

# Baby Massage has an Impact on Weight and Motor Skill of Babies Aged 1 to 12 Months

Suriani Suriani, Yonathan Ramba, \*Hendrik Hendrik

Department of Physiotherapy, Health Polytechnic of Makassar, Indonesia

\*Correspondence Author

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## ABSTRACT

**Introduction:** Underweight or overweight is a child health problem in Indonesia. This is the most important anthropometric measurement for seeing the physical development of newborns. Underweight or overweight which can cause motor delays is closely related to infant growth. **Objective:** to ascertain how baby massage affects the growth of baby weight and gross motor abilities. **Method:** Pre-experimental research using a pretest-posttest one-group design is the kind of study being conducted. Forty newborns were selected as a sample using basic random sampling. Infants were selected based on the inclusion criteria of age 1 - 12 months, did not experience chronic neuromuscular disorders, were still breastfeeding, were born through normal delivery, and came to the Berua Health Center, Makassar City from May to July 2024. Body weight was measured using a baby scale and gross motor skills were measured using the Infant Motor Performance Test. For each significant variable, parametric analysis was conducted with a paired t-test ( $p < 0.05$ ). **Results:** The results showed Body weight increased significantly ( $p = 0.001$ ) and gross motor data increased significantly ( $p = 0.014$ ) in the results. **Conclusion:** massage can influence the development of body weight and gross motor skills in babies aged one to twelve months. The study found that providing infant massage for 10-15 minutes twice a week for one month can have an impact on weight gain and gross motor skills of infants aged 1-12 months. In addition, the data also revealed that providing infant massage has a significant impact on improving gross motor skills of infants aged 1-12 months

**Keyword:** Baby Massage; Body weight; Gross motor skills;

## INTRODUCTION

Overweight or overweight is one of the health problems of Indonesian children. This site is the main anthropometric measurement of newborns to see the rate of their physical growth. If weight does not increase within a certain period, or if they are overweight, this can be an indication of a health problem (1).

Growth is closely correlated with infant development. Underweight or overweight infants can experience motor delays. If the infant is too thin, they are unable to perform gross motor tasks because their muscle mass is small, and if their weight is less than ideal, it can interfere with their gross motor development, so it is necessary to improve the infant's nutritional status and increase their weight so that their muscle mass increases. If the infant is too fat, their motor development can also be delayed because they need more strength to support their weight, so there can be a delay in the development of their gross motor skills.(2,3). The process by which the brain, muscles, and nerve system work together to coordinate movement control in the body is known as motor development. Motor development occurs from infancy to adulthood and involves various aspects of human behavior, including motor skills and behavioral aspects that exist in a person. (4,5).

Growth and development issues pertaining to gross motor development and body weight are primarily caused by babies born with low birth weight. The World Health Organization (WHO) claims that, low birth weight (LBW) causes 60–80% of all neonatal fatalities and accounts for 15.5% of the 20 million live births that occur each year, 96.5% of which occur in developing nations. (6,7). South Sulawesi province's LBW presentation is

ranked seventh (12.4). In 2013, the neonatal mortality rate was 3.18% per 1,000 live births; in 2014, it increased to 2.94% per 1,000 live births; and in 2015, it increased to 3.88% per 1,000 live births. In Makassar City, LBW incidence was 2.80% in 2014, death was 2.46%, and mortality was 1.96% in 2015. In 2016, 3.29% of cases of LBW were reported. (6,8). More than 20 million children under five in underdeveloped nations do not reach their full potential because of deprivation, malnourishment, or an unfavorable environment. Children's cognitive, motor, emotional, and social development are impacted by this. (9).

Massage is a soft touch technique used to enhance blood circulation and relax muscles, which can make newborns feel more comfortable and aid in their physical, mental, and social development. It is one of the early stimulations that can help babies grow quicker. (4,10).

Developmental delays remain a major issue in Indonesia, despite the government's continued emphasis on improving the quality of newborns. A third of infants seem to have minor gross motor skill deficits (10,11). With low birth weight newborns often having poor motor development, the purpose of this study is to find out how baby massage affects infants between the ages of one and twelve months in terms of increasing body weight and improving gross motor abilities.

## **METHODS**

### **Research Design**

The purpose of this pretest-posttest, one-group pre-experiment is to ascertain the effect of baby massage on weight gain and gross motor skills in infants between the ages of one and twelve months.

### **Setting and samples**

This study was conducted at several integrated health posts in the Berua sub-district, Makassar city from April to June 2024. The population was infants aged 1-12 months, who did not experience chronic neuromuscular disorders, were born normally, breastfed and parents agreed for the child to be the subject, so that the population was 65 infants. The sample size was determined based on the calculation results with the sample size determination formula so that a sample of 40 infants was obtained. The sample was obtained using the simple random sampling method.

### **Measurement and data collection**

This study used an assessment instrument that included infant weight measured using a baby weighing scale, which was done by laying the baby on the scale, and then recording the baby's weight. Meanwhile, for the baby's gross motor skills, the Infant Motor Performance Test was used, which was an assessment using a questionnaire that included 42 assessment items, consisting of 13 assessment items of observation results during the spontaneous activity period such as head orientation and limb movements, and 29 observation items of postural response gravity control, including hearing, vision. The observation results were given a value of 1 if found and 0 if no movement was made. This study has met the requirements of the National Unity and Politics Agency of South Sulawesi, Makassar City, and the Makassar City Health Office. The study has received a recommendation from the Health Ethics Commission of the Health Polytechnic of the Ministry of Health of Makassar with the number 277/KEPK-PTKMKS/XII/2023. Parents of subjects who agreed for their children to be subjects filled out the consent form and signed the informed consent. Furthermore, the infants were examined and assessed for gross motor skills.

### **Data analysis**

The research data were obtained from the results of body weight measurements using baby weight scales and gross motor skills of babies using the Infant Motor Performance Test. Measurements were carried out twice, namely before the subject was given baby massage treatment and after being given baby massage treatment for 10-15 minutes with a frequency of 2 times a week for one month. Data before giving baby massage were analyzed with data after giving baby massage using a parametric paired t-test comparison test to ascertain the

effect of baby massage on the body weight and gross motor abilities of infants between the ages of one and twelve months.

## RESULT

The research sample was infants aged 1 - 12 months, who did not experience chronic neuromuscular disorders, were born normally, breastfed and parents agreed for the child to be the subject, so the sample size of the research was 40 infants.

Based on the characteristics, the research subjects were obtained as many as 40 babies aged 1 - 12 months who met the inclusion criteria. The results of the descriptive analysis obtained data on gender, 21 male and 19 female, aged 1 - 6 months as many as 17 babies or 42.5%, and aged 7 - 12 months as many as 23 babies or 57.5%. For body weight, <6000 gr as many as 28 babies or 70% and >6000 gr as many as 12 babies or 30% and motor skills with a value of <0.60 as many as 27 babies or 67.5% and value of >0.60 as many as 13 babies or 32.5%. Thus it is concluded that the research subjects were generally aged 7 - 12 months with an average body weight of <6000 gr, with motor skills generally at a value of >0.60.

Table 1. Analysis of Characteristics of Infants Aged 1-12 Months at Integrated Health Posts in Berua Village in 2024

Variables	frequency	percentage
<b>Gender</b>		
Male	21	52.5
Female	19	47.5
<b>Age (Months)</b>		
1 – 6	17	42.5
7 – 12	23	57.5
<b>Body Weight (Gram)</b>		
≤6000	28	70
> 6000	12	30
<b>Gross motor skills</b>		
≤ 0,60	27	67.5
>0,60	13	32.5

Thus, it is concluded that the research subjects were generally male, aged 7-12 months with an average body weight of <6000 gr, with motor skills generally at a value of <0.60. Data analysis before and after the intervention obtained an average weight before the intervention of 6710.00 grams ± 1233.69 grams, and after the intervention was 7650.00 grams ± 1328.83 grams. Infants' gross motor ability was 0.60 ± 0.50 in the gross motor ability component prior to the intervention, and it increased to 0.90 ± 0.30 after receiving a baby massage.

Table 2 Analysis of Baby's Weight and Motor Skills Before and After Baby Massage

Variables	Intervention Time		p
	Posttest	Pretest	
<b>Body Weight (Gram)</b>	6710.00 ± 1233.694	7650.00 ± 1328.83	0.001
<b>Gross Motor Skills</b>	0.60 ± 0.50	0.90 ± 0.30	0.014

The study data was not normal, according to the data normalcy analysis results, with a p-value less than 0.05, which means that the variable data analysis was continued with a non-parametric test. P-value = 0.001 was obtained from the weight data analysis using the Wilcoxon test, indicating a significant difference in weight before and after receiving a baby massage, meaning that baby massage can have an impact on the weight of babies aged 1-12 months. Likewise, in the gross motor skills of infants, a p-value of 0.014 was obtained, It indicates that there is a discernible difference between the gross motor skills of infants aged 1 to 12 months before and after receiving baby massage, suggesting that baby massage may have an effect on these skills.

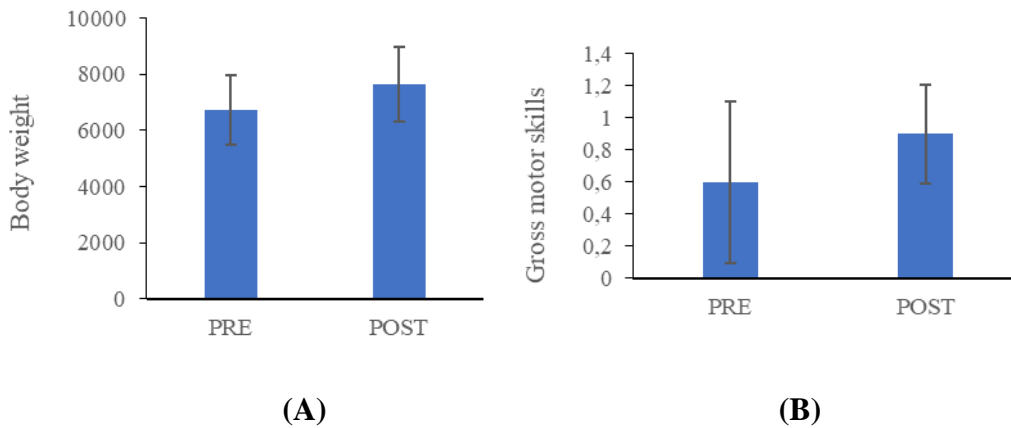


Figure 1 Baby's weight (A) and gross motor skills (B) before and after intervention.

## DISCUSSION

When the baby's weight and age were correlated, the analysis's findings revealed that the baby's weight was typically below normal. This indicates that the sample generally experienced weight gain disorders, so it was necessary to receive intervention with baby massage. This is consistent with the study's findings, which indicated that baby massage helps babies grow and gain weight by improving sleep quality and blood flow so that the energy in the baby's body is concentrated for growth (2). In addition to increasing the baby's weight, baby massage can also improve the baby's gross motor skills. This is also supported by research results which state that baby massage plays a role in improving blood circulation and tissue nutrition, stabilizing muscle tone, strengthening immunity, strengthening the musculoskeletal system, and activating the baby's motor skills, music and stories are needed when doing massage and exercise. (12).

The impact of baby massage on weight gain occurs because intervention with baby massage will affect the nervous system which can increase food absorption and body resistance so that baby growth increases. This is consistent with studies showing that massage therapy for babies affects the vagus nerve system, which is involved in the body's process of absorbing nutrients. In addition, the vagus nerve will also affect the release of beta-endorphin neurochemicals which play a role in the growth mechanism. Furthermore, massaging a baby raises the tone of the vagus nerve, which affects the mechanism of absorbing breast milk. This means that the baby will become hungry faster and nurse the mother more frequently, which increases milk production. (13). This claim is consistent with research showing that baby massage improves both the quality of a baby's sleep and their ability to gain weight. Vagus nerve activity, serotonin production, and beta-endorphin release are some of the basic mechanisms of baby massage. (13).

Giving intervention in the form of baby massage will provide calm and sound sleep to the baby so that the baby is not stressed and the appetite or breastfeeding increases. This is consistent with the study's findings that baby sleep is critical for promoting the infant's growth and development, which determines the next stage of development. When babies sleep, brain cells increase and 75% of growth and development hormones are produced. (13–15). Thus, the impact of baby massage on weight gain in infants between the ages of one and twelve months can be determined.

In addition to having an impact on increasing the baby's weight, baby massage also has an impact on the development of the baby's gross motor skills. This happens because baby massage will cause an increase in the

absorption of enzymes that play a role in producing energy for muscle contractions. This statement is in line with the results of research stating that baby massage causes the absorption of gastrin and insulin enzymes to increase as a result of vagus nerve activity. Insulin functions in carbohydrate metabolism, glycogen storage, and fatty acid synthesis that will be stored in the liver, fat, and muscles. One of these glycogens will produce ATP, which functions for muscle contraction, so that the baby is more active, which means they develop faster. (15,16). Other research results reveal that baby massage has a reflex effect on the autonomic system, baby massage stimulates and relaxes the autonomic nerves. When a child feels afraid, anxious, or sick, or has an emotional reaction, it can be a relaxing effect. This is because baby massage stimulates the hypothalamus through impulses sent to the spinal cord, which in turn triggers the release of sympathy as a self-defense measure. Baby massage can improve behavior, social skills, and communication, as well as other tactile and sensory symptoms. One component that affects physical and mental changes in the body is stress, which can be reduced through baby massage. (10). Baby massage optimizes the metabolic system, as well as physical and psychosocial abilities. Baby massage will improve the relationship between mother and baby and stimulate the growth and development of the baby's muscles and nerves. The stimulation given will also increase blood circulation by 10-15 percent after the massage. (17,18).

Baby massage activates nerve activity, which causes the absorption of insulin and gastrin hormones. Insulin is responsible for carbohydrate metabolism, glycogen storage, and fatty acid synthesis, all of which are stored in the liver, fat, and muscles. One of the functions of glycogen is to produce ATP, or adenosine triphosphate, which is useful for muscle contraction. If babies have enough ATP, they will be more active, which means they can develop motorically faster. (17). This is consistent with studies showing that massage therapy for babies improves motor abilities, including the capacity to manage the coordination of fingers, arms, body, and legs. During the stages of baby growth and development, stimulation to do massage is very important. Infants who receive consistent, focused stimulation will grow more quickly than those who do not receive any encouragement or stimulation at all.(19).

## CONCLUSIONS

Thus, it can be determined that giving a baby massage at a dose of 10-15 minutes with a frequency of 2 times a week for one month can have an impact on weight gain and gross motor skills of babies aged 1-12 months.

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