal therapist. Approaching positioning from two different perspectives might influence their perceptions of different devices, and both provide valuable insight. While the Sleep Sack may be beneficial from the nurses perspective, it may

not give the needed support to the premature infant prior to term age, when considering the perspectives of neonatal therapists. Further research is warranted.

In comparison to other positioning methods (i.e. Sleep Sack, Snuggle Up, nesting, boundaries and swaddling), nurses and therapists reported that the Dandle Roo is the easiest to use and most beneficial. Likewise, nurses were more likely to report that infants do not sleep well in traditional methods, while both disciplines reported that good positioning may be achieved in a variety of ways. Although perceptions are that the Dandle Roo is the most beneficial, without adequate resources, perceptions from this survey indicate that use of nesting and blankets can still facilitate positive results for the preterm infant. This came across in the free responses with nurses and therapists reporting that adequate results can be achieved with traditional positioning, but that the standard blanket and way to wrap that the Dandle Roo affords, may make the process of positioning easier. To date there are no studies or scientific evidence to support that there are benefits to using one method of positioning over another.

Themes from free responses included that positioning should be done on an individual basis, that there needs to be more consistency in how staff position infants, and that more education is needed on positioning methods. Comments about swaddling in the free responses were positive. Comments about the Dandle Roo were generally positive. One respondent stated, "It seemed as though we knew the Dandle Roos were better for our kids just by using them." This may demonstrate that perceptions from nursing and therapists may be based on clinical expertise and observation rather than scientific evidence. However, respondents also suggested that research needs to be conducted in order to determine the best type of positioning for infants in the NICU. A main theme through the free responses was the general perception that positioning is very important for the neonate.

In summary, we found that 99% of respondents agreed that positioning is important for the well-being of preterm infants. The majority of respondents believe the Dandle Roo is the best positioning device for preterm infants that the Dandle Roo is the easiest positioning device to use in the NICU. This study improves our understanding of neonatal nurses' and therapists' perceptions about positioning. Given that both neonatal nurses and therapists have important roles in the care of preterm infants, it is important to understand their perceptions on positioning and what they perceive to be the best positioning methods to optimize the health, development, and well-being of the preterm infant. Neonatal nurses play an important role in monitoring and caring for infants in the NICU and often take on the role as primary caregiver. Neonatal nurses typically spend the most time with the infants and therefore can provide valuable information regarding the types of positioning devices that do and do not work for the infants they are caring for. The therapist's role in the NICU is to maximize the infant's performance and support development. Therapists specialize in the assessment and treatment of infants in the NICU and therefore can provide valuable recommendations regarding positioning. Although the focus of care is different across these two disciplines, these differences provide for various strengths in determining which positioning device is believed to be best for the infant.

To better understand neonatal nurses' and therapist's perceptions on standard of care, it is necessary for more research to be conducted. Future studies investigating neonatal nurses' and therapists' perceptions on positioning should include a larger sample size with more equal distribution of nurses and therapists. Surveys should include more free responses in order to address more detailed opinions on why certain positioning devices are more beneficial than others. Investigating positioning and other interventions can help to optimize care and outcome for these fragile infants. Although much can be learned through understanding neonatal nurses' and therapists' perceptions, more research is needed to more

systematically investigate the benefits of different types of positioning on the preterm infant in the NICU. It is only through controlled studies that the benefits of specific methods of positioning can be fully appreciated.

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1. Positioning care of the preterm infant in the NICU is important for the well-being of the infant?
2. Research has clearly shown the benefits of positioning the preterm infant?
3. Research has clearly demonstrated benefits of the Dandle Roo?
4. Research has clearly demonstrated the benefits of swaddling?
5. Research has clearly demonstrated the benefits of boundaries?
6. Research has clearly shown the benefits of facilitated tuck?
7. Research has clearly shown the benefits of the sleep sack?
8. The Dandle Roo puts the infant in good alignment?
9. The Dandle Wrap puts the infant in good alignment?
10. Swaddling puts the infant in good alignment?
11. Nesting puts the infant in good alignment?
12. The use of boundaries puts the infant in good alignment?
13. The Sleep Sack puts the infant in good alignment?
14. The Snuggle Up puts the infant in good alignment?
15. Lying flat in bed puts the infant in good alignment?
16. Which is the most beneficial for Preterm infants?
17. Which is the easiest to use?
18. The Dandle Roo is beneficial to preterm infants because?
19. Traditional positioning methods (swaddling, boundaries, Snuggle Up, etc.) are beneficial for preterm infants because?
20. Other comments regarding positioning in the NICU?

Figure 1.
Neonatal nursing and therapist survey

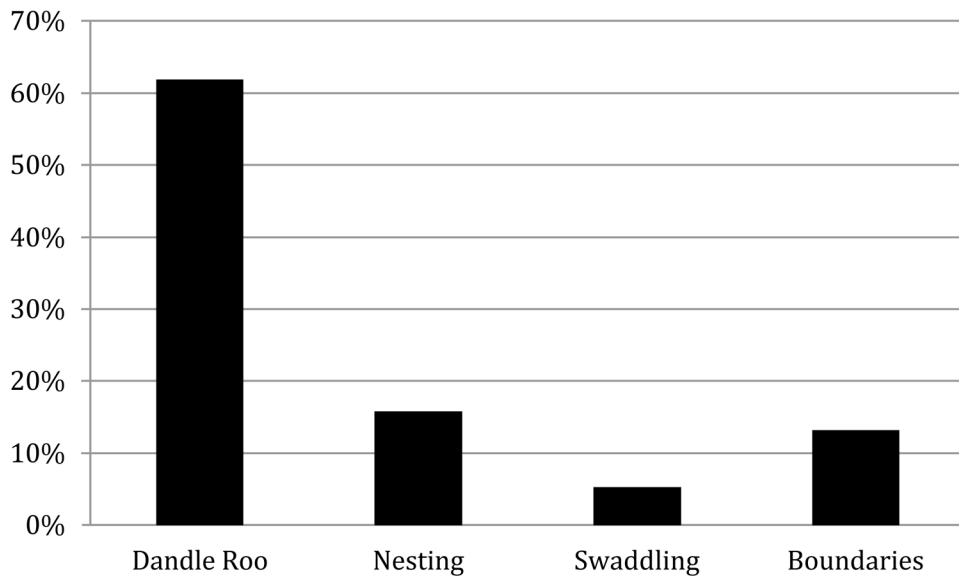


Figure 2.
Which is the most beneficial for preterm infants?

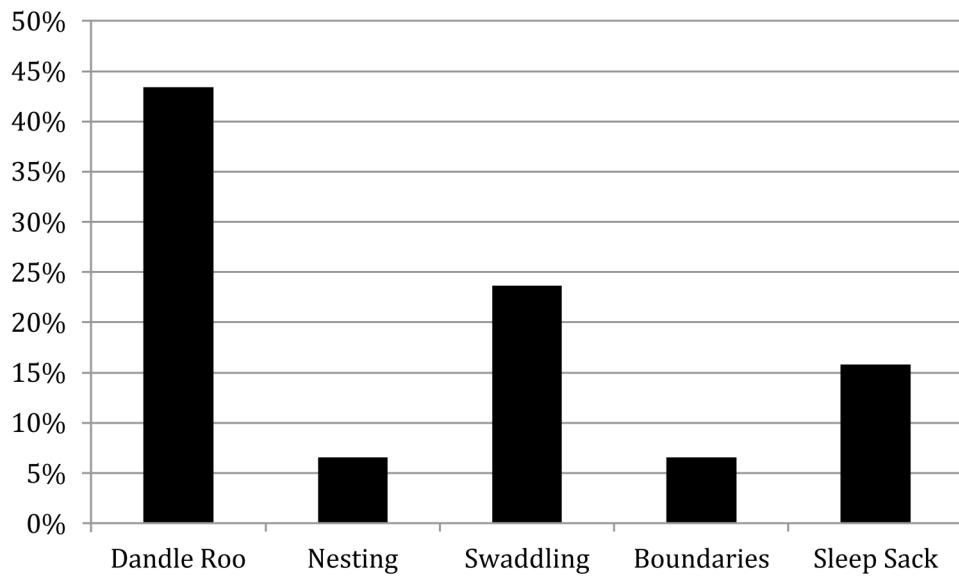


Figure 3.
Which is the easiest to use?

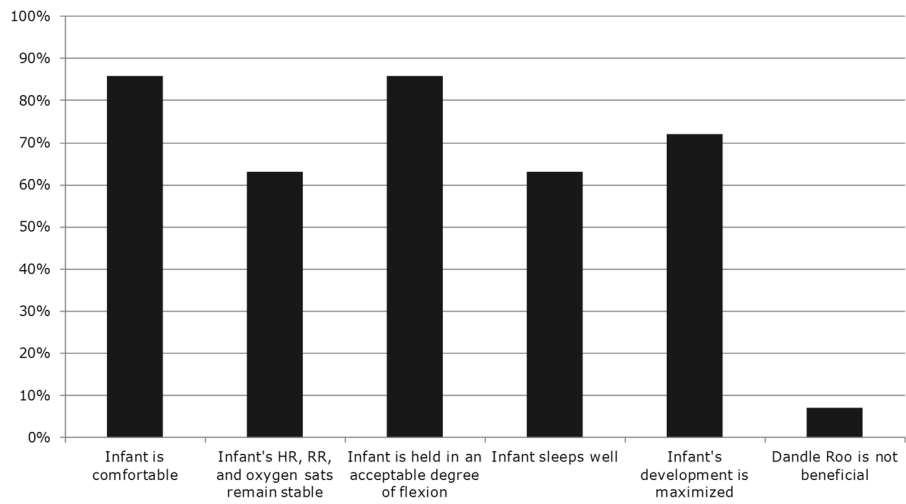


Figure 4.
Perceived benefits of the Dandle Roo.

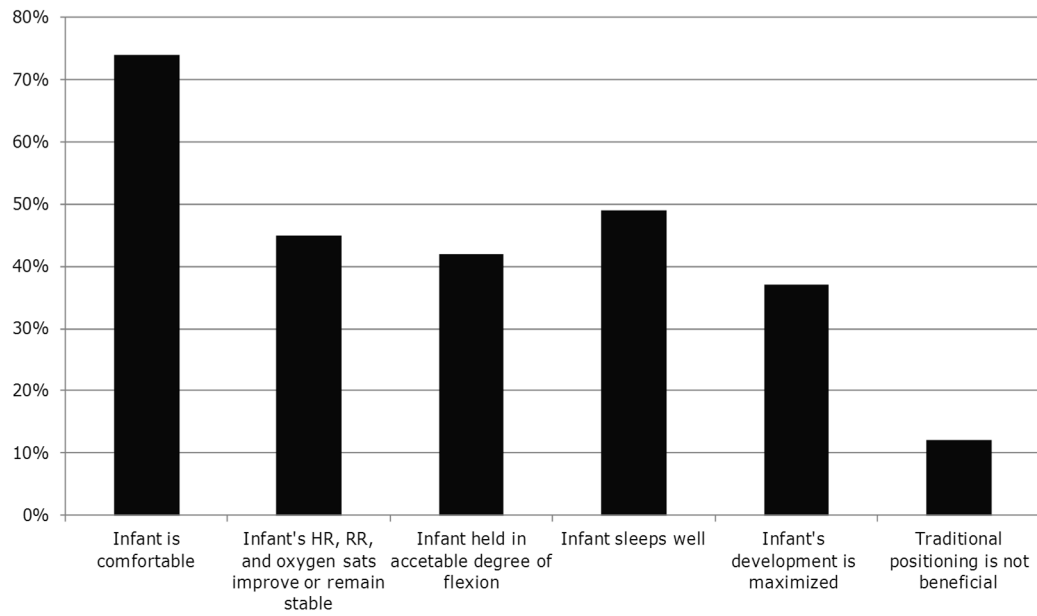


Figure 5.
Perceived benefits of traditional positioning.

Table 1

Perceptions of Positioning Devices and Good Alignment.

Positioning Device Puts the Infant in Good Alignment	Agree %	Disagree %	χ^2	p-value
Dandle Roo				
Nurses	88	12	0.91	0.34
Therapists	100	0		
Dandle Wrap				
Nurses	70	30	3.31	0.07
Therapists	100	0		
Swaddling				
Nurses	94	6	0.53	0.47
Therapists	88	12		
Sleep Sack				
Nurses	69	31	9.06	0.03*
Therapists	0	100		
Nesting				
Nurses	93	7	0.69	0.41
Therapists	93	7		
Boundaries				
Nurses	96	14	0.29	0.59
Therapists	100	0		
Snuggle Up				
Nurses	67	33	0.00	1.00
Therapists	67	33		
Lying Flat				
Nurses	0	100	2.05	0.15
Therapists	0	100		

Note: significant differences between nurses' and therapists' responses are indicated by *.