Healthy Tadulako Journal (Jurnal Kesehatan Tadulako)
Vol. 11 No. 1, January 2025
P-ISSN : 2407-8441/e-ISSN : 2502-0749

Original Research Paper

The Effect of Massage on Weight Gain in Infants in the Working Area of Puskesmas Kandis

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Page : 37-44

Keywords:
Massage, Weight Loss, Baby

Article History:
Received: 2024-07-21
Revised: 2025-01-05
Accepted: 2025-01-28

Published by:
Tadulako University,
Managed by Faculty of Medicine.
Email: healthytadulako@gmail.com
Phone (WA): +6285242303103
Address:
Jalan Soekarno Hatta Km. 9. City of Palu, Central Sulawesi, Indonesia

ABSTRACT

Background: Infant weight is a critical indicator of nutritional status and growth. Factors influencing infant weight include breastfeeding frequency and duration. Massage has been identified as a potential intervention to improve infant weight gain. **Objective:** This study aimed to examine the effect of infant massage on weight gain among infants aged 0 to 12 months in the working area of Puskesmas Kandis. **Methods:** A quasi-experimental design with a pretest-posttest approach was employed. The population consisted of 33 infants, with 30 infants meeting the inclusion criteria. Primary data were collected through direct observation, while secondary data were obtained from Puskesmas health records. Data were analyzed using the Wilcoxon test in SPSS. **Results:** The findings showed a significant increase in infant weight after the massage intervention, with a mean weight gain of 0.2977%. Statistical analysis revealed a p-value of 0.000, indicating a significant difference in weight before and after the intervention. A strong correlation was observed between massage and weight gain, with a correlation coefficient of 0.993. **Conclusion:** Infant massage has a significant positive effect on weight gain. Further research is recommended to explore other factors influencing infant weight gain.

Introduction

Baby's weight is a parameter used to determine the nutritional status of the infant, which in turn helps assess whether the nutritional intake received by the baby is sufficient during the growth period[1–3]. One factor causing malnutrition in infants is a low frequency of breastfeeding, as it is stated that both the frequency and duration of breastfeeding affect the baby's weight[4,5]. Considering that the nutritional intake received by the baby significantly influences the infant's growth and development until adulthood, inadequate nutrient intake can impair both the physical growth and intellectual development of toddlers, ultimately leading to a lost generation[6]. This has a broad impact, causing the country to lose quality human resources (HR). Various methods are implemented to increase baby weight, one of which is through massage[7,8].

Pijat bayi ialah sebuah bentuk terapi dengan tipe rangsangan yang bertujuan untuk memberikan sentuhan yang mana dapat memperlancar sirkulasi darah pada bayi, mempebaiki posisi otot sehingga terjadi peningkatan fungsi organ yang ada pada tubuh bayi[9–11]. Penelitian terbaru yang dilakukan oleh Niky Wahyuning Gusti, yang mana melakukan ekperimen tersebut pada bayi berumur 1 sampai 3 bulan yang mana hasil penelitiannya menunjukkan hasil penambahan berat badan sebelum dan sesudah bayi diberikan perlakuan pijat[12].

Baby massage is a form of therapy involving stimulation through touch aimed at improving blood circulation in the infant, correcting muscle position, and thereby enhancing the function of the organs in the baby's body[9–11]. A recent study conducted by

Niky Wahyuning Gusti involved an experiment on babies aged 1 to 3 months, and the results showed an increase in weight before and after the babies were given massage treatment[12].

Based on the researcher's observations in the working area of Kandis Health Center, there were cases of low infant weight that need to be addressed seriously. Furthermore, based on previous studies conducted by other researchers, this background motivated the researcher to conduct a study to examine the effect of massage therapy on weight gain in infants aged 0 to 12 months in the working area of Kandis Health Center.

This study provides a new contribution by highlighting the effectiveness of infant massage intervention in increasing weight gain in babies using a quasi-experimental method and a pretest-posttest design on infants aged 0 to 12 months an approach rarely used in previous studies. Additionally, this research employs comprehensive statistical analysis to provide empirical evidence on the effectiveness of infant massage in promoting weight gain. This study will offer important contributions to efforts in improving infant nutrition and provide a stronger scientific basis for infant health interventions in the local community.

This study aims to determine the effect of massage on the weight gain of infants in the working area of Kandis Health Center. The research question is: what is the effect of massage on infant weight gain? By testing the hypothesis in this study, it is expected that the research will provide a clearer understanding of the effects of infant massage on the physical growth of babies.

Materials and Methods

Research Design

This study used a quasi-experimental design with a pretest-posttest approach. The research was conducted in the working area of Kandis Health Center from December 2022 to January 2023. This design was intended to examine the effect of infant massage on the increase in infant weight.

Sample

The study population consisted of 33 infants aged 0 to 12 months who were in the working area of the Kandis Health Center. The sampling technique used was purposive sampling, selecting samples of infants aged 2 to 12 months who experienced low body weight issues. Samples that met the inclusion criteria became the subjects of the study.

Data Collection Technique

Data collection was conducted through two types of data: primary and secondary data. Primary data were obtained through direct observation, where the researcher acted as an observer to collect data on the babies' weight and other relevant information from the participants' families. Meanwhile, secondary data were collected by retrieving information related to babies and toddlers experiencing underweight issues in the working area of Puskesmas Kandis through existing health records.

Data Analysis Techniques

The data obtained will be analyzed using bivariate analysis to measure the effect size of the treatment from pretest to posttest on the increase in infant weight. The Wilcoxon test will be used with the SPSS application to examine whether there is an effect of the treatment on the infant's weight. The results will be interpreted based on the p-value, where if the p-value < 0.05, it can be concluded that there is a significant effect of the treatment on the increase in infant weight.

Etical Consideration

This study was conducted with due regard to applicable research ethics principles, although formal approval from a research ethics committee was not obtained. The researchers ensured that the research procedures were

carried out while maintaining the confidentiality and security of participant data. All participants involved in this study were clearly informed about the purpose of the research and the procedures to be undertaken, and gave their voluntary consent (informed consent). Furthermore, the data collected from participants will be kept confidential and used solely for the purposes of this research.

Result

The research results show that general respondent data were obtained through a screening process based on predetermined inclusion and exclusion criteria. The population of infants in the working area of Puskesmas Kandis was recorded at 33 infants, with the study sample determined using the Slovin formula, resulting in 30 infants as respondents who met the inclusion and exclusion criteria. Table 1 shows the age distribution characteristics of the respondents, with the majority aged 3 months (36.7%), followed by 2 and 4 months (each 23.3%), 5 months (13.3%), and 6 months (3.3%). According to the Ministry of Health of the Republic of Indonesia, the subjects of this study fall into the category of infants or toddlers, namely ages 0–5 years.

Table 1. Characteristics of Respondents Based on Age and Gender

Characteristic	Category	Frequency (n)	Percentage (%)
Age	2 months	7	23.3
	3 months	11	36.7
	4 months	7	23.3
	5 months	4	13.3
	6 months	1	3.3
Gender	Male	18	60.0
	Female	12	40.0
Total		30	100.0

Source: *Primary Data, 2023*

The distribution of infant body weight before and after the treatment is presented in Table 2. Before the treatment, the majority of infants had a body weight of 3.0–3.9 kg (36.7%) and 4.0–4.9 kg (26.7%), whereas after the treatment there was an increase in the 5.0–5.9 kg category to 26.7%. The results of the normality test using the Kolmogorov-Smirnov test (Table 3) showed that the distribution data of infant body weight before and after the treatment had a significance value (Sig.) greater than 0.05, indicating that the data were normally distributed.

Table 2. Distribution of Infant Weight Before and After Intervention

Weight Category (Kg)	Before Intervention		After Intervention	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
2.0–2.9	2	6.7	0	0.0
3.0–3.9	11	36.7	11	36.7
4.0–4.9	8	26.7	8	26.7
5.0–5.9	6	23.3	8	26.7
6.0–6.9	2	6.7	2	6.7
7.0–7.9	1	3.3	1	3.3
8.0–8.9	0	0.0	0	0.0
Total	30	100.0	30	100.0

Source: *Primary Data, 2023*

Table 4 shows the results of a paired sample analysis, where the average infant body weight increased from 4.3483 kg before treatment to 4.6450 kg after treatment. The paired t-test revealed a mean weight change of 0.29667 kg. With a significance value of 0.000 ($p < 0.05$), the results indicate a statistically significant difference in infant body weight before and after the intervention. These findings suggest that the treatment had a meaningful impact on increasing infant body weight and may serve as an effective approach to supporting infant growth.

Table 3. Normality Test Results Using Kolmogorov-Smirnov Test

Variable	Kolmogorov-Smirnov Statistic	N	Sig. (p-value)
Weight Before Intervention	0.127	30	0.200
Weight After Intervention	0.140	30	0.140

Source: *Primary Data, 2023*

Discussion

Infant Body Weight Before Treatment

Body weight is the result of the cumulative increase or decrease of all tissues in the body, including bones, muscles, fat, body fluids, and others[14,15]. Body weight is also used as a primary indicator for diagnosing the nutritional status and growth of infants[16,17]. If a newborn's weight is below 2,500 grams (2.5 kg), the infant is categorized as having low birth weight. During infancy to toddlerhood, body weight serves as a reference for monitoring physical growth, through which one can determine the infant's nutritional status[18]. Table 2 presents the respondents' body weight data before the treatment (pre-intervention), showing that their weights ranged from 2.0 to 7.9 kg.

Table 4. Descriptive and Paired Sample t-Test Results

Parameter	Mean	N	Std. Deviation	Std. Error Mean	t	Df	Sig. (2-tailed)
Weight Before Intervention	4.3483	30	1.08393	0.19790			
Weight After Intervention	4.6450	30	1.12873	0.20608	11.803	29	0.000
Mean Difference	0.29667						

Source: *Primary Data, 2023*

The results of the study in Table 2 indicate that the respondents' body weights can be considered suboptimal when referring to the Indonesian Ministry of Health Regulation No. 2 of 2020 concerning child anthropometric standards. It is stated that the average body weight for boys aged 0 to 6 months, respectively, is 2.9; 3.9; 4.9; 5.7; 6.2; 6.7; and 7.9 kg. Meanwhile, the standard body weights for girls are 2.8; 3.6; 4.5; 5.2; 5.7; 6.1; and 6.5 kg[19].

The occurrence of infant body weight being within normal limits is influenced by two main factors: internal and external factors[20,21]. Factors that affect infant growth and development include genetics, age and sex, healthcare, vulnerability to illness, internal and external environmental factors, physical and psychosocial conditions, as well as nutritional intake [22].

As previously mentioned, nutritional intake is a crucial factor influencing an infant's weight gain. For babies under 6 months of age, nutrition is obtained from breast milk, whereas for those aged 6 months and above, nutrition comes from the food provided by the infant's family[23]. To address this issue and to maintain or even increase the infant's weight to a normal level, an intervention such as baby massage can be implemented.

Increase in Infant Body Weight

An increase in infant body weight occurred after the intervention in the form of massage was administered. The results of the intervention, as presented in Table 4, show the infant body weight after the researcher provided the treatment (post-intervention). It can be seen from the table that infants who initially had a body weight in the range of 2.0–2.9 kg experienced an increase in weight after the intervention. In other words, the researcher assumes that after the massage intervention was conducted on the infants, there was an effect of the massage that led to a difference in body weight compared to before.

These research findings are supported by previous studies that demonstrated the effect of massage interventions on increasing the body weight of infants aged 2 to 6 months[24]. Moreover, to enhance the effectiveness of stunting prevention efforts, it is important to strengthen the health and nutrition systems, educate the community about stunting, ensure

continuous monitoring and evaluation, promote cross-sector collaboration, increase access to nutrition and health services, conduct ongoing research and development, apply evidence-based approaches including infant massage, address stunting-related causes, advocate for supportive policies, and provide continuous counseling for health practitioners and field workers[25]. Infant massage serves as a health promotion effort. One of the key factors in preventing stunting is health promotion activities[26].

The Effect of Massage on Infant Weight Gain

The data obtained during the data collection process were tested for normality. Table 5 presents the results of statistical analysis using SPSS. The purpose of conducting this statistical analysis was to assess the normality of the data obtained. The normality test in this study used the Kolmogorov-Smirnov test. The data shown in the table indicate a significance value before the intervention of 0.2 and a significance value after the intervention of 0.14, according to the Kolmogorov-Smirnov test. The Shapiro-Wilk test showed a significance value of 0.130 before the intervention and 0.137 after the intervention.

Based on these results, the researcher confirms that the data used in this study are normally distributed. This is evident from the significance values in both the Kolmogorov-Smirnov and Shapiro-Wilk tables, which are greater than the α value of 0.05. This is consistent with statements from other sources, which explain that if the result of the analysis is greater than α = 0.05, it can be concluded that the sample data come from a population with a normal distribution[27].

After confirming that all the data used in this study are normally distributed, the researcher conducted hypothesis testing using the paired sample t-test available in the IBM SPSS-22 application. The analysis results shown in Table 6 indicate a statistical value of 4.3484 before the intervention and an increased statistical value of 4.6450 after the intervention. These data indicate that after the intervention, baby massage had an effect on increasing body weight by 0.2977%.

The strength of the relationship (correlation) of a treatment can be seen in the correlation test shown in Table 7, which indicates a correlation value of 0.993. The use of correlation analysis is a statistical technique aimed at determining the magnitude that reflects the strength of the relationship between variables. This value indicates that the "r" value in this study uses the Pearson product-moment correlation, which in the table is close to 1, meaning it is quite strong for linear correlation.

Meanwhile, the significance value in the table is 0.000, which means the significance value (sig) is less than α = 0.05. Based on the decision rule, the researcher concludes that there is a relationship between the independent variable and the dependent variable in this study. If there is a linear relationship between variables, the degree of the relationship between the variables increases as well. If the correlation test value is not equal to 0.0, it can be said that there is no indication of a relationship between variables (Safitri, 2016). The data in Table 6 shows a significance value of 0.000, indicating that sig < α = 0.05, thus confirming the existence of a relationship between the variables.

Next, Table 7 presents data indicating whether there is a difference in baby's weight before and after the intervention. The table shows a significance value (2-tailed) of 0.000. According to the decision rule, if the significance value (2-tailed) > α = 0.05, then H0 is accepted and Ha is rejected; however, if the significance value (2-tailed) < α = 0.05, then Ha is accepted and H0 is rejected. The data in the table shows a significance value (2-tailed) of 0.000, which is less than α = 0.05, so the researcher concludes that there is a significant

difference in baby's weight after the intervention was given.

Conclusion

Based on the results of the study and previous discussions, it can be concluded that there is a relationship between the increase in baby's weight and the intervention in the form of massage. This is consistent with the statistical analysis results, where the correlation value is 0.993 and the significance value is $0.000 < \alpha = 0.05$. The administration of massage has an effect on increasing the baby's weight, as supported by the statistical analysis with a Sig (2-tailed) value of 0.000.

It is recommended that baby massage interventions be routinely implemented by healthcare workers and parents in the Puskesmas Kandis area to help improve the nutritional status and weight of infants. Training and education on proper massage techniques should be provided to parents and caregivers to ensure its effectiveness. Furthermore, further research with a larger and more diverse sample is needed to confirm these findings and explore other potentially influencing variables, such as the frequency and duration of massages as well as the overall health condition of the babies. The integration of baby massage as part of child health programs can also be considered by relevant parties to improve the quality of human resources in the future.

Acknowledgement

Thank you to the Head of Puskesmas Kandis for granting permission for this research.

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