

## COMBINATION OF BABY MASSAGE AND CITRONELLA AROMATHERAPY ON WEIGHT INCREASE IN TODDLERS AGED 12-13 MONTHS: QUASI EXPERIMENTAL

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### ABSTRACT

Malnutrition in children is caused by multifactors so that it requires immediate treatment to prevent further complications. One effort to increase nutritional intake in toddlers is baby massage and Citronella aromatherapy. The purpose of this study was to determine the effectiveness of the combination of baby massage and citronella aromatherapy on increasing body weight in malnourished toddlers aged 12-23 months. The type of research is quasi-experimental with one group pretest posttest design. The sample was 50 malnourished toddlers aged 12-23 months. The sampling technique was purposive sampling. The research instruments were weight observation sheets, citronella oil and SOP. The action of giving baby massage and lemongrass aroma simultaneously through inhalation, given twice a week in the afternoon for 4 weeks. 3 drops of Aromatherapy in 400 ml of water using a diffuser for 15 minutes. Baby massage is given for 15 minutes. The weight of malnourished toddlers aged 12-23 months before the intervention was given an average of 7.346 kg and after the intervention was given 7.678 kg. Combination of baby massage and citronella aromatherapy had an effect on increasing the weight of malnourished toddlers. Mothers of malnourished toddlers can provide a combination of baby massage and citronella aromatherapy to increase weight and catch up on their toddlers' growth delays.

Keywords: Baby Massage; Body Weight; Citronella Aromatherapy; Malnourished Toddlers

### INTRODUCTION

Health problems in children are a major event in the field of maternal and child health so that it can be used as a mirror of a country's health level. Some problems that occur in children include infections, developmental disorders, chronic diseases, mental and emotional health, and nutritional disorders such as malnutrition (Herlinadiyaningsih & Lucin, 2022). Malnutrition is a condition that occurs due to a lack of nutrients needed by toddlers, one of which is characterized by low body weight according to height or length, based on age, gender (Suprati dkk, 2023).

Malnutrition is a nutritional status based on the weight index for age (BB/A). Toddlers are said to be malnourished if the weight index for age (BB/A) is less than -3SD (Sari dkk, 2023). The direct impact on toddlers consists of short-term impacts such as stunted growth, weight loss and decreased immunity, while long-term impacts include disruption of the child's physical and mental development, decreased ability to learn, communicate, memory, language and ability to solve problems (Astuti dkk, 2024). The causes of malnutrition in children are multifactorial, but the common causes of this problem are poor food

quality, less than optimal child care, and repeated infections in children (Sulistiyani dkk, 2023). The government has made various efforts to overcome malnutrition in toddlers, including through the preparation of Guidelines for the Prevention and Management of Malnutrition in Toddlers, strengthening early detection, nutrition education, monitoring the growth and development of toddlers, Providing Additional Food (PMT) for toddlers with malnutrition, establishing Therapeutic Feeding Centers (TFC) as centers for nutritional recovery in health facilities, and increasing the capacity of nutrition care teams in the management of malnutrition in toddlers (Direktur Jenderal Kesehatan Masyarakat & Direktorat Gizi Masyarakat, 2020). Management to increase nutritional intake in toddlers with malnutrition can be given pharmacologically, such as by providing vitamin A and folic acid supplements, while non-pharmacological methods include herbal drinks, massage, acupressure and acupuncture (Saidah & Kusumadewi, 2020).

The mechanism of baby massage in increasing nutritional intake in toddlers is that the touch in the massage given can increase the activity of serotonin neurotransmitters so that the

glucocorticoid receptor binding capacity increases which results in a decrease in glucocorticoid hormone levels (adrenaline and stress hormones) thereby increasing endurance. Massage touch can increase vagal activity which causes the release of gastrin, insulin, cholecystokinin hormones so that increased absorption of the digestive tract when the baby is massaged so that the baby's growth becomes more (Yulivantina dkk, 2023). Research states that there is an effect of baby massage on increasing the baby's weight (Ulfa dkk, 2019) (Haryani dkk, 2024).

The mechanism of Citronella aromatherapy in increasing toddler weight is that citronella oil has microbial and antibacterial properties that help fight infections caused by various pathogenic bacteria such as *Helicobacter pylori* and *Escherichia coli*. Citronella is a grass-like plant that contains aromatic compounds. Citronella has the main composition of citranellol, citranellal and geraniol (Hendri & Djamaan, 2020).

Lemongrass is useful for preventing gastrointestinal disorders and helps stimulate bowel function and improve digestion. Lemongrass' anti-inflammatory properties are useful for treating constipation, ulcerative colitis, diarrhea and abdominal pain (Nugraha dkk, 2022). Other studies have shown that citronella oil aromatherapy has an effect on appetite in toddlers (Carolin dkk, 2023).

The results of the 2022 Indonesian Nutritional Status Survey (SSGI) stated that toddlers in Indonesia who experienced nutritional problems were 21.6% stunting, 7.7% wasting, 17.1% underweight and 3.5% overweight (Kementerian Kesehatan RI, 2022). The Central Java Provincial Office reported that up to the first quarter of 2024 there were 10,083 cases of malnutrition in toddlers. Pemalang Regency was ranked second with 1,058 cases after Brebes Regency with 1,159 cases (Dinas Kesehatan Propinsi Jawa Tengah, 2024). Pemalang Regency has the second highest case of malnutrition in Central Java Province in 2024. The priority of handling the incidence of malnutrition in toddlers in 2024 consists of Jatingarang, Banjarmulya, Gondang, Kaligelang, Pesantren, Kreyo, Banyumudal, Sima, Walangsanga, and

Sugihwaras Villages. The incidence of malnutrition in toddlers in the first place was found in Banyumudal Village, which was 10.21%.

Based on data from the Banyumudal Health Center, it is known that the number of undernourished toddlers in 2024 is 103. From a preliminary study, it is known that 60 toddlers experienced weight gain because they used up the Local Food PMT from the Government, 13 toddlers did not routinely visit the Health Center for Posyandu so they did not get Local Food PMT and did not experience weight gain, while 30 other toddlers have not experienced optimal weight gain so they are still in the category of undernourished toddlers. Based on data from the Banyumudal Health Center, it is known that the number of undernourished toddlers in 2024 was 103. Therefore, researchers are interested in conducting a study entitled "Effectiveness of the Combination of Baby Massage and Citronella Aromatherapy on Weight Gain in Undernourished Toddlers Aged 12-23 Months at the Banyumudal Health Center".

## METHOD

This study used a quasi experiment. The approach used was one group pretest posttest design. The study was conducted in the Banyumudal Health Center Area, Pemalang Regency. This study was conducted in January 2025. The population in this study were all malnourished toddlers aged 12-23 months totaling 103 people. The sample of this study was 50 toddlers with inclusion criteria: 1) Toddlers aged 12-23 months with weighing results on the yellow line, 2) Mothers who gave permission for their toddlers to be respondents, 3) Babies with normal births, 4) Healthy babies. Sampling used purposive sampling. The implementation of the study was the action of providing baby massage and lemongrass aroma simultaneously through inhalation which was given 2 x a week in the afternoon for 4 weeks. Aromatherapy dose of 3 drops in 400 ml of water using a diffuser for 15 minutes, Baby massage was given for 15 minutes. Researcher submitted an ethical review request to Karya Husada University Semarang and has received ethical research approval with letter number 032/KEP/UNKAHA/SLE/II/2025.

## RESULTS

**Table 1. Weight of Toddlers Age 12-23 Months Before and After Given a Combination of Baby Massage and Citronella Aromatherapy**

Combination of Baby Massage and Citronella Aromatherapy	Mean	SD	Min-Maks
Pre Test	7,346	0,9541	6,1-9,1
Post Test	7,678	0,9755	6,3-9,7

Table 1 shows that the average weight of malnourished toddlers before being given a combination of baby massage and lemongrass aromatherapy was 7.346 kg with the lowest weight of 6.1 kg and the highest of 9.1 kg. After being given the intervention it became 7.678 kg with the lowest weight of 6.3 kg and the highest of 9.7 kg.

**Table 2. Effectiveness of the Combination of Baby Massage and Citronella Aromatherapy on Weight Gain in Malnourished Toddlers Aged 12-23 months**

Variabel	N	Mean	SD	P value
Pre test	50	7,346	0,9541	0,000
Post test	50	7,678	0,9755	

Table 2 shows the results of the Wilcoxon test, which obtained a p value of 0.000, so H<sub>0</sub> was rejected, meaning that the combination of baby massage and citronella aromatherapy was effective in increasing body weight in malnourished toddlers aged 12-23 months at the Banyumudal Health Center.

## DISCUSSION

### 1. Weight Gain in Undernourished Toddlers After Being Given a Combination of Baby Massage and Citronella Aromatherapy

Malnutrition is a condition that develops due to a deficiency of nutrients needed to maintain health and organ function. This condition often occurs in toddlers and is characterized by low weight for their height or length, age, and gender (Suprati dkk, 2023). Body weight is the most important anthropometric measurement, used at every opportunity to assess the health of children in

all age groups. It is currently the best indicator of a child's nutritional status and growth. It is sensitive to even small changes, objective and repeatable, and can be used on any scale, is relatively inexpensive, easy to use, and requires minimal time (Herawati dkk, 2024).

Based on the above theory, toddlers aged 12-23 months with an average weight of 7.3 kg are considered malnourished. Malnutrition in toddlers aged 12-23 months can be identified by their weight. The KIA (Child Health Book) displays a weight chart based on gender and age. To monitor toddler growth in the Banyumudal Community Health Center (Puskesmas), integrated health service posts (Posyandu) are conducted. Toddlers come to the Posyandu and are weighed and recorded in the KIA book.

A toddler's weight below the standard for their age and gender can be interpreted as malnutrition. Malnutrition in toddlers can impact their health and development now and in the future. Research indicates a link between nutritional status and the development of toddlers aged 1-5 years (Utami, 2023). Furthermore, research indicates that nutritional status is associated with the incidence of acute respiratory infections (ARI) in toddlers (Giroth dkk, 2022).

### 2. Weight Gain in Undernourished Toddler After Being Given a Combination of Baby Massage and Citronella Aromatherapy

Toddlers with malnutrition require management to increase their weight, which is one indicator of their nutritional status. Efforts have been made by the Banyumudal Community Health Center to increase toddlers' weight by providing supplementary feeding (PMT). This study provides a combination of baby massage and citronella aromatherapy with the aim of helping increase nutritional intake in toddlers aged 12-23 months. Baby massage therapy was carried out twice a week every afternoon, for 4 weeks, combined with citronella aromatherapy through inhalation.

Baby massage has benefits for addressing nutritional issues in toddlers because it can ease digestion and increase appetite (Dewi dkk,

2023). Citronella (lemongrass) is a grass-like plant that contains aromatic compounds. Citronella's main components are citranellol, citranellal, and geraniol (Hendri & Djamaan, 2020)

Giving a combination of baby massage and citronella aromatherapy to toddlers with malnutrition can ease the digestive process and help increase their appetite. Citronella aromatherapy contains citranellol, citranellal, and geraniol, which can stimulate intestinal function and improve digestion, thereby helping to optimize food absorption and increase body weight. Based on the results of the study, it was found that malnourished toddlers experienced an increase in body weight of 0.332 kg or 332 grams after being given a combination of baby massage and citronella aromatherapy. The study stated that there is an effect of baby massage on infant weight gain (Ulfa dkk, 2019) (Haryani dkk, 2024). While other studies have shown that there is an effect of citronella oil aromatherapy on appetite in toddlers (Carolyn dkk, 2023).

### 3. The Effectiveness of the Combination of Baby Massage and Citronella Aromatherapy on Weight Gain in Malnourished Toddlers

The Wilcoxon test results obtained a p value of 0.000, so  $H_0$  was rejected, meaning the combination of baby massage and citronella aromatherapy was effective in increasing body weight in malnourished toddlers aged 12-23 months at the Banyumudal Community Health Center. Previous research stated that baby massage affects weight gain (Hasnita dkk, 2024), while previous research stated that giving baby massage using citronella oil has an effect on increasing appetite with the same meal portion, but there is an increase in meal frequency (Utam dkk, 2023).

The mechanism of baby massage in increasing toddler's nutritional intake is that massage will increase the activity of serotonin neurotransmitters so that glucocorticoid receptor binding capacity increases which results in a decrease in glucocorticoid hormone levels (adrenaline and stress hormones) so that

the body's immune system increases. Massage touch can increase vagal activity thereby causing the release of gastrin, insulin, cholecystokinin hormones, thereby increasing digestive tract absorption when the baby is massaged so that the baby's growth becomes more (Yulivantina dkk, 2023). The mechanism of Citronella aromatherapy in increasing toddler's weight is that Citronella aromatherapy has microbial and antibacterial properties that help fight infections caused by various pathogenic bacteria such as *Helicobacter pylori* and *Escherichia coli*. Lemongrass is useful for preventing gastrointestinal disorders and helps stimulate intestinal function and improve digestion (Nugraha dkk, 2022).

Baby massage for malnourished toddlers increases the activity of the neurotransmitter serotonin, which reduces adrenaline and stress hormones, thus providing a relaxing effect and boosting immunity. The touch of a baby massage stimulates the release of the hormone gastrin, which aids digestive absorption, resulting in an increased appetite. Citronella aromatherapy during the massage can also stimulate bowel function and improve digestion, thereby increasing appetite and optimizing nutrient absorption.

The combination of baby massage and citronella aromatherapy can increase the weight of malnourished toddlers. This can be seen from the average increase in body weight between before and after the intervention of a combination of baby massage and citronella aromatherapy. Toddlers after being given a combination of baby massage and citronella aromatherapy experienced a weight increase of 0.332 kg or 332 grams. Malnourished toddlers who receive baby massage will experience increased vagal activity, which causes the release of the hormone gastrin, insulin, and cholecystokinin, thereby increasing digestive tract absorption, thus increasing body weight. Malnourished toddlers who inhale citronella aromatherapy along with baby massage, create impulses generated from the aromatherapy to be transmitted to the limbic system of the brain, thereby stimulating intestinal activity to improve

digestion and increase body weight.

## CONCLUSION

The combination of baby massage and lemongrass aromatherapy is effective in increasing body weight in malnourished toddlers aged 12-23 months at the Banyumudal Health Center.

This intervention can be implemented independently daily by mothers of toddlers aged 12-23 months to ensure their weight does not fall below the red line on their Health Card (KMS) and prevent stunting.

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