Effectiveness of Baby Massage on the Growth and Development of Toddlers: A Scoping Review

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Abstract

Background: Infancy and toddlerhood are important periods in a child's growth and development that require special attention. Baby massage, as a form of communication through touch, is beneficial for growth and development. Regular massage can help increase weight, improve sleep quality, and stimulate the digestive system, which can lead to an increased appetite. In addition to providing a relaxing and comfortable effect, baby massage strengthens the emotional bond between mother and child. Therefore, mothers need to understand the techniques and benefits of baby massage as a form of stimulation and affection through gentle touch.
Objective: This *Scoping review* analyzes the effectiveness of infant massage on infant growth and development.
Method: This article's *Scoping review* uses the PRISMA method to identify articles published during the last five years (2019-2023) through Google Scholar, SAGE, Science Direct, and PubMed and produces 8 relevant journals.
Results: Baby massage is beneficial for the growth and development of babies.
Conclusion: This baby massage can be a non-pharmacological therapy that can help increase the baby's appetite, improve the baby's sleep quality, smooth bowel movements, improve the quality of breastfeeding, increase the body's resistance, and reduce the frequency of spitting up in babies.

Keywords: *Baby Massage; Growth and Development; Baby; Toddler*

INTRODUCTION

The health status of infants can be assessed through two primary indicators: morbidity (illness) and mortality (death). In Indonesia, both morbidity and mortality rates among infants remain relatively high. Morbidity refers to a deviation from a healthy and prosperous condition, indicating the presence of illness. When an infant experiences illness, their growth and development may be adversely affected. Therefore, it is crucial for parents to regularly monitor their child's growth and development every month. Key aspects to observe include body weight, body length, and the development of motor and sensory skills (1,2,3).
The toddler period is widely recognized as a phase of rapid and critical development, often referred to as the "golden age." This period plays a vital role in a child's growth and developmental trajectory, as it marks the beginning of personality and character formation. Given the significance of early monitoring, regular assessment of a child's growth and development should begin as early as possible to support the development of high-quality human resources (4).

Various interventions can be implemented to reduce morbidity rates among children, one of which is infant massage. Infant massage has been shown to provide numerous benefits, including increased body weight, enhanced growth, strengthened immune function, improved breast milk production, better blood circulation and respiration, and improved sleep quality.

Additionally, infant massage can contribute to optimizing overall growth and developmental outcomes (2,5,6).

Infants who receive massage experience enhanced vagus nerve tone (10th cranial nerve), which leads to increased levels of gastrin and insulin absorption enzymes. This physiological response improves nutrient absorption. Enhanced nutrient absorption makes infants feel hungry more frequently, leading to more frequent breastfeeding sessions (7).

Given the growing body of research exploring the benefits of infant massage on child growth and development, this journal aims to present a systematic review of studies examining the effectiveness of infant massage in supporting infant growth and developmental outcomes.

RESEARCH METHODS

This article is compiled based on a systematic review conducted using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, with a focus on the effectiveness of infant massage on infant growth and development. The systematic review process involved collecting and analyzing relevant literature from various electronic databases, including Google Scholar, SAGE Journals, ScienceDirect, and PubMed, up to October 2023.

During the search process, the inclusion criteria were defined as follows: studies must focus on the topic of infant massage about growth and development, and utilize an experimental research design. These criteria were set to ensure that the review incorporates primary evidence demonstrating causal relationships between infant massage and developmental outcomes. Additionally, only articles published in English or Indonesian within the past five years (2019–2023) were considered eligible.

Articles were excluded if they did not meet the core topical focus (infant massage, growth, and development), did not employ an experimental design, or were themselves systematic reviews or meta-analyses. This exclusion criterion was applied to maintain a consistent focus on original empirical studies that directly assess the intervention's effectiveness.

The search strategy used specific keywords including: “Infant Massage” OR “Baby Massage” AND “Growth and Development.” A total of 476 articles were identified through this search. Following a rigorous screening and eligibility assessment based on the aforementioned inclusion and exclusion criteria, eight articles were ultimately selected for detailed analysis and synthesis in this review. The article selection process is explained in Figure 1 (PRISMA chart).

The characteristics of the article are explained in Table 1 below:

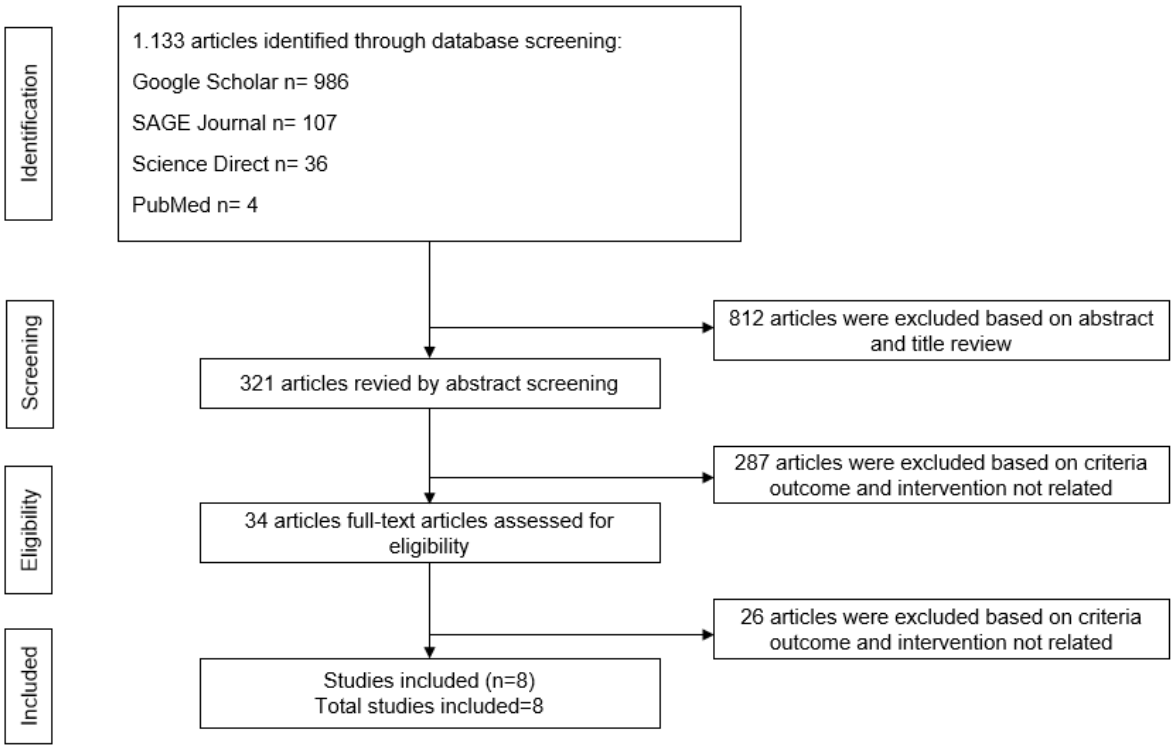

Figure 1: PRISMA Diagram

RESULT

It can be seen based on the specified keywords, there are 476 specified articles. After further searching, 8 articles were obtained that will be analyzed and included in this literature review. The eight articles that will be analyzed are articles published from 2019 to 2023 in the online databases Google Scholar, Sage Journal, Science Direct, and PubMed. Two articles were published in 2019, 2022, and 2023. For the rest, 1 article each was published in 2020 and 2021. The articles that were analyzed mostly used quasi-experimental experimental, which were 6 articles, and the rest used cross-sectional, 1 article, and experimental research, 1 article.

In Table 1. Describes the characteristics of the articles included in the final analysis. The table explains the design, objectives, samples, variables, instruments, results, and conclusions of the research conducted. The purpose of writing this article is to assess the effectiveness of infant massage on infant growth and development. The results of the analysis obtained in the article in Table 1 show that there is a significant influence of infant massage and infant growth and development. Infant massage is a massage that is done closer to gentle strokes or tactile stimulation carried out on the surface of the skin, manipulation of body tissue or organs aims to produce effects on the muscles nerves, and the respiratory system and improve blood circulation. Infant massage is the oldest touch therapy known to man and the most popular (8).

The characteristics of the articles are explained in the following Table 1:

Table 1. Characteristics of the Articles Studied

No	References	Origin Journal	Design Study	Research Purpose	Sample	Variables and Instruments	Results	Conclusion
1.	Sukmawati E, Imanah NDN. 2020 (9)	*Jurnal Kesehatan Al-Irsyad*/ Volume 13, No 1 / Maret-Agustus 2020	*Quasi Eksperiment*	To determine the effectiveness of baby massage on improving the quality of baby sleep.	30 mothers of babies	Independent Variable: Baby Massage Dependent Variable: Baby Sleep Quality Instrument: Questionnaire	Based on the results of the study, it was found that there was an increase in the quality of baby sleep after baby massage, namely that 60% had poor sleep quality before baby massage increased to 73.33%, and the quality of baby sleep became good after massage. The results of the Wilcoxon test showed that the p-value was 0.004, where the p-value <α (0.05), so H0 was rejected and H1 was accepted.	There is effectiveness of baby massage in improving the quality of a baby's sleep, as proven by the respondents who experienced an increase in sleep quality of 73.3% of respondents.
2.	Lestari K P.et al, 2021 (10)	*Journal of Public Health Research*/ Volume 10(s1):233 2, 2021	*Quasi-Experiment*	To determine the effect of baby massage on baby weight	16 respondents for each intervention and control group. Inclusion criteria: • Babies with a history of LBW births. • Age 1-6 months • Exclusive breastfeeding • Normal maternal BMI Exclusion criteria: • Sick babies • Babies with genetic disorders • Already receiving complementary foods	Independent Variable: Baby massage Dependent: Baby weight The instruments used are weight observation sheets, calibrated GEA medical Rgz 20A manual baby weight scales.	The results of the study showed that there was a difference in weight gain before and after the intervention, which was 500 grams. While in the control group, there was a smaller difference in weight gain before and after, which was 268.75 grams. So there was a significant increase in baby weight after receiving baby massage (p = 0.001)	There is a significant effect of baby massage on increasing the baby's weight.
3.	Sadiman S, Islamiyati. 2019 (11)	Jurnal Kesehatan Metro Sai Wawawi/Volume 12 No 2. 9-16. December 2019	*Quasi-experiment non-equivalent control group design*	To determine the effectiveness of baby massage on increasing body weight, length of sleep, and smooth bowel movements.	46 respondents • 23 respondents in the control group. • 23 respondents in the intervention group Control group: Babies who were massaged as usual by the midwife Intervention group: Babies who were massaged every day	Independent variables: Baby massage Dependent variables: Baby weight, sleep time, and smooth bowel movements Instruments: • Observation sheets • Weight scales	Based on the results of the study, it was found that there was an average increase in body weight in the treatment group of 521.8 grams, while the average increase in body weight in the control group was 354.4 grams. The difference in the average weight of babies before and after massage in the treatment and control groups with a p-value of 0.000. The average increase in sleep time in the treatment group was 80.7 minutes, while the average sleep time of babies in the control group decreased by 53.9 minutes. The average sleep time of babies before and after massage in the treatment group p value	The results of the study showed that infant massage was effective in increasing the average weight of infants, the average sleep time of infants, and the average frequency of infant bowel movements.

No	References	Origin Journal	Design Study	Research Purpose	Sample	Variables and Instruments	Results	Conclusion
							0.000, and the control group p value 0.030. In the treatment group, before training and implementation of baby massage, 5 people had abnormal bowel movements, while after the implementation of baby massage, all babies had normal bowel movements. In the control group before the massage, 4 babies were not normal in their bowel movements, while after the massage, there were still 3 babies who were not normal in their bowel movements. The average frequency of bowel movements of babies before and after massage in the treatment group p value 0.25, and there was no difference in the average in the control group p value 0.655.	
4.	Situmorang C C.et al. 2022 (12)	Jurnal Mutiara Kesehatan Masyarakat / Volume 7(2): 94-100	Pre-experiment with one group: pre-test-post-test	To determine the effectiveness of baby massage on the quality of breast milk supply in babies aged 0-6 months.	30 babies aged 0-6 months • 15 intervention group. • 15 in the control group. Intervention group: babies were given a massage a maximum of 2 times a day (morning and evening) and a minimum of 2 times a week, with a massage duration of 20 minutes	Independent variables: Infant massage Dependent variables: Quality of breastfeeding Instruments: observation sheets, interviews, and documentation	The results of the study show that the average duration of breastfeeding before the massage was 7.2 minutes and after the massage was 11.2 minutes, so it can be seen that the quality of breastfeeding was better in the group after the intervention.	That baby massage can increase the duration of breastfeeding in babies aged 0 – 6 months.
5	Qotimah, et al. 2023 (13)	Jurnal Ilmiah Obsgin/ Volume 15 No 2	*Quasi-experiment non-equivalent control group design*	To determine the effectiveness of baby massage in increasing body weight and endurance.	30 respondents • 15 intervention group. • 15 in the control group..	Independent variable: Baby massage. Dependent variable: weight gain and endurance Instrument: observation sheet, interview, documentation, and questionnaire	Based on the t-test analysis, it is known that there is an effect of baby massage on weight gain and endurance of children aged 1-3 years. For weight gain, it is shown by a 2-tailed significance value of 0.000 <α 0.05 and a t-count value = 12.241> t-table = 1.699, which means that there is an effect of giving baby massage on weight gain in children aged 1-3 years. While for endurance, it is shown by a 2-tailed significance value of 0.000 <α 0.05 and a t-count value = 9.522> t-table = 1.699, which means that there is an effect of giving baby massage on endurance in children aged 1-3 years.	The results of this study show that there is an effect of baby massage on increasing body weight and endurance in children aged 1-3 years.

No	References	Origin Journal	Design Study	Research Purpose	Sample	Variables and Instruments	Results	Conclusion
6	Kalsum Umi. 2019 (14)	Jurnal Antara Kebidanan/ Vol. 4, No. 3, Juli-September 2021	*Cross Sectional study*	To determine the effectiveness of baby massage on the sleep patterns of babies aged 0-6 months.	Sample of 30 babies aged 0-6 months	Independent variable: Baby massage Dependent variable: Baby sleep pattern Instrument: Observation sheet and interview	The results of the Chi Square Test statistical test obtained a value of p = 0.003, where p <α (alpha = 0.05). It can be concluded that Ha is accepted and Ho is rejected, which means that there is an effect of baby massage on improving baby sleep patterns.	There is an effective influence between baby massage and improving a baby's sleep patterns..
7	Nurseha, Lintang Santi S. 2022 (15)	*Journal Of Midwifery/ Vol 10 No 1, April 2022*	Quasi-Experiment	To determine the effectiveness of baby massage on increasing body weight and sleep time.	50 respondents • 25 intervention group. • 25 in the control group. Control group: no massage, only weighing Treatment group: regular massage every 3 days for 1 month, with a minimum time of 15 minutes	Independent variables: Baby massage Dependent variables: weight gain and sleep duration Instruments: observation sheets, weight scales, and interviews	The average weight of infants in the treatment group increased from 5,973 grams to 6,875 grams. In the control group, the average weight of infants increased from 6,857 grams to 7,210 grams. There was a difference in the average weight of infants before and after massage in the treatment group, with a p-value of 0.000. In the control group, there was no difference in the average weight of infants before and after massage, with a p-value of 0.062. The length of sleep in the treatment group increased from 659 minutes to 733 minutes. In the control group, it decreased from 654 minutes to 632 minutes. There was a difference in the average sleep time of infants before and after massage in the treatment group, with a p-value of 0.000. In the control group, there was also a difference in the average sleep time of infants before and after, with a p-value of 0.130.	This study concludes that there is a difference in the average weight of babies before and after massage in the treatment group, and there is a difference in the average sleep time of babies before and after massage in the treatment group. Baby massage is effective in increasing the average weight of babies and the average sleep time of babies.
8	Hasanalita, Sanputri. 2023 (16)	Jurnal Ventilator: Jurnal Riset Ilmu Kesehatan dan Keperawatan/ Vol. 1 No. 1. Maret 2023	Eksperimental research	To explain or describe the distribution of spit-up frequency in babies before and after massage.	16 sample	Independent variable: baby massage Dependent variable: frequency distribution of spit up Instrument: observation sheet	The average frequency of spit up before baby massage was 0.500 with a standard deviation of 0.516. The average frequency of spit up after baby massage was 0.686 with a standard deviation of 0.479. The results of statistical tests using the Paired T-Test obtained a p value of 0.003, which means Ho is rejected, so it can be concluded that there is a difference in the frequency of spit up before and after baby massage.	There is a difference in the occurrence of spitting up in babies who are massaged and those who are not massaged. On average, babies who are massaged do not experience spitting up, while babies who are not massaged experience spitting up..

DISCUSSION

The review in this paper can be used as a reference for the effectiveness of baby massage on growth and development. Some of the benefits of baby massage include:

a. Improving the quality and pattern of baby sleep

One of the factors that can affect a baby's growth is the need for sleep. Sleep is one of the stimuli for brain growth. It is estimated that around 75% of growth hormones are excreted when children sleep. This hormone has the task of stimulating bone and tissue growth and regulating the body's metabolism, including the brain. In addition, growth hormones also allow the body to repair and renew all cells in the body. This cell renewal process will take place faster when the baby is asleep than when awake. In the first year, the baby's brain will grow three times from its birth state or around 80% of the adult brain (17).

With the advancement of science and technology, experts have found that touching and massaging babies has a positive impact on the physiological functions of the body. One of the main benefits is helping babies sleep better. This is important because in the early stages of life, the development of the baby's nerve cells is still ongoing and not fully mature, so sufficient sleep time is needed to support the formation and strengthening of brain synapses (14).

The quality of a baby's sleep not only affects physical development, but also their attitude the next day (18). Sleep also has a major effect on the mental, emotional, physical, and immune systems (19). The right massage method for babies is useful for improving sleep quality. Babies need the sensation of touch in their early lives to adapt to their environment. Therefore, baby massage has a great effect on improving the quality of a baby's sleep (9).

Babies who are regularly massaged tend to have better sleep quality because massage can stimulate an increase in the hormone serotonin in the body. Serotonin functions as a neurotransmitter that plays an important role in the mechanism of sleep, namely by reducing the activity of the reticular activating system and calming other brain functions. Serotonin itself is formed from the amino acid tryptophan, which then undergoes a conversion process into 5-hydroxytryptophan (5-HTP), then into N-acetylserotonin, and finally turns into melatonin. This melatonin hormone plays a role in regulating sleep rhythms, so that babies can sleep longer and more soundly, especially at night (14).

b. Increase the baby's weight

Baby massage can provide tactile stimulation that can stimulate muscles, bones, and body organ systems to function optimally. Baby massage can also increase food absorption because the massage performed on the baby will cause an increase in the tone of the vagus nerve (a brain nerve), which will stimulate an increase in the absorption of gastrin and insulin enzymes (20). The vagus nerve stimulated by the massage will increase the work of intestinal peristalsis, which makes stomach emptying faster, and the baby becomes hungry easily, so that the baby will breastfeed more often from the mother (21).

In addition, baby massage also increases the secretion of the beta endorphin hormone, which affects the growth mechanism. Babies who are massaged regularly experience an average weight gain in 1 month of around 900 grams, while babies who are not massaged regularly have an average weight gain in one month of around 760 grams (22).

c. Helps smooth bowel movements

Another benefit of baby massage is that it can increase peristaltic motion for the digestive process. Peristalsis is a kind of wave and regular contraction in the digestive tract that functions to move food so that the digestive process takes place quickly. The method that can be used on babies who experience constipation is by gently massaging around the baby's stomach area from the center towards a circular motion clockwise. The massage

can be done using baby massage oil or cream to make it easier for the hands to massage (3).

d. Effectiveness of infant massage on the quality of breastfeeding
Infant massage is a form of midwifery care given to neonates, infants, and toddlers with gentle and structured massage techniques from the face to the feet. This activity helps relax the baby's muscles, improve blood circulation, and support better sleep quality. In addition to these physical benefits, infant massage can also stimulate increased frequency and duration of breastfeeding, so that the baby feels more comfortable and calm during the breastfeeding process (23).

Baby massage can stimulate the baby's ability to breastfeed more optimally, so that the need for breast milk can be met optimally. This increase in breastfeeding effectiveness also encourages the mother's breast milk production according to the baby's needs. Exclusive breastfeeding provides many benefits for babies, such as increasing endurance, meeting nutritional intake, and supporting healthy weight growth. For mothers, breastfeeding also provides benefits, including helping the uterus return to its original size, acting as a natural contraceptive, and saving time and money (24).

e. Increases body immunity
Baby massage has two main benefits, namely physical and psychological benefits. From a physical perspective, baby massage plays an important role in helping weight gain, especially in premature babies, supporting the growth and function of the digestive tract, improving body fat storage, and reducing stress levels in babies. In addition, baby massage also contributes to strengthening the immune system, helping to reduce bilirubin levels in babies with jaundice, and increasing heart rate variability as an indicator of good heart health. Other benefits of baby massage include increasing growth, increasing baby concentration, and making babies sleep more soundly, increasing body immunity, which can cause a decrease in adrenaline hormone levels (stress hormones). This decrease in stress hormones causes an increase in body immunity, especially IgM and IgG (13).

f. Effectiveness of baby massage on spit-up disorders
Baby massage is a gentle touch technique in the form of gentle strokes or tactile stimulation performed on the surface of the skin, with light manipulation of the body's tissues or organs. The goal is to provide a positive effect on the nervous system, muscles, respiration, and improve blood circulation (25,26). One of the benefits of baby massage is that it helps relieve digestive disorders such as bloating and colic, and helps babies to sleep better. Massage can facilitate the movement of air in the stomach, so that trapped gas can be released more easily. In addition, massage also helps babies overcome digestive disorders caused by the immaturity of the cardiac sphincter in the stomach, which often causes babies to spit up. With regular and proper massage, the function of the baby's digestive system can be more optimal, and the baby's comfort will increase (27).

CONCLUSION

Based on the analysis conducted on 8 articles selected from various trusted databases and journals, it was found that baby massage is a form of early stimulation that is very beneficial for children's growth and development, both physically and psychologically. Gentle massage techniques that are carried out routinely can provide various positive effects, such as improving sleep quality, facilitating the digestive system, increasing the baby's weight, relieving discomfort or pain, and strengthening the immune system. Massage also plays an important role in helping babies sleep better and longer, which is very much needed in the process of nerve maturation and optimal growth. In addition to the physical benefits, baby massage also strengthens the emotional bond between baby and parent, and helps babies feel

safer, calmer, and more comfortable. With these various benefits, baby massage is a simple but effective non-pharmacological method in supporting the health and well-being of babies as a whole.

SUGGESTION

It is expected that parents, especially mothers, can learn and apply baby massage techniques correctly through guidance from health workers such as midwives. Health workers are also expected to be more proactive in providing education about baby massage as an effort to support children's health and development. In addition, support from health facilities and local governments is needed to organize regular training or counseling so that the benefits of baby massage can be felt widely and evenly.

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