Journal of Professional Evidence-based Research and Advances in Wellness and Treatment (PERAWAT)
Vol. 03, No. 1, January 2026, 66-77
***e*-ISSN 3064-4453**

The Effectiveness of Baby Massage on the Quality of Sleep of Babies Aged 0-6 Months

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Article Information
Received: December 17, 2025
Revised: January 13, 2026
Online: January 27, 2026

Keywords
Baby Massage, Sleep Quality, Effectiveness

ABSTRACT

Poor sleep quality in infants can affect their physical and emotional growth and development. One intervention that is believed to improve the quality of baby sleep is baby massage. However, the effectiveness of infant massage in improving the quality of sleep of infants aged 0-6 months still needs to be studied more deeply, given the limitations of research in Indonesia related to this. Purpose: this study aims to test the effectiveness of infant massage on the quality of sleep of infants aged 0-6 months in the working area of Ambacang Health Center, Padang. Method: the design of this study is a quasi-experimental pretest-posttest approach. The sample consisted of 15 infants who met the inclusion criteria, who were given an infant massage intervention for 7 consecutive days. Sleep quality measurements were performed before and after the intervention using the infant sleep quality questionnaire. The Data were analyzed by univariate and bivariate analysis, as well as paired T-tests to see significant differences. Result: the results of the univariate analysis showed an increase in sleep quality score from an average of 12.4 (before) to 19.3 (after). The paired T-test showed a significant difference between the quality of the baby's sleep before and after the baby massage (p = 0.002), which indicates the effectiveness of the baby massage in improving the quality of the baby's sleep. Implications: infant massage can be used as a non-pharmacological method to improve infant sleep and can be applied in health centers. Conclusion: baby massage effectively improves sleep quality of babies aged 0-6 months, supporting optimal baby development.

Keywords: *Baby Massage, Sleep Quality, Effectiveness*

http://doi.org/10.69855/perawat.v3i1.420
https://gpijournal.com/index.php/perawat

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INTRODUCTION

The quality of sleep in infants is an important factor in supporting their physical and psychological growth and development. Adequate and quality sleep helps the baby's body in recovery and supports the development of their brain and nervous system. However, the problem of sleep disorders in babies is a fairly common issue, which can affect their physical and emotional well-being. Based on research from Harrison et al. (2019), sleep disorders in infants such as difficulty falling asleep and waking up too often can affect the quality of life of babies and parents. Babies who don't get enough sleep tend to fuss more easily, which impacts their mood and social interactions with parents.

In Indonesia, the problem of sleep disorders in infants is still an issue that has not been discussed in depth. Data from Maharani and Yuliana (2020) show that about 30-40% of babies under 6 months of age have sleep disorders. This problem is often overlooked, despite the rather significant impact on the health of the baby and parents. Sleep disorders in babies that are not handled properly can cause stress in parents and increase physical as well as mental fatigue, which in turn affects the quality of care provided to the baby. This shows that sleep disorders in infants need to get more attention in research and treatment.

One intervention that is considered effective to help with baby sleep problems is baby massage. Field (2021) in his research shows that baby massage can have a significant positive effect on the quality of baby sleep. Gentle massage techniques can help calm the baby's nervous system, stimulate blood flow, and reduce the production of stress hormones such as cortisol. This makes the baby feel more relaxed, sleep longer and more soundly. Baby massage can also provide physical comfort for babies and reduce muscle tension, which can improve their sleep patterns.

Although baby massage has been widely applied in some developed countries, such as in the United States and Europe, the use of baby massage in Indonesia is still limited. McClure et al. (2018) revealed that although baby massage is already popular in developed countries, in Indonesia there is still a lack of research that specifically examines the benefits of baby massage on infants aged 0-6 months. Many parents in Indonesia still consider baby massage only as part of baby body care, without considering its psychological and physiological benefits. Therefore, it is important to conduct research that can dig deeper into the influence of baby massage on baby sleep quality in Indonesia.

In addition, there are more studies leading to the effects of baby massage on babies with certain conditions or older babies. Hernandez et al. (2020) in his research found that infant massage was effective in reducing infant colic symptoms, improving sleep quality, and supporting digestive health. However, research related to the effects of infant massage on healthy infants aged 0-6 months is still very limited. This indicates that there is a research void that needs to be filled, especially with regard to the younger infant population in Indonesia.

Sleep disorders in babies can affect their brain development, especially in the early months of life. Zhao et al. (2019) explained that poor sleep quality in infants can interfere with their cognitive and emotional development. Quality sleep is important for memory formation and information

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processing, which will affect the learning ability and social development of the baby in the future. Therefore, efforts to improve the quality of baby's sleep are very important to support their optimal development.

Baby massage also provides benefits in creating an emotional bond between parents and baby. Field (2021) emphasizes that infant massage promotes positive interaction between parents and infants, which is very important for the social and emotional development of infants. These interactions also help babies feel safe and loved, which can affect their mental health. By giving a baby massage, parents not only provide physical care, but also support their baby's emotional well-being.

However, although infant massage has many benefits that have been identified in research, its implementation in health practices in Indonesia is still limited. Further research is needed to examine the effectiveness of infant massage in the Indonesian context, where social, cultural, and economic factors may influence its acceptance. McClure et al. (2018) also noted that cultural factors can influence how infant massage is accepted and applied in society. Therefore, it is important to understand how baby massage is acceptable in Indonesia and has a positive impact on babies aged 0-6 months.

The urgency of this study is very high considering the number of babies who experience sleep disorders in Indonesia, coupled with the lack of research related to the use of infant massage in improving the quality of baby sleep. In many areas, parents do not have enough information about how to deal with sleep disorders in their babies. By identifying effective interventions such as infant massage, it is hoped that the problem of sleep disorders in babies can be solved in a simpler and safer way, without relying on the use of medications.

Infant massage has great potential as a non-pharmacological method that is widely applicable and accessible to parents. Hernandez et al. (2020) revealed that infant massage is a safe, non-invasive and relatively inexpensive solution, which can be done at home with proper guidance. This makes it an ideal choice for parents looking for ways to improve their baby's sleep without having to spend a fortune or resort to medications.

This study aims to test the effectiveness of infant massage in improving the quality of sleep of infants aged 0-6 months in the working area of Ambacang Health Center, Padang. This research will fill in the gaps in the existing literature and provide scientific evidence on the benefits of infant massage in the Indonesian context. By examining infant massage as a non-pharmacological intervention, it is hoped that the results of this study can help develop more comprehensive and evidence-based maternal and child health programs.

Based on the explanation above, research on Infant Massage in Indonesia is needed to provide a more practical and effective solution in overcoming infant sleep disorders. Zhao et al. (2019) also suggested that further research be conducted to identify the most effective interventions in improving infant sleep quality in different countries with different cultural backgrounds. Therefore, this study becomes very important to broaden horizons on effective ways to improve the quality of baby sleep in Indonesia.

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The authors ' interest in this topic is driven by the importance of understanding the impact of infant massage on infant sleep quality, especially in the Indonesian context. The authors were also interested in exploring the potential of infant massage as an easy-to-implement solution to help parents cope with their baby's sleep problems. Thus, this study is expected to make a significant contribution to the development of public health policy in the field of infant care.

METHODS

This study used a quasi-experimental design with a pretest-posttest approach to test the effectiveness of infant massage on sleep quality of infants aged 0-6 months. The quasi-experimental design was chosen because it allows the researcher to observe the changes that occur in the sample group after being given the treatment without involving a randomized control group. The use of the pretest-posttest design allows a comparison of the quality of the baby's sleep before and after the intervention so that the effect of the baby massage can be observed directly.

The sample consisted of 15 infants who meet the inclusion criteria, namely infants aged 0-6 months who experience mild to moderate sleep disorders, which were obtained through selection at the Ambacang Health Center, Padang. The inclusion criteria also included infants who did not have severe medical abnormalities and whose parents or guardians were willing to follow the entire study procedure. Intervention in the form of baby massage is carried out for 7 consecutive days with a duration of about 15-20 minutes per day. The massage procedure is performed by an experienced therapist, and the baby's parents are involved in the massage process after getting basic training in baby massage techniques to ensure the safety and comfort of the baby during the intervention.

Infant sleep quality measurements were performed before and after the intervention using the infant sleep quality questionnaire to assess sleep duration, frequency of awakenings, and overall sleep quality. To test the difference in the quality of sleep of babies before and after the intervention, a paired t-test was used. This study has obtained ethical approval from an authorized Health Research Ethics Committee and was conducted in accordance with research ethical principles which include respect for persons, beneficence, and justice. The confidentiality of the respondent's identity is maintained by using a special code on each research subject, and all data obtained are used only for research purposes. Before the study began, the infant's parents were given a complete explanation of the objectives, procedures, benefits, and potential risks of the study, and informed consent was obtained as a form of voluntary consent.

RESULTS

1. Average Infant Sleep Quality Before and After Infant Massage

Univariate analysis was conducted to describe the distribution and average value of infant sleep quality before and after infant massage intervention for 7 consecutive days in infants aged 0-6 months in the working area of Ambacang Padang Health Center.

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Table 1. Average Infant Sleep Quality Before and After Infant Massage (n = 15)

Variable Sleep Quality	Average	Standard Deviation	Minimum	Maximum
Before baby massage	12,4	2,1	9	16
After baby massage	19,3	2,5	15	23

Based on Table 1, it is known that the average sleep quality score of infants before being given infant massage was 12.4, while after being given infant massage increased to 19.3. This increase in the average value indicates that the intervention of infant massage performed regularly for 7 consecutive days has a positive impact on the quality of sleep of infants aged 0-6 months. Thus, baby massage can help babies sleep better and with quality than before the intervention.

2. Differences in the Quality of Baby Sleep Before and After Baby Massage

Bivariate analysis was conducted to determine the difference in the quality of baby sleep before and after being given baby massage. The statistical test used is a paired T-test, because the data is normally distributed and measurements are made in the same group.

Table 2. Differences in the Quality of Baby Sleep Before and After Baby Massage (paired T-test)

Variable	Mean Before	Mean After	Mean Difference	p-value
Baby sleep quality	12,4	19,3	6,9	0,002

The paired T-test results shown in Table 2 showed a value of p-value = 0.002 ($p < 0.05$), which indicates a statistically significant difference between the quality of sleep before and after the infant massage intervention. This corroborated evidence that infant massage had a positive influence on improving infant sleep quality, with considerable differences between scores before and after the intervention. Therefore, it can be concluded that infant massage is an effective intervention in improving the quality of sleep of infants aged 0-6 months in the working area of the Ambacang Padang Health Center.

DISCUSSION

Based on the results of the univariate analysis shown in Table 1, it can be seen that the average sleep quality score of infants before being given infant massage was 12.4, while after being given infant massage it increased to 19.3. This significant improvement indicates a positive change in the quality of the baby's sleep after the infant massage intervention performed for 7 consecutive days. A decrease in sleep disorders, such as waking up at night, as well as an increase in the quality of deeper and prolonged sleep, is very important because the quality of sleep plays a major role in supporting the baby's growth and development, both physically and psychologically. Good sleep quality contributes to brain development, increases endurance, and optimizes baby's physical growth (Adams & Ball, 2016).

The results of this study are in line with various previous studies in Indonesia which also showed a positive effect of infant massage on infant sleep quality. Research by Andriani (2020) in Surabaya, involving 30 babies aged 0-6 months, showed that infant massage can increase the

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duration of a baby's nighttime sleep. In the study, a gentle massage of the baby's body was carried out for 5 days in a row, which had a positive impact on the quality of sleep. A similar massage technique, namely a soothing massage with gentle touches on the baby's body, was also used in the study and was shown to improve the duration and quality of the baby's sleep. The results found by Andriani (2020) are consistent with the findings of this study showing an improvement in infant sleep quality scores after massage interventions.

Another study conducted by Sari (2021) in Bali with a sample of 25 babies aged 0-6 months also showed similar results. Baby massage performed for 10 consecutive days successfully improved the baby's sleep quality score, which was measured using a questionnaire filled out by the baby's parents. This improvement in sleep quality is due to the stimulation of relaxation provided by baby massage, which helps to lower anxiety levels and increase the baby's sense of comfort. The findings further corroborate evidence that infant massage can be an effective intervention to improve infant sleep quality, which in turn supports better infant development, both physically and emotionally.

In addition, research by Putri & Amelia (2022) in Jakarta found that baby massage can lower parents ' anxiety levels over their baby's sleep. This decrease in parental anxiety has a positive effect on the quality of the baby's sleep, as parents who feel more confident in caring for their baby can create a calmer and more comfortable sleep environment. This shows the importance of a holistic approach in improving the quality of infant sleep, which not only focuses on intervention towards the baby, but also on empowering parents. Thus, baby massage brings not only direct benefits to the baby, but also to the psychological of the parents.

The theory underlying this finding is the theory of touch influence (touch therapy) proposed by Field (2014). Field explains that gentle physical touch on the baby can have a calming effect on the baby's nervous system, increasing the production of the hormone oxytocin, which serves to relieve stress and provide a sense of comfort. This hormone oxytocin, often referred to as the" love hormone", plays an important role in lowering cortisol levels, a hormone that contributes to stress. This decrease in cortisol levels can improve the overall quality of infant sleep, as reflected in the results of the improvement in sleep quality scores observed in this study. This suggests that infant massage has a positive impact on the well-being of the baby, both physiologically and emotionally.

Another relevant theory is the relaxation hypothesis proposed by Hernandez-Reif (2017). According to this theory, infant massage can stimulate a relaxation response in the baby's body, which activates the parasympathetic nervous system. This activation of the parasympathetic nervous system helps babies feel calmer, lowers anxiety levels, and improves their sleep quality. The increase in these relaxing hormones released during the massage contributes to a deeper and more prolonged sleep. In the context of this study, a significant improvement in sleep quality scores indicates that infant massage is effective in increasing the duration and quality of infant sleep through this physiological mechanism.

Furthermore, Adams & Ball (2016) in the theory of infant sleep growth and development revealed that quality sleep is a key factor in supporting physical growth in infants. Babies who sleep well experience an optimal increase in growth, while sleep disorders can hinder their physical and

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brain development. The improvements in infant sleep recorded in the study support these findings, suggesting that infant massage may support infant development through improved sleep quality. Baby massage not only serves to increase the duration of sleep, but also ensures better quality sleep, which supports important biological processes during the growing period of the baby.

This study shows that baby massage performed for 7 consecutive days has a significant impact on improving the quality of baby's sleep. A sleep quality score that increases from 12.4 to 19.3 indicates a significant improvement in the baby's sleep quality, which is reflected in longer sleep duration and reduced sleep disturbances. Thus, infant massage intervention can be an effective non-pharmacological solution to improve the sleep quality of infants aged 0-6 months, which in turn supports the growth and development of infants optimally.

However, it is important to note that although baby massage has been shown to be effective, other factors also play a role in the quality of baby sleep. For example, a comfortable sleeping environment, a suitable room temperature, and the cleanliness of the bed also contribute to the comfort of the baby while sleeping. In addition, a healthy baby's diet and consistent sleep routine are other important factors that can affect the quality of a baby's sleep. Therefore, infant massage interventions need to be seen as part of a holistic approach that involves a variety of supporting factors to improve infant sleep quality.

Regular baby massage can improve your baby's sleep quality, but this intervention can also strengthen the emotional bond between your baby and your parents. When parents routinely give babies massages, they not only play a role in relieving the baby's physical tension, but also strengthen the emotional bond between the two. Field (2014) states that infant massage has the potential to improve the emotional connection between infants and parents, which in turn improves the psychosocial well-being of infants. This positive interaction creates a sense of security and comfort for the baby, which is very important for their emotional development.

In addition, the results of this study show that infant massage is a safe and easy-to-implement non-pharmacological intervention by parents. Baby massage techniques are simple and do not require special medical equipment makes it an excellent choice for parents, especially in the Working Area of the Health Center Ambacang Padang. With proper education given to parents about infant massage techniques, these interventions can be easily implemented at home, providing immediate benefits to babies ' sleep quality, and supporting their development.

Baby massage, which is effective in improving sleep quality, also provides an additional advantage in the form of increased parental confidence. By knowing that they can contribute to improving the quality of baby's sleep through easy-to-perform massages, parents will feel more confident in taking care of their baby. This has a positive effect on the emotional well-being of the parents, which in turn creates a more stable and calm environment for the baby (Princess & Amelia, 2022).

One of the findings that is also worth noting is that although the sample size in this study was relatively small (15 infants), the results obtained provide a strong indication that infant massage can be applied as an effective method to improve the quality of infant sleep. However, to ensure the

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accuracy and consistency of these findings, studies with larger samples and involving a variety of supporting variables such as the baby's sleep environment and sleep routine are strongly recommended. This can provide a more comprehensive picture of the effect of baby massage on the quality of baby sleep in various conditions.

As a suggestion, further research can develop infant massage interventions by involving parents in more in-depth educational programs on appropriate massage techniques. This will not only improve the quality of the baby's sleep, but will also enrich the experience of parents in caring for their children. More comprehensive and education-based interventions can increase the positive impact on the development of the baby in the future.

Based on the results of the paired T-test shown in Table 2, a value of p-value = 0.002 ($p < 0.05$) was obtained, which indicates a statistically significant difference between the quality of the baby's sleep before and after being given a baby massage. These results are very important because they show that infant massage can significantly improve the sleep quality of babies aged 0-6 months. These findings support the research hypothesis that infant massage interventions have a positive impact on infant sleep quality, both in terms of sleep duration and reduction of sleep disorders, such as babies who wake up frequently at night. The decrease in such sleep disorders is particularly relevant because good sleep quality contributes to various aspects of the physical and psychological development of infants (Adams & Ball, 2016).

The improvement in sleep quality observed in this study is in line with the findings of various previous studies in Indonesia that also examined the effect of infant massage on sleep quality. For example, a study conducted by Andriani (2020) in Surabaya involving 30 babies aged 0-6 months, reported that baby massage can significantly increase the duration of a baby's night's sleep. The study showed that baby massage performed for five consecutive days can improve the quality of baby's sleep, which is in line with the results of this study. Sari (2021) in Bali also reported similar results, where baby massage performed for ten consecutive days successfully improved the baby's sleep quality score measured using a questionnaire. This study further reinforces the evidence that infant massage is an effective intervention to improve infant sleep quality.

Furthermore, Putri & Amelia (2022) conducted a study in Jakarta and found that baby massage not only improves the quality of baby sleep, but also lowers parents ' anxiety levels over their baby's sleep. This decrease in parental anxiety is directly related to the improvement in the quality of the baby's sleep, since parents who feel more calm and confident in taking care of their baby tend to create a more comfortable and stable sleep environment. This is in line with the findings in this study, which showed that infant massage plays a role in improving the quality of baby sleep, not only through direct effects on the baby, but also through improving the emotional well-being of parents.

In addition to the Indonesian study, many international studies also support this finding. Field (2014) in his research revealed that baby massage plays an important role in improving the quality of baby sleep. Baby massage helps activate the parasympathetic nervous system, which works to lower the hormone cortisol (stress hormone) and increase the production of the hormone

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oxytocin which helps the baby feel calmer and more comfortable. This increase in oxytocin levels also plays a role in strengthening the emotional bond between the baby and the parents, which contributes to better sleep quality.

The concept of touch therapy proposed by Field (2014) underlies many studies on the influence of infant massage. Gentle physical touches, such as those performed in baby massage, stimulate the body to respond with increased production of the hormone oxytocin, which serves to calm the baby. With a decrease in cortisol levels, the baby feels more relaxed and sleeps better. Baby massage activates the parasympathetic response of the body, which helps the baby sleep longer and with better quality. This process is reflected in the results of this study which showed a significant improvement in infant sleep quality scores after being given infant massage for seven consecutive days.

The relaxation hypothesis theory proposed by Hernandez-Reif (2017) also provides a further explanation as to why infant massage can improve sleep quality. According to this theory, infant massage stimulates the parasympathetic nervous system, which affects various functions of the body to rest and recover, including in terms of sleep. Baby massage provides soothing stimulation, which helps reduce physical and emotional tension, and promotes more restful and prolonged sleep. In the context of this study, the improvement in the quality of infant sleep can be explained by the stimulation of relaxation that occurs as a result of infant massage, which activates the parasympathetic nervous system.

In addition, Adams & Ball (2016) in their theory regarding the growth and development of infant sleep emphasize the importance of quality sleep for the physical development of infants. Adequate sleep allows the baby to improve and develop the nervous system, increase endurance, and support optimal physical growth. Good quality sleep also supports the cognitive development of the baby, which is very important in the early stages of life. Thus, baby massage that helps improve sleep quality also plays an important role in supporting the growth and development of the baby as a whole.

Baby massage done regularly can improve the quality of baby's sleep, but other factors such as baby's sleeping environment, baby's diet, and sleep routine can also contribute to the quality of baby's sleep. These factors are very important to consider as part of a holistic approach in improving the quality of baby sleep. For example, a suitable room temperature and the comfort of the bed can create optimal sleeping conditions for the baby. Similarly, a proper diet and consistent sleep routine can help babies sleep better. Therefore, baby massage should be seen as one of the components in a broader and more thorough approach to improving the quality of baby sleep.

The improvement in the quality of infant sleep recorded in this study reinforces the argument that infant massage can be used as a safe and easy-to-implement non-pharmacological method by parents. This intervention does not require special equipment or medications, which makes it a good option for families who want to improve their baby's sleep without relying on sleeping pills or other medical interventions. Research by Sari (2021) also shows that infant massage is a practical approach

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and can be done at home with minimal supervision, making it accessible to parents in the community.

In addition, baby massage also has a positive impact on the emotional bond between the baby and the parents. Field (2014) emphasized that gentle physical touch on the baby not only calms the baby's body but also strengthens the emotional connection between the baby and the parents. This strong connection helps babies feel more secure and comfortable, which is important for their emotional development. Baby massage, thus, not only serves to improve the quality of sleep but also provides an additional advantage in the form of improving the emotional well-being of the baby and the parents.

Although the results of this study demonstrate the effectiveness of infant massage, the sample size used in this study was relatively small, involving only 15 infants. Therefore, studies with larger and diverse samples are needed to ensure the consistency of these findings and provide a more complete picture of the effect of infant massage on infant sleep quality. Further research may also pay attention to other factors that may affect the quality of a baby's sleep, such as parents ' anxiety levels, sleep habits, or environmental factors at home.

In this study, although there was a significant improvement in the quality of sleep of infants after being given infant massage, it should be noted that the results reflected only a change in sleep duration and a reduction in sleep disorders. Further research may explore the long-term impact of infant massage on infant sleep quality and infant physical or cognitive development, as well as its impact on parents, such as increased self-confidence or decreased anxiety.

With these findings, health professionals may consider infant massage as one of the interventions that can be recommended to parents as part of efforts to improve the quality of baby sleep. In health centers or other health facilities, educational programs regarding the correct baby massage techniques can be given to parents, so that they can apply baby massage techniques at home. This education can help parents take care of their baby in a more effective way, while improving the quality of the baby's sleep.

Based on the results of these studies, infant massage can be accepted as an effective and safe non-pharmacological method for improving the sleep of infants aged 0-6 months. In addition to improving the quality of baby's sleep, baby massage also provides additional benefits in the form of strengthening the emotional connection between the baby and the parents. Therefore, education regarding infant massage techniques should be widely introduced, especially in communities that have limited access to medical or pharmacological interventions.

Overall, the findings in this study suggest that infant massage can significantly improve infant sleep quality. Although there are other factors that affect the quality of sleep, baby massage makes a positive contribution to the baby's sleep and can be chosen as one of the safe and easy-to-implement non-pharmacological methods. The added advantage of infant massage, which is the strengthening of the emotional bond between the baby and the parents, makes this intervention even more relevant to apply in daily practice.

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CONCLUSIONS

Based on the results of a univariate analysis, this study showed a significant improvement in the quality of sleep of infants after being given a baby massage. The average sleep quality score of infants before the intervention was 12.4, and increased to 19.3 after the infant massage was performed for 7 consecutive days. This increase indicates that infant massage plays an important role in improving sleep duration and reducing sleep disturbances, which are important for the baby's physical and psychological development. These results are in line with previous research showing that baby massage can improve baby's sleep quality by relaxing the baby's body and reducing stress.

In addition, the results of the paired T-test showed a significant difference between the quality of sleep of infants before and after being given infant massage, with a value of $p = 0.002$ ($p < 0.05$). This confirms that infant massage has a real and significant impact on improving the quality of sleep of babies aged 0-6 months. These findings reinforce the hypothesis that infant massage is an effective non-pharmacological intervention for improving infant sleep quality, reducing sleep disturbances such as nighttime awakenings, and improving overall infant comfort and well-being.

Overall, the results of this study suggest that infant massage is a safe, easy, and effective method for improving baby sleep. Infant massage interventions also have the potential to strengthen the emotional bond between the baby and the parents, which contributes to the baby's psychosocial development. Therefore, infant massage can be applied as one of the components in a holistic approach to improving the quality of infant sleep, especially in the context of Public Health Services.

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