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THE INFLUENCE OF MORINGA LEAVES CONSUMPTION ON INFANTS WITH LOW BIRTH WEIGHT BELOW THE GREEN LINE

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ABSTRAK PENGARUH KONSUMSI DAUN KELOR TERHADAP BAYI DENGAN BERAT BADAN LAHIR RENDAH DI BAWAH GARIS HIJAU

Latar Belakang: Berat badan bayi harus diperhatikan secara cermat oleh ibu untuk mengoptimalkan pertumbuhannya. Berdasarkan data Puskesmas Bandar Jaya, pada tahun 2019 terdapat 59 kasus balita dengan berat badan kurang, pada tahun 2020 sebanyak 63 kasus, dan pada tahun 2021 meningkat menjadi 87 kasus. Asupan gizi yang dapat meningkatkan gizi balita dengan berat badan kurang antara lain dengan mengonsumsi daun kelor. Daun kelor mengandung protein, vitamin, dan mineral yang berpotensi menjadi bahan terapi dan suplemen bagi anak gizi buruk.

Tujuan: Untuk mengetahui pengaruh pemberian sediaan daun kelor terhadap bayi dengan berat badan dibawah garis hijau di wilayah kerja Puskesmas Bandar Jaya Kabupaten Lampung Tengah.

Metode: Penelitian ini merupakan penelitian kuantitatif dengan menggunakan desain quasi eksperimen dengan pendekatan non-equivalent control group. Populasinya terdiri dari seluruh bayi dengan berat badan di bawah garis hijau yang berjumlah 34 orang, dengan jumlah sampel sebanyak 34 responden dengan menggunakan teknik total sampling. Pengumpulan data dilakukan dengan menggunakan kuesioner. Analisis univariat dan bivariat dilakukan dengan menggunakan uji Wilcoxon.

Hasil: Diketahui berat badan bayi sebelum intervensi pada kelompok intervensi adalah 6229,4 gram dan setelah intervensi adalah 6658,8 gram. Sedangkan berat badan bayi sebelum intervensi pada kelompok kontrol adalah 6105,8 gram, dan setelah intervensi adalah 6355,8 gram, dengan selisih berat badan 179,2 gram. Terdapat pengaruh pemberian sediaan daun kelor terhadap bayi dengan berat badan dibawah garis hijau di wilayah pelayanan Puskesmas Bandar Jaya Kabupaten Lampung Tengah (p-value 0,000).

Kesimpulan: Terdapat pengaruh pemberian sediaan daun kelor terhadap bayi dengan berat badan dibawah garis hijau.

Kata Kunci: Berat Badan Bayi, Bawah Garis Hijau, Daun Kelor

ABSTRACT

Background: Infant weight should be carefully considered by mothers to optimize growth. Based on the data from Bandar Jaya Health Center, in 2019, there were 59 cases of underweight toddlers, in 2020, there were 63 cases, and in 2021, it increased to 87 cases. Nutritional intake that can enhance the nutrition of underweight toddlers includes consuming moringa leaves. Moringa leaves contain protein, vitamins, and minerals that have potential therapeutic and supplementary food for malnourished children.

Objective: To determine the influence of moringa leaves preparation on infants with weight below the green line in the working area of bandar jaya health center, central lampung regency.

Method: This is a quantitative study using a quasi-experimental design with a non-equivalent control group approach. The population consisted of all infants with weight below the green line, totaling 34 individuals, with a sample size of 34 respondents using a total sampling technique. Data collection was done using questionnaires. Univariate and bivariate analysis were performed using the Wilcoxon test.

Results: It was found that the weight of infants before intervention in the intervention group was 6229.4 grams and after intervention was 6658.8 grams. Meanwhile, the weight of infants before intervention in the control group was 6105.8 grams, and after intervention was 6355.8 grams, with a weight difference of 179.2 grams. There is an influence of moringa leaves preparation on infants with weight below the green line in the service area of Bandar Jaya Health Center, Central Lampung Regency (p-value 0.000).

Conclusion: There is an influence of moringa leaves preparation on infants with weight below the green line.

Keywords: Infant Weight, Below The Green Line,Moringa Leaves.

INTRODUCTION

The growth and development of children experience rapid improvement during the early stages of life, specifically from ages 0 to 5, often referred to as the "Golden Age" phase (Yunita & Surayana, 2021). This phase is crucial as the unique attributes gained during this period cannot be replicated, making it a determining period for the child's future life. The growth and development process a child goes through can be used to assess their quality (Fikawati, 2015).

Achieving good nutritional status requires the body to receive proper nutritional intake. One significant factor that supports infant growth and development is the consumption of appropriate nutritional intake. Inadequate nutritional intake or deficiency can have long-term effects on the growth and development of infants and toddlers, making it difficult to rectify later. On the contrary, if the body receives adequate nutritional intake, it will contribute to optimal physical growth, brain development, work capability, and overall health (Ria Julita Sari, 2022).

The consequences of insufficient nutritional needs for children include having an inadequate immune system, making them susceptible to diseases from their surroundings. Additionally, it can lead to stunted height and weight growth, impacting the child's cognitive abilities as an adult (Rahmidini, 2020). One common issue in child growth and development is underweight. Underweight is categorized by nutritional status based on Weight for Age (WFA) with a Z-score of <-2 SD (Supariasa, 2016).

One of the government's efforts to enhance human resources and alleviate poverty is by improving the nutrition of children, especially infants and toddlers. Poor nutritional status among infants is a recurring issue within society. Thus, the percentage of malnutrition cases needs to be continually reduced to not exceed 5% (Nurul Aryastuti, 2022).

The percentage of severely underweight infants is 1.2%, while infants with low weight make up 5.2% of the cases. The province with the highest percentage of severely underweight and low weight cases is East Nusa Tenggara, at 2.3%. On the other hand, the lowest percentage is in Bali, at 0.3%. In the province of Lampung, the percentage for severely underweight infants is 0.5%, and for low weight infants, it's 2.7%. When considering malnutrition and undernutrition cases among toddlers, West Papua has the highest prevalence, while Bengkulu has the lowest. In Lampung Province, the percentages are 0.5% for severe malnutrition and 2.7% for undernutrition (Ministry of Health, 2022).

Based on the data on Prevalence of Underweight and Severely Underweight (Underweight) in Toddlers by Regency/City in Lampung Province for the year 2021, the highest occurrence is in Pesisir Barat Regency with a rate of 20%, followed by Central Lampung Regency at 17.3%. The lowest rate is in East Lampung Regency at 10.3% (Lampung Provincial Health Office, 2022).

Based on the data from Central Lampung Regency, in the year 2021, a total of 18,976 toddlers were weighed, out of which 1,307 toddlers experienced undernutrition. The highest incidence occurred in the working area of Wates Health Center with 160 cases, while the lowest occurred in Bumi Nabung and Segala Mider Health Center with 0 cases. Bandar Jaya Health Center had 87 cases (Central Lampung Regency Health Office, 2022). According to the data from Bandar Jaya Health Center, in 2019, there were 59 cases of undernourished toddlers, and in 2020, the cases increased to 63. In 2021, it further increased to 87 cases (Data from RM Bandar Jaya Health Center, 2022). These data highlight the existing issues related to infant and toddler nutrition.

Undernutrition can lead to a decrease in a child's immune system, making them susceptible to infections. If undernutrition is not addressed promptly, it will affect the quality of the next generation. Moreover, long-term effects can include a decrease in Intelligence Quotient (IQ) scores by 10 to 13 points (S. Saribuan, 2019). This can result in reduced cognitive development, sensory integration issues, attention deficits, decreased self-confidence, and a decline in academic performance. A direct cause of undernutrition is insufficient food intake. Research conducted by Rahayu & Nurindahsari (2018) on the impact of giving moringa leaves (kelor) to infants shows that there is an effect of moringa leaves on infant nutritional status. This suggests a potential solution for addressing undernutrition through the supplementation of moringa leaves.

The provision of extra biscuit meals to the control group over a span of 30 days resulted in a weight increase of 0.25 kilograms in undernourished infants. Conversely, providing a combined dish with moringa leaves (kelor) to the treatment group led to a weight increase of 0.71 kilograms in undernourished infants (Nababan et al., 2021). In the treatment class, regular consumption of moringa leaf dishes for 30 days resulted in a weight gain of 0.45 kg (Muliawati, 2020). Similarly, in the control class, there was a weight gain from month 1 to month 2, amounting to 0.26 kilograms. This study reveals that bread containing 5% Moringa Oleifera Leaf Powder (MOLP) can significantly contribute to addressing

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malnutrition, especially protein deficiency in toddlers. Research by Gustiya showed that Moringa Nanoparticles from oleifera leaves have been proven to increase albumin levels significantly compared to the control group in stunted toddlers (Nababan et al., 2021).

Results from a pre-survey with mothers of infants aged 7-12 months at Bandar Jaya Health Center indicated that mothers are not yet aware of the benefits of moringa leaves, moringa leaf flour, or moringa leaf dishes as nutritious complementary foods for infant development and growth alongside breastfeeding (MP-ASI). Out of the 3 infants with weight below the green line, none of them used moringa leaves as an additional means to increase their weight; they only consumed the biscuits distributed by Public Health Center. The intervention conducted for undernourished infants in the working area of Bandar Jaya Health Center was Supplementary Feeding (PMT). However, this intervention seems to have been less effective in reducing the incidence of undernutrition among infants and toddlers. Hence, there is a need for innovation in providing supplementary feeding for infants and toddlers.

RESEARCH METHODS

The research follows a quantitative methodology, specifically a quasi-experimental design or a semi-experimental design with a non-equivalent control group. The subjects of the study are all infants with weight below the green line. The research objects are infant weight and moringa leaf preparations. The sample for the experiment is simple, consisting of an experimental group and a control group, each with 17 respondents, resulting in a total sample size of 34 respondents. The sampling technique is purposive sampling, with inclusion criteria involving mothers willing to have their infants undergo the intervention. The research takes place in the working area of Bandar Jaya Health Center.

Moringa leaf preparations are administered to infants aged 7-12 months in a dosage of 2 grams once a day for a consecutive 30 days. In this study, moringa leaf preparations are in the form of moringa leaf powder mixed with complementary feeding (MPASI). Measurement is done using a digital scale, and data collection is performed through observation sheets. Data analysis includes both univariate and bivariate analysis (Wilcoxon test).

RESEARCH RESULTS

Univariate Analysis

It is observed that the mean weight of infants before intervention in the intervention group is 6229.4 grams, with a standard deviation of 449.6 grams. The minimum weight recorded is 5700 grams, and the maximum weight is 7100 grams. After the intervention, the mean weight of infants in the intervention group is 6658.8 grams, with a standard deviation of 433.0 grams. The minimum weight observed is 6150 grams, and the maximum weight is 7400 grams.

Table 1
Infant Weight Before and After Moringa Leaf Supplementation Intervention in the Working Area of Bandar Jaya Health Center, Central Lampung Regency

Infant Weight	Mean	SD	Min	Max	N
Before	6229,4	449,6	5700	7100	17
After	6658.8	433.0	6150	7400	17

Table 2
Infant Weight in the Control Group in the Working Area of Bandar Jaya Health Center, Central Lampung Regency

Infant Weight	Mean	SD	Min	Max	N
Before	6105,8	368,2	5700	6800	17
After	6355.8	344.0	5900	7050	17

It is noted that the mean weight of infants before intervention in the control group is 6105.8 grams, with a standard deviation of 368.2 grams. The minimum weight observed is 5700 grams, and the maximum weight is 6800 grams. After the intervention, the mean weight of infants in the control group is 6355.8 grams, with a standard deviation of 344.0 grams. The minimum weight recorded is 5900 grams, and the maximum weight is 7050 grams.

The normality test using Shapiro-Wilk for both intervention and control groups indicate that the

significant value < 0.05, implying that the data is not normally distributed.

Table 3
Normality Test

Infant Weight	Moringa Leaf	*Shapiro Wilk*	Status
Intervention	Before	0.036	Not Normal
	After	0.042	Not Normal
Control	Before	0.008	Not Normal
	After	0.018	Not Normal

Bivariate Analysis

Based on the results of the Wilcoxon test, the p-value = 0.000 (p-value < α = 0.05), indicating that there is an influence of Moringa leaf supplementation on infants with weight below the green line in the working area of Bandar Jaya Health Center, Central Lampung Regency. The weight increase is approximately 429.4 grams, and mothers chose to provide Supplementary Feeding + Moringa leaf compared to biscuit feeding.

Table 4
Effect of Moringa Leaf Supplementation on Infants with Weight below the Green Line in the Working Area of Bandar Jaya Health Center, Central Lampung Regency

Infant Weight	Moringa Leaf	Mean	Median	Min-Max	P-Value
Intervention	Before	6229,4	6100.0	5700 -7100	0.000
	After	6658.8	6450.0	6150 - 7400	
Control	Before	6105,8	6000.0	5700 - 6800	0.000
	After	6355.8	6250.0	5900 - 7050	

DISCUSSION

Based on the results of the Wilcoxon test, the p-value was calculated as 0.000 (p-value < α = 0.05), indicating that there is a significant effect of providing processed moringa leaf on infants with weight below the green line in the Working Area of Bandar Jaya Health Center, Central Lampung Regency. The observed p-value suggests that mothers opted to provide Supplementary Feeding + moringa leaf (PMT + moringa leaf) rather than biscuits, resulting in an average weight difference of 429.4 grams.

Achieving proper nutritional status is crucial for overall health. Adequate nutrient intake is a key factor that supports the growth and development of infants. Inadequate nutrition can have long-term consequences on the growth and development of infants and toddlers, and rectifying these issues later can be challenging. Conversely, a well-nourished body can lead to optimal physical growth, brain development, work capacity, and overall health (Ria Julita Sari, 2022).

Nababan's study (2021) aligns with the present research, showing a p-value < 0.05, which indicates that processed moringa leaf can enhance infant weight. Similarly, Muliawati's study (2020) demonstrated a p-value < 0.05, indicating that moringa leaf extract can contribute to increasing the weight of toddlers. The research conducted by Musa (2022) also found significant results, with paired t-test analysis showing a Sig. value of (2-tailed) 0.000 < 0.05, indicating the influence of moringa nuggets on weight changes in toddlers.

One of the government's efforts to enhance human resources and alleviate poverty is to improve child nutrition, especially among infants and toddlers. Addressing poor nutritional status in infants is a persistent concern, and efforts are made to ensure that the percentage of undernourished children remains below 5% (Nurul Aryastuti, 2022).

The direct cause of undernutrition is inadequate food intake. Drawing from research conducted by Rahayu & Nurindahsari (2018) on the improvement of infant nutritional status through moringa leaf supplementation, it is evident that providing moringa leaves has an impact on infant nutritional status.

Moringa leaf extract holds a myriad of benefits, including its potential to enhance the growth of toddlers. The relatively high content of vitamins

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and proteins in moringa leaves makes it a potential alternative as supplementary food. Toddlers require adequate nutrients as they are in a phase of growth and development. Prolonged deficiency in nutrient consumption can lead to Chronic Energy Deficiency (CED). Micro-nutrients present in moringa leaves have been proven to enhance toddler growth. Consumption of moringa leaf extract can aid in the improvement of malnutrition in toddlers, either by incorporating it into meals or consuming it directly (Maryani, I., & Suryadarma, 2019).

Based on the research findings, it is known that the intervention group exhibited weight increases ranging from 250 to 650 grams, while in the control group, one individual did not experience weight gain after supplementary feeding, and weight increases ranged from 150 to 350 grams. From these results, it can be inferred that the intervention group experienced greater weight gain compared to the control group. Moringa leaves serve as a potential primary source of various nutrients and therapeutic elements, including antibiotics, as well as a boost to the immune system. The leaves contain protein, vitamins, and minerals, offering potential as therapy and supplementary food for malnourished children with the addition of moringa to their daily meals. Moringa leaf consumption is an alternative for addressing cases of weight below the green line. Along with vitamin C, the nutritional content increases when moringa leaves are consumed in dried and powdered form. The differences in weight gain among infants can be attributed to varying food intake in terms of composition and frequency. These findings suggest that healthcare workers should provide informal education or counseling to mothers with infants below the green line to optimize their children's growth.

CONCLUSION

There is an influence of moringa leaf supplementation on infants with weight below the green line in the Working Area of Bandar Jaya Health Center, Central Lampung Regency (p-value 0.000).

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