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Effectiveness of infant massage therapy on weight gain in low birth weight infants: A literature review

Ni Made Sulastri*, Ni Wayan Armini, Ni Komang Erny Astiti

Poltekkes Kemenkes Denpasar

Corresponding author: *Email: madesulastri85@gmail.com

Abstract

Background: Low birth weight infants (LBWI) are at risk of growth disorders and neonatal complications. Baby massage therapy is a non-pharmacological intervention believed to improve infant growth and weight gain.

Purpose: To examine and analyze the research findings related to the effectiveness of infant massage therapy on weight gain in low-birth-weight infants

Method: This literature review analyzed articles from Google Scholar, PubMed, and ScienceDirect published between 2021–2026. Studies that focused on infant massage therapy and weight gain in underweight or premature infants were included. The inclusion criteria are described in this article.

Results: The analyzed studies showed that infant massage therapy promotes weight gain in underweight and premature infants. Massage increases activity of the vagus nerve, which in turn boosts digestion, nutrient absorption, sleep quality, and milk production in infants. Other benefits include better physiological stability, less stress and better bonding between mother and baby.

Conclusion: Infant massage stimulates the parasympathetic nervous system and maintains the production of growth hormone, thus promoting the absorption of nutrients and the growth of infants. The results show infant massage therapy is safe, effective and cost-efficient.

Keywords: Baby Massage Therapy; Low Birth Weight Infants; Weight Gain.

INTRODUCTION

Low Birth Weight Infants (LBWI) remain one of the major health issues in the world because they contribute to high rates of neonatal morbidity and mortality. LBW is defined as a baby born with a weight of less than 2500 grams regardless of gestational age. This condition can be caused by prematurity, intrauterine growth restriction, or maternal factors such as the mother's nutritional status, diseases during pregnancy, and obstetric complications. Babies with low birth weight (LBW) have a higher risk of experiencing growth disorders, developmental delays, hypothermia, infections, and other organ system disorders compared to babies with normal birth weight (Munir & Winarsih, 2024). Weight gain is one of the important indicators in assessing the

success of growth and health conditions in infants, especially in low birth weight (LBW) babies. Infants with low birth weight require optimal growth monitoring because inadequate weight gain can increase the risk of both short-term and long-term complications. Therefore, effective, safe, and easy-to-implement interventions are needed to help increase the weight of low birth weight infants (Oktaviani, Rustina, & Efendi, 2018).

One of the non-pharmacological interventions widely used is baby massage therapy. Baby massage is a form of tactile-kinesthetic stimulation that is performed gently and regularly on the baby's body. This therapy is believed to have a positive effect on infant growth thru increased vagus nerve activity,

improved digestive function, enhanced nutrient absorption, and stimulation of growth-related hormone production. Increased vagus nerve activity can accelerate gastric emptying, making the baby hungrier more often and increasing feeding frequency, which ultimately leads to weight gain in the baby (Lubis, Aprilia, Syarifah, & Primasari, 2025).

Various studies show that baby massage has a positive effect on the increase in baby's weight. Another research shows a significant increase in weight in infants aged 2–6 months after being given regular baby massages. In addition to increasing weight, baby massage also provides other benefits such as improving sleep quality, enhancing blood circulation, strengthening the emotional bond between mother and baby, and helping the baby become more relaxed (Carolyn, Suprihatin, & Agustin, 2020). In low birth weight infants, baby massage therapy is considered one of the early stimulation methods that is effective and relatively easy to apply both in healthcare facilities and at home by parents after receiving proper education. Another research shows that baby massage has an impact on the weight gain of low birth weight infants in the working area of community health centers. In addition, other research also mentions that massage stimulation can help improve the physiological condition of premature infants and accelerate weight gain (Harahap, Hasibuan, Zenderato, Siregar, Munthe, & Paninsari, 2024).

RESEARCH METHOD

This study uses a literature review method to identify, examine, and analyze various research findings on the effectiveness of baby massage therapy in increasing weight in low birth weight infants (LBW). This method is conducted systematically by collecting and evaluating relevant research according to the topic being studied. Article searches were conducted through several electronic databases, namely Google Scholar, PubMed, and ScienceDirect. Inclusion criteria for articles include research articles discussing baby massage therapy for low birth weight infants (LBWI), articles examining the effect of baby massage on weight gain in infants, quantitative research articles with quasi-experimental, pre-experimental, randomized controlled trial, or case control designs, articles published within the 2021–2026 range, articles available in full text, and articles in both Indonesian and English. Exclusion criteria include articles that do not discuss weight gain in infants, articles in the form of reviews, opinions, theses, or proceedings that lack complete research data, and articles with duplicate data or that cannot be accessed in full. The article selection process was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Ni Made Sulastri*, Ni Wayan Armini, Ni Komang Erny Astiti

Poltekkes Kemenkes Denpasar
Corresponding author: *Email: madesulastri85@gmail.com

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RESEARCH RESULTS

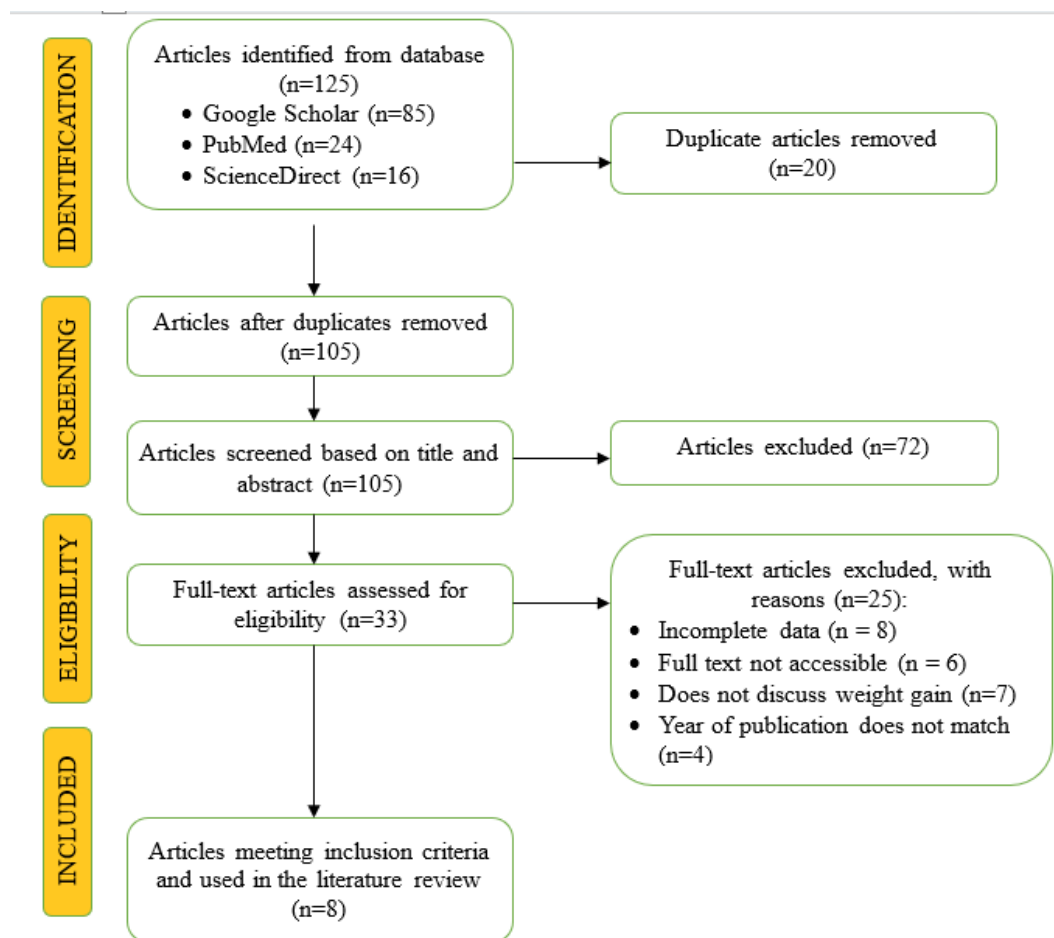


Figure 1. Figure PRISMA Flow Chart

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Table Summary of Selected Articles

(Author, Year)(Country)	Purpose	Design & Method	Results
(Lestari et al., 2021) (Indonesia)	To experience delayed growth and development. This study aims to identify the effect of baby massage on infants' body weight.	The research design used was quasiexperimental pre and post-test type with control group. There were 16 infants for each group selected by purposive sampling. Baby massage was given to the infants twice a week within four weeks, 10 to 15 mins per session. Data analysis was used paired ttest and independent t-test.	The mean age of infants was 3.69 months for both group, the mean age at birth was 37.8 weeks (intervention) and 38 weeks (control), the mean birth weight of infants was 2,295 grams (intervention) and 2,288 grams (control). Most of the infants was male for both group. There was an effect of baby massage on the increase in infants' weight gain with a history of low birth weight significantly with a p-value <0.05.
(Mohini et al., 2021) (India)	To a Randomized Comparison of the Effect of Coconut Oil Massage on Weight Change in Low Birth Weight Newborns.	Randomized controlled study	Massage using coconut oil improves the weight gain of LBW neonates better than the control group.
(Mrljak et al., 2022) (Sweden)	to investigate the effects of infant massage. A systematic literature review was conducted to investigate the effects of infant massage on the following outcomes: pain relief, jaundice, and weight gain.	The inclusion criteria were infants from 0–12 months. The literature search was performed until January 2022, using the CINAHL, PubMed, and PsycINFO databases, and included studies published from 2017–2021, returning 16 RCT/CCT studies with a total of 1416 participating infants.	Infant massage has been proven to have a positive effect on the weight gain of premature and low birth weight infants.
(Atika et al., 2024) (Indonesia)	To evaluate the impact of infant massage on weight gain among LBW infants.	This is a systematic review using PICOS framework, investigating studies from 2018 to 2023 in databases including Cochrane,	Infants who received massage experienced a higher weight gain compared to the group without massage.

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		PubMed, ScienceDirect, and Scopus. The inclusion criteria involved full-text access and the keywords low birth weight, weight gain, and massage. The initial search yielded 1913 literature, which were screened based on publication year and type, resulting in 122 articles.	
(Pratiwi et al., 2024) (Indonesia)	To determine the effectiveness of combined massage therapy and nesting in increasing the weight of premature babies with LBW accompanied by RDS.	The research employed a case study approach. The subjects were premature babies with LBW accompanied by RDS in the perinatology room of the National Referral Hospital in Indonesia. This case study revealed that combined massage and nesting therapy resulted in a 6.1%–7.8% increase in body weight and a stabilization of oxygen saturation from days one to three of therapy.	Infant massage is effective in increasing the weight of premature low birth weight infants through growth stimulation and improved nutrition.
(Hasanah et al., 2025) (Indonesia)	To investigate the effectiveness of infant massage intervention involving mothers in enhancing weight gain in premature infants.	study employed a systematic review method. A search in the PubMed, Science Direct, Sage Journals, Scopus, Taylor & Francis, Proquest, Clinical Key to retrieve randomized controlled trial of premature infants receiving massage therapy by mother impact of weight gain on infant premature. The registration number was CRD42024622719. Results: Of 883 record article retrieved, 5 RCTs with 406 participants were included.	Infant massage by mothers is an effective intervention in increasing weight gain in premature infants. Parental involvement in the care of premature infants through this intervention can significantly benefit the infant's well-being and development.

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(Resiani et al., 2025) (Indonesia)	To assess the effect of infant massage on weight gain in Low Birth Weight (LBW) infants in the neonatal ward.	A quasi-experimental design with a one group pretest-posttest approach. The sample consisted of 15 LBW infants selected through purposive sampling. The intervention involved infant massage performed for seven consecutive days. Data were analyzed using paired t-test.	The baby's weight increased significantly after 7 days of massage therapy ($p=0.001$).
(Mahmudah et al., 2025) (Indonesia)	to analyze the effect of infant massage on weight gain in infant with low birth weight	A case study design was used, involving an infant diagnosed with low birth weight. The primary data collection methods included observation and weight measurement before and after the infant massage intervention. Data analysis was conducted by comparing weight changes before and after regular massage sessions.	The baby's weight increased from 1265 grams to 1420 grams after 7 days of regular baby massage intervention.

Ni Made Sulastr^{*}, Ni Wayan Armini, Ni Komang Erny Astiti

Poltekkes Kemenkes Denpasar

Corresponding author: *Email: madesulastr⁸⁵@gmail.com

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DISCUSSION

The results of the literature review from various studies indicate that baby massage therapy is effective in increasing the weight of low birth weight infants (LBW) as well as premature babies. Most studies report a significant increase in weight after regular baby massage. These findings indicate that baby massage can be used as a safe, easy-to-implement, and beneficial non-pharmacological intervention to support the growth of low birth weight infants. The increase in weight among low birth weight infants after baby massage can be explained thru the theory of tactile-kinesthetic stimulation. The touch during baby massage can stimulate vagus nerve activity, which plays a role in enhancing gastrointestinal function, accelerating gastric emptying, and improving nutrient absorption. Increased vagus nerve activity causes babies to feel hungry more quickly and increases the frequency of breastfeeding, thereby optimizing nutrient intake (Diego, Field, Hernandez-Reif, Deeds, Ascencio, & Begert, 2007).

In addition, baby massage is also known to increase the production of growth hormones and insulin-like growth factor-1 (IGF-1), which play a role in the growth process of the baby's body tissues. According to the neuroendocrine theory, touch stimulation can enhance the activity of the parasympathetic nervous system, thereby improving the baby's body metabolism. Moderate pressure massage is more effective in increasing body weight compared to light pressure because it can enhance vagal activity and growth hormone production (Field, Diego, & Hernandez-Reif, 2011). The results of the research in this literature review are in line with the another study which showed that LBW infants who received regular baby massage experienced a more significant increase in weight compared to the control group (Lestari, Nurbadlina, Wagiyo, & Jauhar, 2021). The study mentioned that massage stimulation helps improve sleep quality and energy efficiency in infants, allowing more calories to be used for body growth. Similar findings were also reported who stated that the use of coconut oil in baby massage significantly increased the weight of low birth weight neonates thru improved blood circulation and relaxation of the baby (Mohini, Jaipal, Bisht, & Tyagi, 2021).

A systematic review also shows that most of the analyzed studies found a positive relationship between baby massage and weight gain in low birth weight infants. Babies who received massage intervention experienced faster weight gain compared to babies without massage intervention. The study confirms that massage therapy can be an effective additional intervention in neonatal care, particularly for babies with growth disorders (Atika, Manaf, Sabrina, Ismahendra, Soediono, Bachtiar, & Karim, 2024). The results of this review are also supported the systematic review, which states that infant massage provides benefits for the growth of premature babies, including weight gain, improved sleep quality, and physiological stability. The study explains that infant massage helps reduce stress hormone levels such as cortisol, making the baby calmer and conserving body energy that would otherwise be used for stress responses (Mrljak, Danielsson, Hedov, & Garmy, 2022).

Another study in a Cochrane review found that baby massage in premature and low birth weight infants can increase daily weight gain by about 5 grams per day compared to the non-massage group. In addition, babies who received massage also had shorter hospital stays. This shows that baby massage not only impacts growth but also the efficiency of neonatal care (Vickers, Ohlsson, Lacy, & Horsley, 2004). Another research explains that baby massage helps improve the sleep patterns of premature infants. Quality sleep plays an important role in the secretion of growth hormone, which is produced more optimally when the baby sleeps. With improved sleep quality, the growth process and weight gain in babies become better (Ferber, Kuint, Weller, Feldman, Dollberg, Arbel, & Koholet, 2002).

Another research also explain that baby massage enhances emotional interaction between the mother and the baby. The touch contact that occurs during massage helps enhance bonding attachment, making the baby feel safer and more comfortable. A stable emotional condition can improve the baby's feeding patterns and sleep quality (Lee, 2006).

Another research found that the combination of baby massage therapy and kangaroo mother care provides a more optimal weight gain compared to

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Poltekkes Kemenkes Denpasar

Corresponding author: *Email: madesulastri85@gmail.com

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kangaroo mother care alone. This indicates that the combination of touch stimulation interventions and skin contact can have a synergistic effect on the growth of low birth weight babies. Low birth weight babies who received massage therapy for 15 minutes twice a day experienced a higher average weight gain compared to the control group. The research shows that the frequency and duration of massage affect the effectiveness of weight gain in infants (Nurhayati, 2025),

Another research shows that baby massage can increase serotonin levels and reduce stress hormones. Serotonin plays a role in creating a sense of comfort and relaxation, making the baby calmer and easier to sleep. Adequate sleep contributes to the metabolic processes and growth of the baby. In addition to affecting physical growth, baby massage also helps improve motor development and behavioral responses in premature infants. The sensory stimulation provided through massage helps the development of the central nervous system, making the baby more active and responsive to the environment (Anggraini & Sari, 2020).

Another systematic review concluded that most studies related to infant massage show positive results on the growth of premature babies, particularly in terms of weight gain and physiological stability. However, the study also emphasizes the need for uniform massage procedure standards to enhance the validity of the research results (Smith, 2013). Another reported that massage therapy helps improve blood circulation and tissue oxygenation in premature infants. The increase in tissue oxygenation helps enhance cellular metabolism and supports the optimal growth process of the baby (Lin, Yu, Zhang, Liu, & Xiong, 2023).

Another research mentioned that baby massage therapy performed regularly for two weeks accelerates the achievement of ideal body weight in low birth weight infants undergoing neonatal care. The results indicate that baby massage can be an effective complementary therapy in neonatal care (Kurniawati, 2017).

Another study also reported that baby massage therapy is effectively applied in primary healthcare services because it is easy to perform, low-cost, and can be taught to parents. Educating mothers about baby massage can enhance their skills in providing early stimulation that supports the growth and

development of low birth weight infants. Although most studies show positive results, there are some differences related to the duration, frequency, massage techniques, and the characteristics of the babies studied. These differences can affect the extent of the weight gain achieved. In addition, other factors such as nutrition, gestational age, the clinical condition of the baby, and the parents' skills in performing the massage can also affect the effectiveness of the therapy (Fitriana, Rofi'ah, & Munayarokh, 2019).

Overall, baby massage therapy has been proven effective in increasing the weight of low birth weight (LBW) infants through enhanced vagus nerve activity, improved gastrointestinal function, better sleep quality, reduced stress hormones, and increased breastfeeding frequency. Therefore, baby massage therapy can be recommended as a complementary intervention in the care of low birth weight infants both in hospitals and in primary healthcare services.

CONCLUSION

Based on the results of the literature review, baby massage therapy is effective in increasing the weight of low birth weight (LBW) infants and premature babies. Baby massage helps increase vagus nerve activity, improve digestive function, enhance sleep quality, and increase feeding frequency, thereby optimizing the baby's growth. In addition to increasing weight, baby massage also provides benefits such as relaxation and enhancing the bonding attachment between mother and baby. Therefore, baby massage therapy can be used as a non-pharmacological and complementary intervention in the care of low birth weight infants, both in hospitals and primary healthcare services.

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Ni Made Sulastri*, Ni Wayan Armini, Ni Komang Erny Astiti

Poltekkes Kemenkes Denpasar
Corresponding author: *Email: madesulastri85@gmail.com

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Poltekkes Kemenkes Denpasar

Corresponding author: *Email: madesulastri85@gmail.com

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