

## BABY MASSAGE AND BABY GYM TO INCREASE INFANTS GROWTH

## PIJAT BAYI DAN BABY GYM UNTUK MENINGKATKAN PERTUMBUHAN BAYI

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## ABSTRACT

Infancy is a golden period as well as a critical period of growth and development. The number of babies born in 2021 in Indonesia is 4,438,141 people and in the area of Central Java Province 508,062 live births, Semarang City the number of babies born is 22,030 babies. The cause of malnutrition is not only due to lack of consumption of nutrients, but also due to infection or disease. Baby massage can increase growth in babies if done correctly and regularly. The baby gym movement increases muscles and joints so that motor skills increase and will improve body function skills. The purpose of this study was to determine the effectiveness of baby massage and baby gym on the growth of babies aged 3-5 months in South Semarang District, Semarang City. Quasi-experimental research, Pretest-Posttest control group design. The research sample was 32 infants, each group 16 babies. The research sampling technique uses purposive sampling. There is no significant difference in growth before and after treatment between the baby massage and baby gym groups, p-value 0.05, but baby massage is more effective for increasing baby growth compared to baby gym. Baby massage is more effective for increasing baby growth. growth. Baby's parents in increasing baby's growth by doing baby massage more often

Keywords: baby massage; baby gym; growth

## ABSTRAK

Masa bayi adalah masa keemasan sekaligus masa kritis pertumbuhan dan perkembangan. Jumlah bayi lahir tahun 2021 di Indonesia 4.438.141 jiwa dan wilayah Provinsi Jawa Tengah 508.062 bayi lahir hidup, Kota Semarang jumlah bayi lahir 22.030 bayi. Penyebab gizi buruk bukan hanya disebabkan kurangnya konsumsi gizi, namun juga disebabkan karena infeksi atau penyakit. Baby massage dapat meningkatkan pertumbuhan pada bayi jika dilakukan dengan benar dan secara rutin. Gerakan baby gym meningkatkan otot dan persendian sehingga motorik meningkat dan akan meningkatkan keterampilan fungsi tubuh, Tujuan Penelitian ini adalah mengetahui efektifitas baby massage dan baby gym terhadap pertumbuhan bayi umur 3-5 bulan di Kecamatan Semarang Selatan, Kota Semarang. Penelitian quasi experiment, Pretest-Posttest control group design. Sampel penelitian sebanyak 32 bayi, masing-masing kelompok. 16 bayi. Teknik Sampling penelitian menggunakan purposive sampling. Hasil Penelitian: tidak terdapat perbedaan yang signifikan pertumbuhan sebelum dan sesudah perlakuan antara kelompok baby massage dan baby gym, p-value 0,05, tetapi baby massage lebih efektif untuk meningkatkan pertumbuhan bayi dibandingkan dengan baby gym Simpulan: Baby massage lebih efektif untuk meningkatkan pertumbuhan. Orang tua bayi dalam meningkatkan pertumbuhan bayi dengan lebih sering melakukan baby massage

Kata kunci : baby massage; baby gym; pertumbuhan

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## INTRODUCTION

Infancy is a golden period as well as a critical period of growth and development, especially in the golden period of 1000 days of birth. Critical points that must be considered during the first 1000 days of life are 280 days in the womb, 0-6 months 180 days, 6-8 months 60 days, 8-12 months 120 days, and 12-24 months 360 days. During this period, the brain grows very rapidly, which supports the entire process of child growth perfectly. This period is important because malnutrition in the golden period cannot be corrected in later life. The achievement of optimal growth and development is the result of the interaction of various interrelated factors, namely genetic, environmental and behavioral factors, as well as useful stimuli. The behavior of parents in providing nutrition to children is very influential in the growth and development of children. Nutrition is of course the most influential and can be seen in the measurement of body weight. Optimal nutritional status in infants in the first two years of life is one of the determinants of the quality of resources in the community so proper handling at the beginning of growth will prevent nutritional disorders that can appear as adults (Indonesian Health Profile, Ministry of Health, 2021).

The number of babies born in 2021 in Indonesia is 4,438,141 people and the area of Central Java Province is 508,062 babies born alive. For the Semarang City area, the number of babies born was 22,030 babies. (Central Java health profile, 2021). The infant mortality rate from 0-11 months in 2021 in Indonesia is 25,256 deaths, while in In Central Java the infant mortality rate is 7.9/1000 live births, Semarang City is 6.04/1000 live births. The percentage of children under five who are monitored for their growth and development in 2021 is 69.6%, while the strategic plan target is 70%. The coverage target was not achieved at the age of less than five years (toddlers) whose growth and development were monitored as a result of the COVID-19 pandemic.

During the pandemic, growth and development monitoring carried out at the Integrated Service Post was stopped according to the level of the COVID-19 pandemic situation. Central Java Province in implementing monitoring the growth and development of children under five did not meet the target, only 65% was achieved.

The number of children under five who were followed up with growth and development checks through the Stimulation of Early Detection and Intervention on Child Growth and Development in 2021 in Indonesia was 57.6%, while in Central Java it was 54.1%. Infants weigh 0-23 months (under two years) in Indonesia with the criteria of very less by 1.2%, underweight by 5.2%, while in Central Java the weight is very less by 1.3% and underweight by 6.3% higher than the national average. The criteria for very underweight children under five in Indonesia are 1.2%, and the criteria for underweight are 6.1%, while in Central Java, the weight is very low at 1.2% and the underweight is 7.6%. Malnutrition in children under five based on the Body Height index by Age includes very short and short categories. National level data (Indonesia) for 2021 under two years (0 -23 months) in the very short category of 2.7%, short at 6.5%, while in Central Java under two years the very short category is 2.9% and short by 8.1%. The category under five years (0 – 59 months) at the national level is very short at 2.5% and short at 7.0%, while in Central Java the very short category is 2.6% and short is 8.7%. The data on short toddlers in the city of Semarang is 3.1% (1,367 of 44,058 children under five). The percentage of nutrition in Indonesia is based on the Body Weight Index according to Height (BB/TB) at the age of 0-23 months with the category of poor nutrition at 1% and undernutrition at 3.9%, while in Central Java it is 1.1% and undernutrition by 5%. While at the age of 0-59 months in Indonesia the category of malnutrition is 0.9% and undernourished is 4%, in Central Java, it is 1.1% and undernourished is 5.3% (Indonesian Health Profile, 2021). Malnutrition cases in Semarang City were 3.25% (1,434), and 29 cases of malnutrition. (Semarang City Health Profile 2021)

Efforts made in preventing and handling nutritional problems include early initiation of breastfeeding, exclusive breastfeeding, weighing toddlers, giving vitamin A capsules at the age of 6 – 59 months, giving blood-added tablets to adolescent girls, giving additional food to pregnant women with low-calorie energy and undernourished children under five. (Indonesia Health Profile 2021) Prevention and treatment of nutritional problems, growth, and development

can also be done with stimulation through baby massage which is beneficial for the baby's health. Massage can stimulate the vagus nerve, where this nerve increases intestinal peristalsis so that gastric emptying increases thereby stimulating the baby's appetite. On the other hand, massage also improves blood circulation and increases cell metabolism, from this series the baby's weight will increase. (R Utami, 2013)

Research conducted on premature babies who were massaged 3 x 10 minutes for 10 days, their weight gain was 20 %-47% and in term infants aged 1-3 months massaged 15 minutes, twice a week for six weeks, the weight gain was better than those who were not massaged (4\_Utami R, Pedoman Pijat Bayi.Pdf, n.d.) The difference in the study of infants in the massaged group was 763.66 grams (18.125%) and the average weight gain of infants in the non-massaged group was 623.33 grams (14.51%). (Sugiharti et al.,2014).

The cause of malnutrition is not only due to a lack of nutritional consumption, but can also be caused by infection or disease. There are 1,367 stunting toddlers in Semarang City in 2021 out of 44,058 toddlers with a prevalence of 3.1%. South Semarang District, 130 stunting cases from 1,994 toddlers, North Semarang District 260 stunting cases from 4,048 toddlers, Central Semarang District 100 stunting cases from 1625 toddlers resocialization and promotion in Posyandu through cadres both online and offline, fulfillment of anthropometric facilities at Posyandu, increasing the ability of cadres in monitoring growth.

Stimulation in infants and toddlers is also carried out using the Stimulation of Early Detection and Intervention of Growth and Development and Mother and Child Health guidebooks, stimulation using baby massage and the baby gym has not been developed in the area. Based on interviews with 10 mothers of children under five in the District of South Semarang, baby massage was carried out on newborns until the umbilical cord was released and on sick babies carried out by traditional birth attendants, in addition to the efforts made to malnourished toddlers were by providing additional food and classes. toddlers, while the efforts made for toddlers aged 3-5 months are providing health education about exclusive breastfeeding. Stimulation efforts with massage and baby gym

have never been done. Baby massage and baby gym are stimulation as an effort to increase growth. Treatment Baby massage can increase growth in babies if done correctly and regularly.

Movements Baby gym increase muscles and joints so that motor skills increase and will improve body function skills, baby gym are more for increasing muscles and joints Based on this description, the researchers are interested in conducting a different study for baby massage and baby gym entitled "the effectiveness of baby massage and baby gym on the growth of babies aged 3-5 months in South Semarang District, Semarang City".

## METHODS

The study was conducted in the South Semarang District, Semarang City, and was carried out from May to September 2022. This research is quantitative research with the type of research used in the Quasi Experiment with a research design using non-randomized pre and post-tests with a control group design consisting of the two groups.

The sampling method is purposive sampling. The population in this study were infants aged 3-5 months in the district of South Semarang, amounting to 32 infants. The sample of this study was 16 infants in each group. treatment baby massage was 3 times a week for 2 weeks, while the baby gym was carried out 1 time a day for 2 weeks. Determination of the sample in this study were members of the population who met the inclusion and exclusion criteria of the research sample. The inclusion sample is healthy baby age 3 – 5 month, babies who get breast milk. The exclusion sample is low birth weight babies, sick baby, and disabled baby. Before doing research, first obtained research permission and provided informed consent to the respondents.

The instruments used in this study were respondent identity sheets, meters, calibrated scales, pretest and posttest for treatment, and SOPs for baby massage and baby gym. The data processing uses a computer with an SPSS program for data analysis.

## RESULTS

Table 1 shows the results of the median weight pre-5800 and the median post-weight 6700. The median pre-TB was 60.0 and the median pre-TB was 62.0. Median Lila pre-13 and median Lila post 14.00.

Table 1 Distribution of Growth before and after Baby massage, n=16

Variable	Min	Max	Mean	Median	SD
Weight pre	5500	6900	5914,2	5800	494,7
Height pre	58,0	61,0	59,38	60,0	1,25
Upper Arm Circumference pre	12,0	14,0	13,28	13,0	0,75
Weigh post	6300	7500	6685,7	6700	405,9
Height post	60,0	64,0	61,57	62,0	1,61
Upper Arm Circumference post	13,0	15,0	14,21	14,0	0,69

Table 2 shows the results of the median pre-6300 weight and post-7000 median weight. The median pre-height was 60.0 and the median pre-height was 62.0. Median upper arm circumference pre-14 and median upper arm circumference post 14.5.

Table 2 Distribution of Growth Before and after Baby gym, n=16

Variable	Min	Max	Mean	Median	SD
Weight pre	5500	1010	6800	6300	1580
Height pre	54,0	69,0	59,28	60,0	5,25
Upper Arm Circumference pre	13,0	16,0	14,28	14,0	1,11
Weigh post	5800	10800	7428,5	7000	1616,2
Height post	57,0	72,0	62,42	62,0	5,19
Upper Arm Circumference post	14,0	17,0	15,21	14,5	1,31

Table 3 shows the results of the average body weight pre 5914.2 and the average post weight 6685.7 with a difference of 771.4. The results of the average pre-arm circumference were 13.28 and the average post-arm circumference 14.21 with a difference of 0.93.

The P-value of pre and post-weight 0.00 and upper arm circumference pre and post-baby massage 0.00 so that there is an effect of baby massage on body weight and upper Upper Arm Circumference

Table 3. Paired T-test of differences in body weight, and upper arm circumference before and after baby massage

Variabel	Mean	p value
Weight pre	5914,2	0.000
Weight post	6685,7	
Upper Arm Circumference pre	13,28	0.000
Upper Arm Circumference po:	14,21	

Table 4 shows the average result of pre-TB is 59.2 and the average post-TB is 61.5 with a difference of 2.286, p-value 0.014 so there is a difference in height before and after baby massage

Table 4 tests Wilcoxon differences in height before and after baby massage

Variabel	Mean	(p-value)
Height pre	59,2	0,014
Height post	61,5	

Table 5 shows the results of the average pre-height 59.28 and the average post TB 62.42 with a difference of 3.14. The average result of upper arm circumference pre 14.28 and average upper arm circumference post 15.21 with a difference of 0.92. The result of the pre-post height p-value is 0.018 so there is an effect of baby massage on height. The p-value of the pre-post upper arm circumference was 0.014 so there was an effect of the baby gym on the Upper Arm Circumference

Table 5 Paired T-test test for differences in height growth and upper arm circumference before and after baby gym

Variable	Mean	(p-value)
Height pre	59,28	0,018
Height post	62,42	
Upper Arm Circumference pre	14,28	0,004
Upper Arm Circumference post	15,21	

Table 6 shows the average results of pre and post-weight 680.0 and the average post-weight 7428.5 with a difference of 628.5. The p-value

results on pre and post-weight are 0.018 so there is no effect of the baby gym on body weight

Table 6 Wilcoxon differences in weight growth before and after the baby gym

Variable	Mean	(p-value)
Weight pre	6800,0	0,308
Weight post	7428,5	

Table 7 can be seen that there is no significant difference for the difference in growth before and after treatment between the baby massage and baby gym because a p-value of 0.05 means  $H_a$  is rejected  $H_o$  is accepted there is no significant difference between baby massage, and baby gym in the growth of infants aged 3-5 months in South Semarang district, but seen from the results of the mean rank above the baby massage more effective in increasing the growth of the baby's body weight and Lila compared to the baby gym, and the baby gym is more effective than the baby massage on TB.

Table 7 the effectiveness of baby massage and baby gym on the growth of infants aged 3-5 months

Growth (3-5bl)		Mean Rank	p-value
Baby massage	Weight	9,29	0,100
Baby gym	Weight	5,71	
Baby massage	Height	5,86	0,100
Baby gym	Height	9,14	
Baby massage	Upper Arm Circumference	8,07	0,545
Baby gym	Upper Arm Circumference	6,93	

## DISCUSSION

### Growth before and after baby massage

Treatment baby massage there was an increase in growth with the previous average value at BB 5914.2 to 66685.2; in the previous TB 59.38 to 61.57; in the previous Lila 13.28 to 14.21. Based on the research that has been done, the results obtained are 11 respondents according to the KBM and 5 respondents exceeding the KBM. The results of measuring the body length of 11 infants were not

by the theory of increasing body length, which was 2.5 cm per month, while the length of the baby's body increased by 2 cm, there were 5 babies exceeding the theory of increasing body length from the total number of respondents.

The results of the measurement of the upper arm circumference showed that all infants experienced an increase of 1 cm each. According to the information from the baby's mother, after the baby's massage, the baby is hungry faster so he often feeds, and sleeps more soundly. Babies will experience an increase in body length or height of about 2.5 cm every month. This addition will gradually decrease until the age of 9 years, only about 5 cm/year and this addition will stop at the age of 18-20 years (Eka & Sari, 2014). Upper arm circumference reflects the growth of fat and muscle tissue that is not affected much by the state of body fluids than body weight. Upper arm circumference can be used to assess nutritional status or growth at preschool age (Desi Ermita Amru, 2022) The results of research conducted by Ade Nurhasanah that respondents who were massaged experienced weight gain and body length (Ade Nur Hasanah, 2022), as well as Yunianti's research that infant massage affects the weight of infants aged 1-6 months (Yunianti, 2018)

### Growth before and after the baby gym

The results of the research that has been carried out show that 5 respondents who experienced weight gain did not match the minimum weight gain because the baby gym increased muscles and joints so that motor skills increased and would improve body function skills so that it was less than optimal to increase body weight. , 9 respondents exceed the increase in minimum height growth because the baby gym has benefits, namely strengthening joint muscles, increasing motor development, and increasing flexibility or body flexibility. A total of 3 respondents whose slight increase was due to the baby gym was more to increase muscles and joints (Eka Falentina., 2019)

Based on the research that has been done, it was found that 7 babies whose increase was the least due to the baby gym movement were more to increase muscles and joints. (Nur et al., 2020). Early growth of a child experiences fairly rapid and significant growth. The weight growth of infants aged 0-6 months has increased by 150-210 grams/week. The baby will weigh twice the weight. Based on the guideline for weight growth aged 3-5 months is 4500-6500 grams (4\_Utami R, Pedomani Pijat Bayi.Pdf, n.d.)

#### Differences in growth before and after baby massage

The results of the research have been processed using the paired t-test, namely the difference test of 2 variables (BB, LILA) with a p-value of 0.05 and a different test of 2 variables (Height) using the Wilcoxon with a p-value of 0.05, which means  $H_a$  is accepted and  $H_o$  is rejected, meaning there is a significant difference in growth in body weight, height, and upper arm circumference. before and after baby massage for infants aged 3-5 months in the South Semarang District, Semarang City.

From the results of these studies, it can be seen that baby massage affects increasing weight, height, and upper arm circumference. Treatment Baby massage can increase growth in babies if done correctly and regularly. The same study conducted by Yusari Asih showed an increase in body weight, body length, and head circumference of babies who received baby massages. (Asih et al., 2019).

Babies after a baby massage become hungry faster so they feed often, sleep better, and sleep activities will affect the mechanism of food absorption. massaged babies experience an increase in vagus nerve tone which causes an increase in the levels of gastrin and insulin absorption enzymes. Thus, the absorption of food will be better, so it will affect the baby's weight gain. Based on the guideline for weight growth for ages 3-5 months is 4500-6500 grams. (R Utami, 2013) This study is in line with Anisya Selviana's research that there is an effect of baby massage on the growth of infants 0-6 months in weight and body length, that the frequencies of breastfeeding in infants who are given baby massage interventions is more frequent

than before baby massage. (Selvia et al., 2021) as well as Yunda's research that baby massage affects the growth of infants aged 0-12 months (Yunda, 2018)

Research conducted by Novy Rumini hopes that baby massage increases body weight in the group with baby massage there is a weight gain of 1250 grams and the No baby massage was done there was an increase of 570 grams, so there was an effect of baby massage on weight gain (Novi Rumini et al., 2019)

#### Differences in growth before and after the baby gym

The results of this study can be seen that the baby gym has a significant effect on the increase in TB and LILA with a p-value of 0.05. But op-value BB there is no significant effect with a p-value of 0.05. Baby gym is an exercise to help stimulate the growth and development of the baby's nervous and motor systems optimally. Researchers treated gym to the respondents 1 time a day for 2 weeks within 10 minutes.

The results of Eka Falentina Tarigan's research with the difference in the effect of the baby gym and baby spa in increasing growth and development, with the results for body weight with a p-value of 0.716 meaning no there is an effect of the baby gym in increasing body weight, but on body length with p value 0.014 so that there is an effect of the baby gym on body length.

Treatment Baby gym was carried out every day for 2 weeks. Movements Baby gym increase muscles and joints so that motor skills increase and will improve body function skills, baby gym are more for increasing muscles and joints (Eka Falentina Tarigan, 2019)

#### Effectiveness of baby massage and baby gym on growth

Based on research that has been done, it can be seen that there is no significant difference in growth before and after treatment between the baby massage and baby gym because a p-value of 0.05 means  $H_a$  is rejected,  $H_o$  is accepted. From the results that have been carried out by researchers in the baby massage, the average increase is more in body weight and upper arm circumference. Meanwhile, in the baby gym, the average increase was more in height. Baby



massage is more effective than baby gyms. Because the baby gym is effective in increasing height, what is meant by growth in this study is an increase in BB, TB, and LILA. treatment baby massage carried out by researchers was 3 times a week for 2 weeks within 15 minutes, while the baby gym was 1 time a day for 2 weeks within 10 minutes.

Research conducted by Titiek Idayati showed that the average value of body weight before the baby was carried out massage is 5828.47 grams and after the baby massage is 5952.4 grams with a p-value of 0.006 so there is an effect of baby massage on babies in the village of Kedung Sumur, Krembung, Sidoarjo, the benefits of baby massage are to increase the baby's weight and baby massage can cause positive biochemical and physical effects.

Baby massage causes an increase in vagus nerve activity and will stimulate digestive hormones including insulin and gastrin. Insulin plays a role in metabolism, causing an increase in carbohydrate metabolism, glycogen storage, fatty acid synthesis, amino acid uptake, and protein synthesis. So, insulin is an important anabolic hormone that acts on various tissues including the liver, fat, and muscle. Increased insulin and gastrin can stimulate digestive function so that the absorption of food juices becomes better. Better absorption of food will cause the baby to be hungry faster and therefore the baby will suckle more often (Idayanti et al., 2018) for body weight with a p-value of 0.716 means that there is no effect of the baby gym in increasing body weight, but on body length with p value 0.014 so that there is an effect of the baby gym on body length. Baby gym is an exercise to help stimulate the growth and development of the baby's nervous and motor systems optimally.

Through the baby gym, the bonding between mother and baby will be stronger. With baby gymnastics we can also find out wrong developments in babies early so that we can take appropriate anticipatory actions so that babies grow normally. The benefits of baby gyms are strengthening joint muscles, increasing motor development, flexibility or body flexibility, coordination, and balance, body resistance, ability

and skills of body functions as well as increasing alertness, strengthening interactions between parents and babies, improving blood circulation and strengthening the heart and increasing the baby's ability to respond to stimuli from the environment (Eka Falentina Tarigan, 2019).

## CONCLUSIONS

There is a significant difference statistically between growth before and after baby massage with a p-value of 0.05. There is a statistically significant difference in the growth of TB and LILA before and after the baby gym with a p-value of 0.05. However, there was no statistically significant difference in BB before and after the baby gym with a p-value of 0.05. There is no significant difference between baby massage and baby gym in the growth of babies aged 3-5 months, but judging from the mean rank results, baby massage treatment is more effective in increasing growth in body weight and upper arm circumference compared to the baby gym, and the.

Baby gym is more effective than Baby massage in increasing height. Baby massage is more effective in increasing growth compared to baby gym. Further research can be conducted for more movement such as baby swim.

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