

ARTICLE INFORMATION

Received: May 08, 2026

Revised: May 25, 2026

Available online: May 26, 2026

at: <https://e-jurnal.iphorr.com/index.php/mchc>

The effect of the m-shape carrying method on sleep quality in infants aged 3-6 months

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Abstract

Background: Sleep is essential for a baby's growth and development. One way to promote better sleep is to use the M-shape carrying technique, an ergonomic position that mimics the baby's natural position in the womb.

Purpose: To examine the role of ergonomic baby carrying in a baby carrier in determining how well babies aged 3–6 months sleep.

Method: A pre-experimental study with a single-group design before and after treatment was conducted. A total of 45 babies aged 3 to 6 months were selected through purposive sampling. Data were collected using a questionnaire, and the results were analyzed using the Wilcoxon statistical test.

Results: The study showed a significant difference in infant sleep quality before and after using the M-shape carrying method, with a p-value of 0.000 ($p < 0.05$), indicating a positive effect. The use of the M-shape carrying position has been shown to help improve sleep patterns and comfort levels in babies aged 3 to 6 months.

Conclusion: This approach can be an effective non-drug method to support improved infant sleep quality.

Keywords: Carrying; Infant; M-Shape Method; Sleep Quality.

INTRODUCTION

The early stages of life are a crucial period for a child's growth and development, requiring the utmost attention and love. One of the main factors influencing a child's development is the quality of their sleep and rest (Aprianti, Nababan, Panjaitan, & Bali, 2023).

Infancy is a golden period for a child's growth and development, so it requires special attention and affection. One factor that influences a baby's growth and development is sleep and rest (Sinaga, 2020). Babies who are adequately held and cuddled will be calmer, crying less and having more fun. This allows them more time and energy to grow and develop physically and interact with their environment (Hanum, Rita, Samra, Ginting, Wahyuni, Sari, & Aritonang, 2024).

Based on a 2020 WHO report published in the journal *Pediatrics*, an estimated one-third of infants experience sleep problems. A study on sleep difficulties in toddlers conducted in five major cities of

Jakarta, Bandung, Medan, Palembang, and Batam indicated that 51.3% of infants faced sleep problems, 42% of respondents experienced sleep times that did not reach 12 hours, often waking up more than three times, and difficulty falling back to sleep during the night period with a duration of more than one hour. Although not explained in detail, most of these disorders appear in the age range of 0–36 months, with the highest risk found in the age phase of 3–6 months when babies begin to form more regular but still unstable sleep patterns (Sari, 2017).

A baby can be considered to have a sleep disorder if they sleep less than nine hours a night, wake up more than three times, are fussy, cry easily, and have difficulty returning to sleep. One way to help babies sleep better is by holding them. Holding is also known to promote bonding and closeness by strengthening the relationship, helping babies sleep better, and improving focus while awake. However,

many mothers are still hesitant to hold their babies frequently, especially in the early stages of life, for fear of holding them in the wrong position (Sukmawati & Imanah, 2020).

Although it may seem simple, carrying a baby should be done correctly and safely. One recommended method, the M-shape technique, is considered effective in helping babies develop communication skills and deepen emotional bonds with their parents or caregivers, as it positions the baby with their face facing directly toward their caregiver (Dewi, Utami, & Rini, 2021). Babies who are adequately held and cuddled will be calmer because they cry and fuss less. This way, they have more time and energy to grow and develop physically and interact with their environment. Certain baby-holding positions can help babies become familiar with their surroundings and make them curious to learn more. This curiosity is the starting point for parents or caregivers to stimulate them further, allowing their abilities to grow daily (Widiatmoko & Widiatmoko, 2022).

Infancy is a golden period for a child's growth and development, requiring special attention and affection. Sleep and rest are key factors influencing a baby's growth and development. One way to meet these needs is by carrying the baby. However, many mothers are reluctant to carry their babies regularly, especially in the early stages of life. This is due to fears of holding their baby incorrectly and a lack of understanding of the correct position (Fitriahadi, Satriandari, & Jamal, 2025). Carrying a baby is an unavoidable activity when becoming a parent and has been a hereditary habit passed down from our ancestors since the 20th century in the daily lives of various nations such as African, Indian, American, Mexican, and even across the world. In the 1980s, the development of long cloth slings and instant slings grew rapidly in line with the rapid number of companies producing various types of slings, from small businesses to large scale. When a baby is born, the baby must adapt to a different environment. Warmth and darkness are replaced by the cold temperature of the room and the glare of light. So when the baby is born, the baby wants to be carried continuously and always wants to be close to the mother because the baby finds comfort similar to when still in the womb (Muminah & Salim, 2022).

The M-shape position is the most recommended baby carrying technique by orthopedic and

traumatology specialists, where the knees are positioned higher than the baby's buttocks. The M-shape position is currently considered the safest because it keeps the baby's pelvis in its socket and prevents hip dysplasia in babies. The M-shape position also allows babies to be calmer, sleep easier, and strengthens emotional bonds with parents (bonding attachment) because the baby's face is facing the person carrying them. It also trains the baby's core muscle development because carrying in the M-shape position has the same effect as placing the baby on their stomach (Williams & Turner, 2020).

Babies love being held because they have been held since they were in their mother's womb. From the moment they are born, babies constantly hear their mother's heartbeat, her distinctive voice, the warmth of her body, and the rhythm of her movements. However, when babies are born into the unfamiliar outside world, they often cry and become restless because they are not used to it (Dewi & Utami, 2021). When carrying a baby, many muscle groups are tense, especially those that support the spine, which helps maintain posture, coordination, and balance. Common baby carrying positions include the M-shape (front carry) and J-shape (hip carry). Prolonged carrying can cause pain and soreness in areas such as the shoulders, back, waist, and legs. Peripheral neuropathy can occur in nerve areas that are easily compressed due to pressure from inflammation (Rachmawati, Marufa, & Multazam, 2025).

RESEARCH METHOD

A quantitative, pre-experimental quasi-experimental design with a one-group pretest-posttest approach was used to observe the effect of the M-shape method of carrying on the sleep quality of infants aged 3 to 6 months. This design was evaluated by comparing the conditions before and after the intervention in identical groups.

The population in this study included all infants aged 3 to 6 months living in the Sepanjang village area of Glenmore, and met predetermined inclusion criteria. According to Sugiyono, a population is a collection of objects or subjects with specific characteristics and numbers that become the focus of research for analysis and drawing conclusions. A total of 45 infants, aged 3-6 months, were included in the study population. The inclusion criteria for this study were infants aged 3-6 months, healthy infants (not currently ill), parents who expressed willingness to participate in the study.

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DOI: 10.56922/mchc.v5i2.3883

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The exclusion criteria were infants with congenital abnormalities or neurological disorders, and infants undergoing sleep therapy or using sleeping medication. Data processing was carried out

statistically using the Wilcoxon test to determine the effect of sleep quality on infants before and after the intervention because the data was ordinal and not normally distributed.

RESEARCH RESULTS

Tabel 1. Characteristics of Respondent (N=45)

Variable	Results
Age (Mean±SD) (Month)	(4.56 ± 1.18) (3-6)
3	12/26.7
4	9/20.0
5	11/24.4
6	13/28.9
Gender (n/%)	
Male	26/58.0
Female	19/42.0
Health Status	
Healthy	45/100
Sick	0/0
M-Shape Method Pretest (n/%)	
Good	4/8.7
Enough	36/78.2
Poor	5/11.0
M-Shape Method Pretest (n/%)	
Good	22/49.0
Enough	22/49.0
Poor	1/2.0
The Effect of the M-Shape Carrying Method Before M-Shape (n/%)	
Good	4/8.7
Enough	36/78.2
Poor	5/11.0
The Effect of the M-Shape Carrying Method After M-Shape (n/%)	
Good	22/49.0
Enough	22/49.0
Poor	1/49.0

Table 1. Shows that the average age of respondents and standard deviation is (4.56 ± 1.18) with a range of ages (3-6) months. Based on gender, the majority of respondents are male, namely 26 (58.0%), with a healthy health status of 45 (100%). Based on the Sleep Quality of Babies Aged 3-6 Months Before the M-Shape method of carrying, the majority of respondents had sufficient sleep quality, namely 36 (78.2%) and after the M-shape

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method of carrying, the majority of respondents had good and sufficient sleep quality, 22 (49.0%). Based on the Effect of Carrying the M-Shape Method, before the majority of respondents had sleep quality, 36 (78.2%) and after the M-shape method of carrying, the majority of respondents had good and sufficient sleep quality, 22 (49.0%).

Table 2. Results of the Wilcoxon Signed Ranks Test

		Ranks		
		N	Mean Rank	Sum of Ranks
Posttest- Pretest	Negative Ranks	0 ^a	.00	.00
	Positive Ranks	20 ^b	10.50	210.00
	Ties	25 ^c		

Test Statistics ^a	
Z	-4.300 ^b
Asymp. Sig. (2-tailed)	.000

Based on table 2. the Wilcoxon test results identified a p-value of 0.000. Based on this value, the p value <0.05 can be concluded that carrying the M-shape method has an effect on the sleep quality of babies aged three to six months.

DISCUSSION

Pretest results showed that 36 participants (78.3%) reported adequate sleep quality, only 4 (8.7%) babies (8.7%) had good sleep quality, and 5 (10.9%) had poor sleep quality. This indicates that, in general, infant sleep quality had not reached optimal levels before the intervention. This research aligns with other studies indicating that after the M-Shape method, attachment bonding results were considered good. This consistency of results reinforces the belief that the application of the M-Shape method is not only relevant to previous studies but also reliable across a variety of conditions and datasets (Dewi et al., 2021).

Holding a baby may seem simple, but parents should understand the correct and safe method. The M-Shape technique is a recommended method because the baby's position facing the carrier can develop language skills while strengthening emotional bonds (Nababan et al., 2020).

The table shows that all 45 respondents' babies were in good health (100%). A combined analysis of infant health and sleep quality showed that the majority, 36 infants (78.3%), had adequate sleep quality. This data indicates that before the intervention, the sleep quality of most infants was still not optimal.

This study aligns with previous reports, which revealed that before the M-Shape holding technique was implemented, almost half of the infants reported only adequate sleep quality. This indicates that infant sleep quality at this stage has not yet reached optimal levels, necessitating effective interventions or methods to improve their sleep quality (Nababan et al., 2020).

A baby's sleep quality is influenced by physical comfort, interaction patterns with parents, and environmental conditions. One factor contributing to physical comfort is proper body positioning during daily activities, such as being carried. A baby is categorized as having sleep pattern problems if their nighttime sleep duration is less than 9 hours, they wake up more than three times, and their total wake time exceeds one hour. Sleep quality is typically assessed by sleep duration and latency, as well as feeling refreshed and well-rested upon waking. Good sleep quality is characterized by feeling refreshed and refreshed upon waking in the morning, as well as adequate sleep for the baby's age (Sari, 2018).

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According to researchers, the majority of babies, 36 (78.3%), were in the adequate sleep quality category, while only 4 (8.7%) had good sleep quality. This indicates that, in general, babies' sleep quality had not reached optimal levels before intervention.

After carrying using the M-Shape method, there was a significant improvement. A total of 22 infants (47.8%) showed a majority of good results, with a total of 22 infants (47.8%) classified as adequate, and one infant (2.2%) still in the inadequate category. This change indicates that the M-Shape method is effective in increasing infants' sleep comfort levels. This study found results in line with previous research, where after the M-Shape method was administered, 54 infants (27%) showed satisfactory bonding attachment results (Dewi et al., 2021). According to other researchers, sleep quality in infants plays a crucial role in supporting their development and growth. Babies who sleep soundly and without sleep disturbances tend to be more active and calm the next day. Sleep quality is a measure of the quality and physiological conditions that occur during the sleep process (Handriana & Nugraha (2019). Quality sleep will regenerate body functions, including the regeneration of brain cells, through an adequate balance of non-REM and REM sleep phases. When someone wakes up feeling refreshed, it indicates that their sleep quality is good (Madhu, Balaji, Kandi, Ca, Harikrishna, Metta, & Mudamanchu, 2024).

Table 1 shows that the largest number of respondents was 6 months old, namely 13 (28.9%). Cross-tabulation results showed that 29 infants (64.4%) in the 3–6 month age group demonstrated adequate sleep quality. Researchers concluded that 6-month-old babies are more easily scheduled with consistent sleep routines, resulting in good sleep patterns. Therefore, it is important for families to ensure that their babies' sleep needs are met according to their age to ensure optimal growth and development.

At 0–3 months of age, babies' total sleep duration ranges from 15–17 hours per day, with an average of 8 hours during the day and 9 hours at night. As they age, their sleep needs tend to decrease. Babies aged 3–6 months generally sleep around 13–15 hours per day, with about three naps a day. At six months, babies' sleep rhythms begin to approach adult sleep patterns (Lemos, 2018).

The cross-tabulation table, which illustrates the

relationship between infant health and sleep quality, shows that the majority of infants in this age range had good sleep quality, with 22 respondents (47.8%). This study's findings align with previous findings, which reported that before implementing the M-Shape technique, most infants had adequate sleep quality, with 15 respondents (46.9%) (Nababan et al., 2020).

In Indonesia, the M-Shape position is still rarely used by mothers, as many believe it can cause pain in the baby's legs or lead to other problems. However, this technique is the most recommended method for carrying babies, as it maintains a natural pelvic position. Furthermore, M-Shape carrying makes babies more peaceful and easier to fall asleep, while strengthening the emotional bond with parents. This method also plays a role in training the main supporting muscles, as the movements are similar to the prone position, which supports muscle development (Fahira & Rosandini, 2021).

Carrying the M-shape position also helps babies become more relaxed, fall asleep quickly, and emotional closeness with parents increases, because the baby's position is facing the carrier, this method not only strengthens the emotional bond but also helps train the baby's main muscles. Carrying a baby with the legs open like the letter M provides stimulation similar to placing the baby in a prone position (Williams & Turner, 2020).

According to researchers, the M-shape position, which resembles a baby's natural position in the womb, provides a sense of comfort and security. The baby's face facing the carrier creates positive emotional stimulation and increases closeness, which indirectly impacts sleep quality.

Based on the results of the improved sleep quality in infants after the M-shape carrying intervention, with 22 infants (47.8%) showing good sleep quality and 22 infants (47.8%) showing adequate sleep quality, M-shape carrying can improve sleep quality in infants at the community health center throughout the study period.

Table 4.6 shows that before the intervention, the majority of respondents (36 respondents (53.1%) were in the adequate sleep category. After implementing this carrying technique, an improvement was found, with 22 respondents (47.8%) showing good sleep quality. Data analysis using the Wilcoxon test with a p-value of 0.000, which is below the 0.05 significance level, the null

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hypothesis was rejected and the alternative hypothesis was accepted, indicating a significant effect of the use of carrying techniques that support natural postures on the quality of sleep in infants aged 3–6 months at Sepanjang Community Health Center. Researchers emphasized that given the importance of sleep for infant development, optimal sleep fulfillment must be considered to avoid negative impacts on growth. Carrying in an ergonomic "M"-shaped position has been shown to help calm babies, facilitate sleep, and increase emotional closeness with parents. Furthermore, this position also functions to train core muscle strength, as it provides physical stimulation equivalent to the prone position (Williams & Turner, 2020).

This research is supported by findings from a previous study entitled "Analysis of the Relationship between Carrying Techniques and Ergonomic Positions on Emotional Bonding and Sleep Quality in Infants Aged Three to Six Months." The study explained that carrying with the legs in an "M" shape can provide comfort for babies, which ultimately impacts sleep quality. These results show that carrying in an ergonomic position has a significant influence on the rest patterns of babies aged three to six months (Aprianti, Nababan, Panjaitan, & Bali, 2023).

According to researchers, based on the results of the analysis before and after the implementation of the M-Shape carrying technique, it was found that the method had an effect on improving the quality of sleep in babies aged three to six months in the Sepanjang Community Health Center working area. This shows that the M-Shape carrying position helps babies feel more comfortable and secure, so that the transition to sleep is easier and the duration of the baby's sleep is longer and of better quality.

CONCLUSION

The Wilcoxon statistical analysis showed that the M-Shape carrying technique significantly affected the sleep patterns of infants 3–6 months old, with a p-value of 0.000 ($p < 0.05$), indicating the effectiveness of this method in improving sleep quality. Therefore, carrying using the M-Shape method can be a safe, simple, and effective non-pharmacological intervention to help improve infant sleep quality during early development.

SUGGESTION

This study is expected to be beneficial to various parties. For parents, the results can serve as a guideline for implementing the M-Shape carrying method to improve infant comfort and sleep quality while strengthening emotional bonds. For Sepanjang Community Health Center, the results can be used as a basis for educating the public about the benefits of proper carrying positions. For educational institutions, this study can serve as a learning reference for midwifery students. Meanwhile, for future researchers, it is recommended that this study be expanded with a more comprehensive scope and a larger sample size, as well as the addition of other variables that influence infant sleep quality.

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