



## RESEARCH ARTICLE

# The Effect Of Baby Massage On Sleep Quality And Weight Gain In Infants Aged 3-24 Months At The Ririn Pmb In Bengkulu City In 2025

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## Abstract

**Background:** Globally, there are 149.2 million children under the age of 5 experiencing growth and developmental disorders (WHO, 2020). Important factors influencing infant growth and development include sleep quality and body weight. One safe and appropriate intervention for infants is baby massage (Fitriyanti, 2024). Baby massage is a gentle and rhythmic massage given to infants, starting with light touches and gradually increasing pressure according to the baby's age. This helps calm the nervous system and reduce stress hormone levels (Rahayu, 2020). **Objective:** To determine the effect of baby massage on sleep quality and weight gain in infants aged 3–24 months at PMB Ririn, Bengkulu City, in 2025. **Method:** This study used a pre-experimental design with a one-group pre-test and post-test approach. Data were collected using questionnaires, observation sheets, and growth monitoring charts (KMS). The study sample consisted of 20 infants selected through purposive sampling. **Results:** Before the intervention, most respondents had poor sleep quality (7 infants or 35%) and fair sleep quality (7 infants or 35%). After the baby massage intervention, most infants showed improvement to good sleep quality (16 infants or 80%). The average body weight before the intervention was 8,140 grams, which increased to an average of 8,875 grams after the intervention—an average gain of 735 grams per month. Bivariate analysis using the Wilcoxon signed-rank test showed that baby massage had a significant effect on improving both sleep quality and infant body weight, with a p-value of 0.000.

**Keyword:** Baby Massage, Sleep Quality, Weight Gain, 3–24-Month-Old Babies

## Introduction

Background: Infancy is a crucial golden period in the growth and development process, requiring special attention, especially regarding sleep quality and weight. Sleep disorders and developmental delays are still common, both globally and in Indonesia. Based on the latest data from the WHO, the prevalence of developmental delays in children under 5 years of age globally is estimated at around 1-3%. Furthermore, in 2020, the WHO reported that globally there were 149.2 million children under 5 years of age with developmental disorders, with 95% of them living in low- and middle-income countries (WHO 2020). In Indonesia alone, the prevalence of developmental delays in children reached 11.7% (Riskasdas 2018), and around 44.2% of infants experience sleep disorders. However, almost or even more than 72% of parents do not consider sleep disorders in infants to be a problem. Sleep problems can disrupt infant growth, such as disrupting infant weight, causing vulnerabilities in immune function, and disrupting endocrine system regulation (Lutfiani 2022).

Based on the 2023 Indonesian Health Survey (SKI), the rate of growth and development disorders in Bengkulu Province increased to 20.2% compared to the previous year. Data from the Bengkulu Province National Population and Family Planning Board (BKKBN) from e-PPGBM (Educational Population and Family Planning Agency) in 2023 recorded a 15.1% increase in growth and development prevalence from the previous year, increasing by 5.1% to 20.2%. This problem is also reflected in Bengkulu City, particularly in the Betungan Community Health Center (Puskesmas Betungan) area, where 107 infants were not gaining weight and 4 infants were malnourished (Puskesmas Betungan 2025).

One safe and effective non-pharmacological intervention to support infant growth and development by improving sleep quality

and weight gain is baby massage. Baby massage is a gentle massage that can increase growth hormones, improve sleep quality, stimulate appetite, and increase nutrient absorption. An initial survey conducted at PMB Bd. Ririn Purnama Sari, SST, showed that babies who regularly receive baby massage have better sleep quality than babies who are not massaged. This prompted a study to determine the effect of baby massage on sleep quality and infant weight gain in order to optimize infant growth and development in Bengkulu City.

## Method

This study is a quantitative experimental study with a one group pretest-posttest design, which aims to determine the effect of *baby massage* on sleep quality and weight gain in infants aged 3–24 months. The study was conducted at PMB Ririn, Bengkulu City on April 15–May 20, 2025. The sample in this study was 20 infants selected using a total sampling technique, because the population was relatively small and possible to be studied entirely. The intervention in the form of *baby massage* was carried out for 15–30 minutes, twice a week for one month according to Standard Operating Procedures (SOP).

Data collection instruments consist of:

- Questionnaires to assess infant sleep quality, completed before and after the intervention.
- Scales and KIA book (KMS) to measure weight gain, which was carried out before and one week after the last intervention.

Data were analyzed univariately to describe the frequency distribution, and bivariately using the Wilcoxon Signed Rank Test because the data were not normally distributed, with a significance level of  $\alpha = 0.05$ . This research has received ethical clearance from the Research Ethics Committee of Dehasen University, Bengkulu, and was conducted with due regard to the principles of beneficence (maximizing benefits and minimizing risks), justice, and protection of the privacy rights and confidentiality of research subjects' data through informed consent and data coding.

## Results and Discussion

Researchers conducted the study by collecting respondents, then distributing questionnaires and weighing the baby's weight, then performing *Baby massage* twice a week for 1 month with a total of 8

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massages. *Baby massage* was performed by midwives, midwife assistants, and researchers. One week after the last massage, researchers distributed questionnaires and weighed the baby's weight to determine the results of the *Baby massage intervention*. The limitation of this study is that the age range of the babies studied was quite wide, 3-24 months. At that age, there are significant differences in motor development, sleep patterns, and nutritional needs of babies, which can affect the response to *baby massage*. During the implementation of *baby massage*, there were babies who were in less than optimal conditions, such as fussy and experiencing mild illness. These conditions can affect the comfort and relaxation of the baby, which are important components in the effectiveness of *baby massage*.

### Univariate Analysis

Overview of sleep quality before *baby massage*

**Table 1. Frequency Distribution of Respondents Based on Sleep Quality Before *Baby Massage* in the PMB Ririn Work Area**

Quality Sleep Pre test	Frequency	Percentage
Not enough	7	35%
Enough	7	35%
Good	6	30 %
Total	20	100

Source : Data Primary, 2025

Based on table 5.1, it shows that most babies before *baby massage* had poor sleep quality, as many as 7 babies (35%), and sufficient sleep quality for 7 babies (35%).

### Overview of sleep quality after *baby massage*

**Table 2 Frequency Distribution of Respondents Based on Sleep Quality After *Baby Massage* in PMB Ririn's Work Area**

Quality Sleep Post test	Frequency	Percentage
Not enough	0	0%
Enough	4	20%
Good	16	80 %
Total	20	100

Source : Data Primary, 2025

Based on table 5.2, it shows that most babies after *baby massage* had good sleep quality, as many as 16 babies (80%).

### Overview of body weight before *baby massage*

**Table 3 Frequency Distribution of Respondents Based on Body Weight Before *Baby Massage* in the PMB Ririn Work Area**

Variables	N	Mean	Median	Minimum	Maximum
Weight Before	20	8,140	8,100	5,200	11000

Source : Data Primary, 2025

Based on table 5.3, it shows that the average weight of babies before intervention with *baby massage* was 8,140 grams.

### Image of body weight after *baby massage*

**Table.4 Frequency Distribution of Respondents Based on Body Weight After *Baby Massage* in the PMB Ririn Work Area**

Variables	N	Mean	Median	Minimum	Maximum
Weight After	20	8,875	8,900	6,200	11700

Source : Data Primary, 2025

Based on table 5.4, it shows that the average weight of babies after intervention with *baby massage* is 8,875 grams.

### Bivariate Analysis

The effect of *baby massage* on the quality of baby's sleep

**Table 5 Effect of *Baby Massage* on Baby's Sleep Quality**

Sleep quality before <i>Baby massage</i> and Sleep quality	N	Positive Ranks	Ties	Negative Ranks	P Value
	20	18	2	0	0,000

after  
Baby  
massage

Data source Primary, 2025

Based on table 5.5 with the *Wilcoxon signed rank test*, it shows that out of 20 babies, there were 18 babies who experienced an increase in sleep quality after *baby massage* (positive ranks), 2 babies experienced no change (ties), and no babies experienced a decrease in sleep quality (negative ranks = 0). A p-value of 0.000 indicates that there is a statistically significant difference between sleep quality before and after *baby massage*. Thus, it can be concluded that *baby massage* has a significant effect on improving the quality of baby sleep.

### The effect of *baby massage* on baby weight gain

**Table 6 Effect of *Baby Massage* on Infant Weight Gain**

Weight gain before <i>Baby massage</i> and weight gain after <i>Baby massage</i>	N	Positive Ranks	Ties	Negative Ranks	P Value
	20	0	0	0	0,000

Data source Primary, 2025

Based on table 5.6, statistical tests using the *Wilcoxon Signed Rank Test* show that of the 20 babies studied, all (100%) experienced an increase in weight gain after being given *baby massage* (positive ranks = 20). There were no babies whose weight remained the same (ties = 0) or decreased (negative ranks = 0). The p-value of 0.000 ( $p < 0.05$ ) indicates that the difference in sleep quality before and after *baby massage* is very statistically significant. Thus, it can be concluded that *baby massage* has a significant effect on weight gain in babies aged 3–24 months at PMB Ririn, Bengkulu City in 2025. Based on the results of the study, it can be seen that the educational background of the informant that is finished diploma midwifery Which

### Discussion

#### Univariate Analysis

##### *Sleep quality before baby massage*

Based on the results of the study, it was found that before the *baby massage* intervention, 7 babies (35%) had poor sleep quality, 7 babies (35%) had adequate sleep quality, and 6 babies (30%) had good sleep quality. According to the researchers, poor sleep quality in babies can cause low immunity, make the child cry easily, be fussy, and can disrupt the baby's growth during the growth period. Considering the importance of sleep time for baby development, their sleep needs must be truly met so as not to have a negative impact on their development. Factors influencing adequate sleep quality include age and health status. Data from respondents showed that the majority of respondents, eight infants aged 3-6 months (40%), are experiencing a more stable circadian rhythm, allowing their sleep patterns to develop more regularly. However, at this age, infants are still susceptible to sleep disturbances due to various factors, including physical discomfort and the need for nighttime feedings. (Cahaya 2020) Research by Nabilah (2025) showed that babies aged 3–6 months who received *baby massage* intervention experienced significant improvements in sleep quality. Before the intervention, most babies had poor sleep quality, but after *baby massage*, sleep quality improved for the majority of respondents. The theory suggests that babies with sleep problems are those who sleep less than 9 hours a night and frequently wake up more than three times, each waking for an hour or more. Furthermore, during sleep, babies are often fussy, cry, and have difficulty falling back to sleep. (Niyati et al, 2023)

##### *Sleep quality after baby massage*

The research results showed that the majority of infants' sleep quality was good, as many as 16 (80 %) after the *baby massage* intervention. This is in line with findings in various studies highlighting the effectiveness of interventions such as *baby massage* in improving sleep quality. Good sleep quality in infants is an important indicator in supporting optimal growth and development,

both physically and neurologically. According to Cahaya (2020), the majority of infants aged 3-6 months experienced good sleep quality after baby massage, namely 22 respondents (73.3%). Research by Kusniyanto et al. (2023) in Gowa Regency reported that after a 3-week infant massage intervention, 93.3% of infants demonstrated good sleep quality, an increase from 26.7% before the intervention. A paired t-test yielded a p-value of 0.000, confirming the effectiveness of infant massage in improving sleep quality. Overall, the high percentage of infants with good sleep quality in this study is likely influenced by consistent care, a supportive sleep environment, and interventions such as baby massage. Optimal sleep quality is a crucial foundation for infants' long-term health.

### ***Body weight before baby massage***

Based on the results of the study, it shows that most babies' weight before intervention with baby massage had the lowest weight of 5,200 grams and the highest with a weight of 11,000 grams, with an average weight of 8,140 grams. Thus, the findings in this study indicate that most babies are already within the appropriate range. Although there are some babies with a lower weight (5,200 grams), this condition can still be improved through growth stimulation, one of which is baby massage intervention. According to research by Supartina et al. (2024), interventions such as baby massage not only improve sleep quality but also help stimulate the baby's digestive system and metabolism, contributing to weight gain. This intervention stimulates intestinal peristalsis and increases the baby's appetite, allowing the baby's body to digest and absorb nutrients more effectively.

### ***Body weight after baby massage***

Based on the results of the study, it shows that the majority of babies' weight after intervention with Baby massage has the lowest weight of 6,200 grams and the highest with a weight of 11,700 grams and an average of 8,875 grams. These results indicate a positive change in baby weight after regular baby massage. The average increase in weight of  $\pm 760$  grams from before the intervention (8,140 grams) shows that baby massage contributes to the baby's physical growth, especially in increasing body weight. Infant massage is believed to stimulate the parasympathetic nervous system, which can increase gastric activity and intestinal peristalsis, thus optimizing nutrient absorption. This is consistent with research by Sari (2023) conducted at the Menggala Community Health Center. In her study, providing infant massage for two weeks showed a significant increase in infant weight, with statistical tests showing a p-value of 0.000, indicating a highly significant effect. According to research by Kusniyanto et al. (2023), 93.3% of infants showed weight gain after a 3-week infant massage intervention. This study suggests that infant massage can improve sleep quality and the body's metabolic system, which directly impacts weight gain.

### ***Bivariate Analysis***

#### ***The effect of baby massage on the quality of baby's sleep***

Based on the results of the study with the Wilcoxon signed rank test, it was shown that out of 20 babies, there were 18 babies who experienced an increase in sleep quality after baby massage (positive ranks), 2 babies did not show any change in score (ties) because their sleep quality questionnaire scores had reached the maximum point (100) both before and after the intervention, and no babies experienced a decrease in sleep quality (negative ranks = 0). The p-value of 0.000 indicates that there is a statistically significant difference between sleep quality before and after baby massage. Thus, it can be concluded that baby massage has a significant effect on improving the quality of baby sleep. This study is in line with the research conducted by Fitriyanti et al. (2024) entitled the effect of baby massage on weight gain and sleep quality of babies aged 0-12 months, the results of the study showed a real effect between baby massage on weight gain and sleep quality of babies with a significance level of  $0.000 < 0.05$ . The results of this study are also in line with Della's (2024) study conducted at the Al-Husna Clinic in Bogor involving 50 infants aged 3-24 months, which showed that before the baby massage intervention, the average sleep quality of infants was at 2.00 with a standard deviation of 0.454, which is categorized as

poor sleep quality. After the baby massage intervention, there was an increase in the average sleep quality to 3.05 with a standard deviation of 0.388. The results of the statistical test showed a p-value = 0.04, which means there was a significant difference between the quality of infants' sleep before and after the baby massage.

A 15-30 minute baby massage using oil can help babies sleep more soundly, thereby increasing intelligence. According to a British observer, Field, as quoted by Hull, a molecular virologist, 30 minutes of massage therapy per day can reduce depression and anxiety. Sleep becomes more restful, alertness increases, and crying decreases. Furthermore, babies who sleep more optimally also experience optimal brain development. Baby massage not only affects a child's physical condition but can also improve brain function, making them more... (Dewi, 2022) Baby massage causes nerve endings on the skin's surface to react. These nerves then send messages to the brain via the neural network in the spinal cord. This process stimulates peripheral sensory nerve receptors, particularly pressure receptors. This stimulation of the parasympathetic nervous system plays a key role in the sleep process, specifically the areas within the parasympathetic autonomic nervous system, the raphe nuclei and the nucleus tractus solitarius. These are sensory regions of the medulla and pons through which visceral sensory signals enter the brain via the vagus and glossopharyngeal nerves, ultimately leading to sleep. (Rista N 2023) Thus, researchers believe that regular baby massage can be an effective non-pharmacological intervention to improve infant sleep quality, as it has been shown to provide relaxation and comfort, contributing to better sleep. This assumption also supports the hypothesis that tactile stimulation through baby massage can positively influence infants' nervous and psychological systems, thus improving their sleep quality.

#### ***The effect of baby massage on baby weight gain***

Based on the results of statistical tests using the Wilcoxon Signed Rank Test, it shows that of the 20 babies studied, all (100%) experienced weight gain after being given baby massage (positive ranks = 20). There were no babies whose weight remained the same (ties = 0) or decreased (negative ranks = 0). The p-value of 0.000 ( $p < 0.05$ ) indicates that the difference in weight before and after baby massage was statistically very significant with an average weight gain of  $\pm 760$  grams. Thus, it can be concluded that baby massage has a significant effect on weight gain in babies aged 3-24 months at PMB Ririn, Bengkulu City in 2025. The results of this study are in line with research conducted by Septa A. (2025) The average monthly weight gain in babies who received baby massage in this study was 876.67 grams and babies who did not receive massage 233.33 grams / month. Babies who are frequently massaged will increase the vagus nerve tone, which increases the release of food absorption hormones and increases the levels of gastrin and insulin enzymes, so that food absorption will be better and optimal. That is why babies who are massaged regularly will gain weight faster than those who are not massaged. The results of this study are also in line with Fitriyanti's research (2024) which found a significant effect after doing Baby massage x 15-30 minutes in 1 week for 1 month. Baby massage can increase the baby's appetite by stimulating the production of hormones that regulate hunger and satiety, babies who feel comfortable and relaxed tend to be easier to eat well, in addition to physical factors, the massage moment is also an intimate interaction time between parents and babies, this strong relationship can help reduce the baby's stress, which in turn can affect eating patterns and growth. The results of this study also align with research by Widiyaningsih et al. (2023) in the Journal of Midwifery, which stated that infants aged 3-24 months who received regular baby massage for two weeks experienced better weight gain than infants who did not receive similar intervention. Baby massage is believed to improve blood circulation and nutrient absorption, improve sleep quality, and stimulate growth hormone, all of which contribute to natural weight gain in infants. Parasympathetic Nervous System Stimulation: Baby massage can increase the tone of the vagus nerve, which is part of the parasympathetic nervous system. This increased nerve activity stimulates the production of digestive hormones such as gastrin and insulin, which in turn increases the efficiency of nutrient absorption in the baby's digestive tract. With increased nutrient absorption efficiency, babies tend to feel hungry sooner and more frequently. This encourages higher breastfeeding frequency, thereby increasing calorie intake and contributing to weight gain. Baby massage can stimulate the release of growth hormone, which plays a role in



anabolic processes and tissue growth, including increased body mass. (Pasiriani et al. 2020) Baby massage can stimulate the digestive system and increase the effectiveness of the baby's metabolism, resulting in optimal nutrient absorption and improved weight gain. (Kusniyanto et al. 2023)

Based on these results, researchers believe that baby massage can stimulate the digestive system and increase nutrient absorption through vagus nerve stimulation, thus positively impacting infant weight gain. Therefore, researchers assume that baby massage is an effective non-pharmacological intervention and can be recommended to support infant growth, particularly in terms of weight gain at 3–24 months of age in PMB Ririn, Bengkulu City in 2025.

## Conclusions and Recommendations

### Conclusion

Based on research conducted twice a week for one month with a total of eight massages at a frequency of 15-30 times per minute, it was shown that baby massage significantly impacts sleep quality and weight gain in babies aged 3–24 months. Before the intervention, most babies had poor (35%) and sufficient (35%) sleep quality. After being given baby massage for one month, 80% of babies experienced an improvement in sleep quality to the good category. The average baby weight also increased from 8,140 grams to 8,875 grams. The results of statistical analysis using the Wilcoxon Signed Rank Test showed a p-value of 0.000 ( $<0.05$ ) for both sleep quality and weight variables, which means there is a significant effect between providing baby massage on improving sleep quality and weight gain in babies. These findings support that baby massage is an effective non-pharmacological intervention to support infant growth and development, especially in aspects of sleep and physical growth.

### Suggestion

1. For Babies and Mothers: The results of this study can be used as educational material for mothers to better understand the importance of baby massage in improving the quality of sleep and weight gain of babies, as well as as an early stimulation effort to support optimal growth and development.
2. For Health Workers: This research can be used as a basis for designing health education, counseling, or promotion programs about the benefits of baby massage as an effective non-pharmacological intervention for babies.
3. For Researchers: This research adds insight and experience in the field of infant health, and can be a basis for further research that focuses on stimulating child growth and development.
4. For Dehasen University Bengkulu: The results of this study can enrich academic references in the campus environment, especially in the field of midwifery and child health, as well as being a source of learning for students and lecturers.

For the Government: This research can be used as input in the preparation of policies or early childhood health intervention programs, particularly regarding the importance of stimulation through touch such as baby massage in supporting infant growth and development

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