



## The effect of acupressure point LI4 PC6 ST25 ST36 to the level of macronutrient intake

MeryTresiana Effendi<sup>1</sup>, Diah Fatmasari<sup>2</sup>, Mateus Sakundarno Adi<sup>3</sup>

<sup>1</sup>Poltekkes Kemenkes Semarang, Semarang Indonesia

<sup>2</sup>Kemenkes Semarang, Semarang Indonesia

<sup>3</sup>Universitas Diponegoro Semarang, Indonesia

\*Corresponding Author: Mery Tresiana Effendi

Email id: memejank@gmail.com

### ABSTRACT

#### Background

Eating disorder on two-year-old children has impact on growth and development disorders, decreasing immunity, sleeping disorder, impaired balance and coordination, less aggressiveness, impulsivity and stunting. Acupressure points therapy including: ST36 (Zusanli), CV12 (Zhongwan), SP3 (Taibai), SP6 (San Yinjio) and ST25 (Tianshu) have impact on appetite, which is characterized by increasing of macronutrient intake (carbohydrates, fats and proteins).

#### Objective

To determine the effect of acupressure therapy on the level of macronutrient intake.

#### Research Method

Quasy experiment with non equivalent design control group design approach. The sample of this study were toddlers in Sambirejo Health Center and SumberUrip of RejangLebong Regency, Bengkulu Province, amounting to 40 people divided into two groups, 20 each. The sample was selected by simple random sampling. Data collection used was questionnaires and observations. Data analyses used were Paired Sample T-Test, Wilcoxon Signed Rank Test, Independent Sample T-Test, and Mann Whitney Test.

#### Results

Acupressure therapy has impact on the level of macronutrient intake and the toddler body weight. On the other hand, acupressure therapy has no impact on IgA hormone levels.

#### Conclusion

Effective acupressure therapy has the ability to increase macronutrient intake.

**Keywords:** Acupressure, and macronutrient intake

### INTRODUCTION

Wasting in the world in 2010 affected 52 million toddlers. While in Indonesia, based on data

from the Basic Health Research (Riskesdas) in 2018 shows that the prevalence of under-five children with poor nutrition and malnutrition reaches 17.7%, while based on the results of 2017

Nutrition Status Monitoring (PSG), shows that 3.8% of under-five children in Indonesia had poor nutritional status and 14.0% of children under five have malnutritional status, the percentage of underweight / undernourished (poor nutrition + malnutrition) in the under-five group (17.8%) was higher than the under-two group (14.8%) . In Bengkulu Province, the percentage of poor nutrition and malnutrition in toddlers have showed that 2.3% of children under five had poor nutrition and lack nutrition as much as 11.9% while nutritional status based on height / age (TB / U) was 8.6% included in the category is very short and 20.8% in the short category. [1]

Rejang Lebong Regency has been one of the districts in Bengkulu Province that has nutritional problems and has been one of the priorities in national health development program. According to data from the Ministry of Health (2017) the characteristics of nutritional problems in RejangLebong Regency is included in the category of acute-chronic, nutritional status data for children in RejangLebong District based on the results of Nutrition Status Monitoring (PSG) in 2017 shows the percentage of underweight at 14.6%, stunting 29, 4%, wasting 8.1% and obese toddlers by 5%. [2]

Lack of nutritional intake in children can be caused due to eating behavior disorders. Disorders of eating behavior in children include: difficulty of eating, diet, sensory eating disorders, picky eater (picking food), psychological behaviour to avoid food, rejection syndrome, defense tactile, neophobia and toddler anorexia.

Research in New Zealand shows that 24% of respondents had children who had difficulty of eating at the age of 2 years and by 18% occurred until the age of 4 years. This condition has an impact on growth disruption and development of toddlers, decreased immunity, sleeping disorders, impaired balance and coordination, children become aggressive, impulsive and stunting. Some of the causes of eating difficulties include loss of appetite and impaired digestive function. This is characterized by difficulty chewing, sucking, swallowing, spewing food, playing food for a long time, not wanting to put food in a way by closing the mouth tightly and brushing aside food given. [3-6]

Giving multivitamins to overcome eating difficulties can have a negative impact if given for

a long period of time, an alternative effort that has now been developed is by acupressure (acupoint). Various scientific studies have shown the benefits of touch and massage therapy on children's health. Massage therapy that is often used is the acupressure technique. Acupressure is a therapy of traditional Chinese medicine that has the same principles as acupuncture. Acupressure is a non-invasive technique that uses fingers to rub, squeeze, pinch, and press on different acupressure points on the body. Acupressure involves stimulating the surface acupoints of the body to stimulate energy or *Qi*, result in comfort and positive benefits for health. Some points of acupressure therapy that are scientifically proven have the ability to increase the appetite of toddlers are ST36 (Zusanli), CV12 (Zhongwan), SP3 (Taibai), SP6 (San Yinjiao) and ST25 (Tianshu) points located between the left and right navels and applied to overcome decreased appetite. This happens because these meridian points can facilitate blood circulation in the spleen and digestive system through the brain wave mechanism (hypothalamus) which plays a major role in the response to hunger and appetite. [7-10]

Based on research conducted by YoriRahmi, WedyaWahyu and Eliza Anas, it show that the impact of massage therapy can improve the health and development of premature babies and low-weight-birth babies. Several other studies show that massage therapy is beneficial for children because it can promote blood circulation, normalize central nervous system function and reduce tissue stiffness. Based on this background, this study aims to determine the impact of acupressure therapy on points ST36, ST25, Li4, PC6 on the level of macronutrient intake.

## METHODS

This study is a quantitative analytic study with a quasy experiment research design and a non-equivalent design group control design approach. The sample of this study were toddlers aged 24-59 months per April 2019 who did not experience weight gain for 2 consecutive months, in the work area of the Sambirejo Health Center and the SumberUrip of RejangLebong District. Samples were consisted of 40 people selected by non probability sampling methods using consecutive sampling. The sample was divided into two groups, the intervention and control group of 20 people

each. Intervention groups were given acupressure therapy at points ST36, ST25, Li4, PC6 (with vegetable oil to facilitate the process of therapy was used) and nutritional education. Whereas in the control group there was no acupressure therapy but only nutrition education was provided. Data

collection used was questionnaires and observations. Data analysis used was Paired Sample T-Test, Wilcoxon Signed Rank Test, Independent Sample T-Test, and Mann Whitney Test.

## RESULT

### The Impact of Acupressure on Macronutrient Intake Levels

**Table 1 Differences in Macronutrient Intake Levels between Intervention Groups and Control Groups**

Time	Group	Macronutrient Intake Mean (Mg/ml)	Standard Deviation	Deviation (Δ)	sig. Value (p)
Pre	Intervention	102,18	37,569	9,285	0,407
	Control	92,89	32,258		
Week I	Intervention	108,10	37,947	9,250	0,411
	Control	98,85	32,135		
Week II	Intervention	122,15	30,177	5,700	0,546
	Control	116,45	28,942		
Week III	Intervention	117,10	38,292	22,350	0,041**
	Control	94,75	27,713		
Week IV	Intervention	136,05	30,059	21,700	0,027**
	Control	114,35	29,453		

\*significant

Table 1 shows that the average results of the test of macronutrient intake, significant differences have been found between intervention and control group at weeks 3 and 4 with the value of sig. respectively by 0.041 and 0.027 (p <0.05). In the third week, the intervention group's average macronutrient intake is greater (117.10%) compared to the control group (94.75%). In the fourth week, the mean of the intervention group's

macronutrient intake is greater (136.05%) compared to the control group (114.35%). It indicates that the combination of the administration of acupressure therapy and more nutritional education is proven to increase macronutrient intake compared to administration only nutritional education. Based on the results of the Paired T-Test, the following results are obtained:

**Table 2. Differences in the level of macronutrient intake in the intervention group**

Time	Group	Macronutrient Intake Mean (Mg/ml)	Standard Deviation	Deviation (Δ)	sig. Value (p)
Pre	Intervention	102,18	37,569	9,285	0,407
	Control	92,89	32,258		
Week I	Intervention	108,10	37,947	9,250	0,411
	Control	98,85	32,135		
Week II	Intervention	122,15	30,177	5,700	0,546
	Control	116,45	28,942		
Week III	Intervention	117,10	38,292	22,350	0,041**
	Control	94,75	27,713		
Week IV	Intervention	136,05	30,059	21,700	0,027**
	Control	114,35	29,453		

\*significant

On the intervention group, overall, there has been found a significant increase in the average macronutrient intake since the administration of acupressure and education until the fourth week,

with a difference of 33.875% (p (sig.) = 0,000). It indicates that the combination of acupressure therapy and nutritional education can increase macronutrient intake.

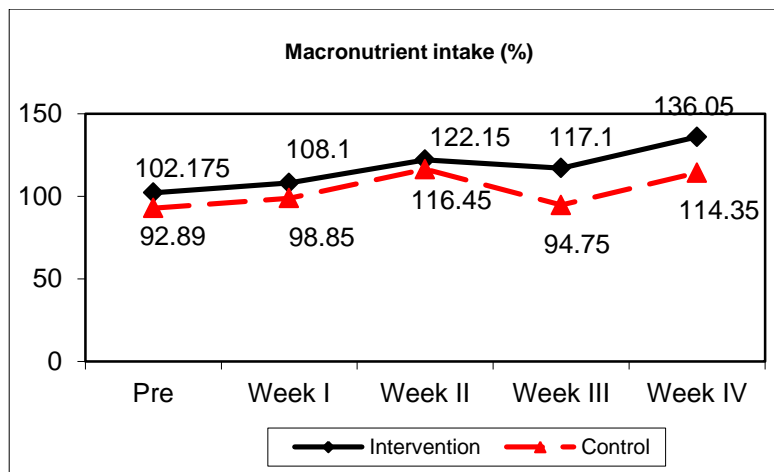
**Table 3 Differences in the Level of Macronutrient Intake in the Control Group**

Time	Group	Macronutrien Intake Mean (Mg/ml)	Standard Deviation	Deviation (Δ)	sig. Value (p)
Pre	Intervention	102,18	37,569	9,285	0,407
	Control	92,89	32,258		
Week I	Intervention	108,10	37,947	9,250	0,411
	Control	98,85	32,135		
Week II	Intervention	122,15	30,177	5,700	0,546
	Control	116,45	28,942		
Week III	Intervention	117,10	38,292	22,350	0,041**
	Control	94,75	27,713		
Week IV	Intervention	136,05	30,059	21,700	0,027**
	Control	114,35	29,453		

\*significant

On the control group, the results show an increase in the average macronutrient intake that continued since nutrition education is given up to week IV. So the overall increase in the average macronutrient intake from before giving education (pre) to week IV, with a difference of 21.460% (p (sig. Value) = 0,000). Based on these results it is known that the administration of nutritional education, and the administration of a combination of acupressure and nutritional education, both

increase the macronutrient intake of infants, but the administration of a combination of acupressure and more nutritional education increase the macronutrient intake of infants compared to only nutrition education. This is indicated by the change in macronutrient intake more often obtained in the intervention toddlers group (33.875%) than in the control group (21.460%). The following is a graph of macronutrient intake from before treatment until the fourth week of treatment.



**Graph 1 The Overview of Increased Macronutrient Intake Levels before (pre) and after (post) for 4 measurements / 4 weeks**

Graph 1 shows a significant increase in macronutrient intake from the first week to the second week, and decreased in the third week, both in the group given the combination of acupressure and education with the group that was only given education. Then the macronutrient intake increased again in the fourth week, occurred in the second, namely the group given the combination treatment of acupressure and education with the group that was only given education. The increase was higher in the group given the combination treatment of acupressure and education, compared to the group that was only given education. It can be concluded that combining acupressure therapy and education can further increase the toddler's macronutrient intake.

## DISCUSSION

The roles of macronutrient substances in the body are source of energy, recovery of damaged cells, etc. Based on the results of this study, the level of macronutrient intake of respondents in the intervention group was given 3 times massage on ST36, ST25, Li4, and PC6 as well as nutrition education for 15 minutes, from 4 times the measurement of macronutrient intake by the food recall method conducted every week where the intervention of acupressure therapy is still carried out with a frequency of 3 times / week. At the time before treatment in the intervention group there were half of the respondents (50%) with adequate macronutrient intake, and almost half (45%) in the control group with adequate macronutrient intake.

The difference in the level of macronutrient intake measured from before treatment to the 1st, 2nd, 3rd and 4th weeks showed that in the intervention group there was a fluctuation in the significant difference in the level of macronutrient intake. Significant differences occur in conditions before (pre) treatment up to week 1 and from week 3 to week 4, while from week 1 to week 2 and week 2 to week to -3 there was no significant difference. Different things happened in the control group where the significant difference in the level of macronutrient intake occurred continuously starting from the condition before treatment until the 4th week. This condition is caused by the intervention group based on the results of observations and interviews with toddlers' mothers obtained information after the acupressure therapy

was done for toddlers, it seems that children tend to be more active playing. This is supported by the results of questionnaires on confounding variables on the physical activity of toddlers in the intervention group, most of which (40%) have good physical activity, this results in an increase in children's social interaction with peers and their environment including shopping for snacks. The habit of shopping for snack food have an effect when taking data with the food recall method wherein the mother says the child's food intake is reduced because the child feels full of the food he bought because the carbohydrate content is usually found in snack foods.

Prasetyia (in Tri MayangSakti, 2016), states that snack foods contain mostly carbohydrate but less protein, vitamins or minerals. Because of the incomplete nutrition in snacks, basically snack foods cannot replace breakfast or lunch. Children who consume a lot of snacks will feel full because of the density of calories that enter the body. While nutrients such as protein, vitamins and minerals are less.

In the control group there were significant differences and all p-values <0.05 were due to the control group having more physical activity than the intervention group. In addition to the bad weather at the time of the study, in the intervention group the treatment was carried out outside the respondent's house, while the control group remained inside the house.

In this study the method used to measure macronutrient intake was food recall, where the possibility of errors in data collection and information on food intake by mothers of children under five is quite large. Determination of nutrient intake using the 24-hour food recall method does not necessarily reflect the average carbohydrate intake or long-term carbohydrate intake that determines nutritional status.

To determine the effect of acupressure therapy on increasing macronutrient intake was carried out by comparing the results of variable measurements in the intervention and control groups which were carried out in stages from the 1st, 2nd, 3rd and 4th weeks. The statistical test results show that after being given an intervention with at week 1 and week 2 there was no significant difference between the intervention group and the control group, while at weeks 3 and 4 there were significant differences between the intervention groups and the control

group, this is indicated with p value 0.041 and 0.027 ( $p < 0.05$ ).

In the third week, the mean of the intervention group's macronutrient intake was greater (117.10) compared to the control group (94.75) or there was a difference of 22.35. In the fourth week, the mean macronutrient intake of the intervention group was greater (136.05) compared to the control group (114.35) or the difference of 21.7.

The description above shows that significant differences were only seen at weeks 3 and 4, this was due to a decrease in macronutrient intake in week 3 compared to macronutrient intake at week 2, this occurred in both groups, and in week 4 increased again. At the 3rd week the difference in the average decline in the control group was greater than the intervention group and the increase after the 3rd to 4th week also showed a sharp difference between the two groups where the intervention group showed a greater increase in difference. This is made as the basis for the conclusion that the combination of acupressure therapy and nutritional education in the intervention group was more influential in increasing macronutrient intake at the 3rd and 4th weeks compared with the intervention only with nutritional education in the control group. The results of this study prove that by doing acupressure massage, especially at the ST.36 point by pressing perpendicularly as deep as 0.5-1.3 cun, cone 5-7 pieces, cylinders 7'-15 'in toddlers effective in increasing appetite and facilitate the digestive process.

There are several factors affect the macronutrient intake of infants, including health, the role of parents and knowledge of parents. In terms of health, the presence of infection in the body can cause low appetite, decreased absorption ability, increased nutritional needs when sick and loss of fluids and nutrients due to diarrhea, nausea, or vomiting so that nutrient intake will be low.[12]

Sunardi in Mazarina Devi states that good nutrition is often not fulfilled by a child because of external and internal factors. Outside factors include the family economy, while internal factors exist in children who are psychologically emerging as a problem of eating children.[13]

Based on the observations of researchers, during the implementation of this study at the 3rd week there was an increase in the intensity of the rain so as to allow a decrease in the level of macronutrient intake in both groups. In the intervention group it

was found a decrease of 5,050 from the second week or smaller when compared to the control group where there was a decrease of 21,700. The decrease in both groups made it possible for a decrease in the resistance of toddlers in both groups so that the possibility of children being attacked by illness caused a decrease in appetite for toddlers. From the difference in the average decrease in macronutrient intake that occurs is seen in the larger control group so it can be assumed that by giving acupressure therapy will maintain macronutrient intake when the weather conditions are not normal.

There are several other factors that can affect the macronutrient intake of infants, including health, the role of parents and parents' knowledge. In terms of health, the presence of infection in the body can cause low appetite, decreased absorption ability, increased nutritional needs when sick and loss of fluids and nutrients due to diarrhea, nausea, or vomiting so that nutrient intake will be low.[12]

Roesli states that the benefits of baby massage can increase body weight and growth, increase endurance, increase infant concentration and make babies sleep soundly, foster bonding between parents and children and increase breast milk production.[14]

Some points of acupressure therapy scientifically proven to improve the appetite of toddlers namely ST36 (Zusanli), CV12 (Zhongwan), SP3 (Taibai), SP6 (San Yinjio) and additional ST25 (Tianshu) points located between the left and right navels if appetite decreases.[15] This happens because these meridian points facilitate blood circulation in the spleen and digestive system through the brain wave mechanism (hypothalamus) which plays a major role in the response to hunger and appetite. The hypothalamus produces ghrelin which can affect appetite.

In the third week of the study it was found that there was an increase in rainfall intensity which allowed an effect on the health of children under five which resulted in a decrease in appetite, this was seen from a decrease in the average level of macronutrient intake from the second week in the control group but in the intervention group decrease from week 2 but too significant.

This is in line with the opinion of Sukanta, who states that in doing acupressure therapy, the patient's condition, type of patient's complaint, and

reactions that will arise (in the form of reactions to strengthen and weaken the energy determined by the length and direction of massage.[16] According to Supariasa macronutrient nutrient intake by the body is affected by body health conditions The presence of infection in the body causes low appetite, decreases absorption ability, increases nutritional needs when sick and loss of fluid and nutrients due to diarrhea, nausea, or vomiting so that nutrient intake will be low.[12]

This research is almost in line with Munjidah's research in which a cross sectional study was conducted by examining the effectiveness of Tui Na massage in overcoming children's eating disorder which states that the result of Tui Na massage is effective in overcoming eating difficulties in infants. The condition of eating disorder that is often experienced by children affect the macronutrient intake and have an impact on the growth and development of children.[11] According to the study of Zuccotti et al., macronutrient intake including high intake of protein, simple chain carbohydrate, saturated fat, natrium, and low intake of feruum and dietary fiber.

## REFERENCES

- [1]. Health Research and Development Agency. Riskesdas Main Results. Jakarta: Ministry of Health of the Republic of Indonesia; 2018.
- [2]. Nutrition Status Monitoring Handbook 2017, Directorate of Community Nutrition, Directorate General of Public Health Ministry of Health in 2018.
- [3]. Christopher R. Sudfeld, e. a. Linear growth and child development in low- and middle-income countries: a meta-analysis. *PEDIATRICS*. 135, 2015.
- [4]. Widodo, Joko. Education and Consultation on Difficult Eating and Impairment of Weight Loss. Jakarta: Picky Eaters And Grow UpClinic; 2012.
- [5]. The Ministry of Health of Republic of Indonesia. Guidelines for Control of Acute Respiratory Infections. Jakarta: Ministry of Health of the Republic of Indonesia; 2009.
- [6]. Hidayat, A, Aziz Alimul. Introduction to child nursing volumes 1. Jakarta: Salembamedika; 2009
- [7]. YoriRahmi, WedyaWahyu and Eliza Anas, Effects of Massage Therapy on Increasing Premature Baby's Weight in RSUP. Dr. M. Djamil Padang, *NERS JOURNAL OF NURSING* 8(2), 2012, 129-136
- [8]. Ramada Nadia Christina Oliveira, Fabiane de Amorim Almeida, and Mariana Lucas da Rocha Cunha. Therapeutic touch: influence on vital signs of newborns. 2013. [https://www.researchgate.net/. . . / 260040692\\_Therapeutic\\_touch](https://www.researchgate.net/. . . / 260040692_Therapeutic_touch)
- [9]. Mazarina Devi, Analysis of factors affecting nutrition status in rural, technology and vocational school, 33(2), 2010, 183-192,
- [10]. Hidayat, A, Aziz Alimul. Introduction to child nursing volumes 1. Jakarta: Salembamedika; 2009
- [11]. Gian Vincenzo Zuccotti et al, Nutrient Intake in Italian Infants and Toddlers from North and South Italy: The Nutrintake 636 Study, *Nutrients* 6, 2014, 3169-3186; doi: 10.3390 / nu6083169.
- [12]. Supariasa, N. Assessment of Nutritional Status. Medical Book. Jakarta: EGC. 2000.

## CONCLUSION AND SUGGESTION

### Conclusion

1. The level of macronutrient intake before acupressure therapy at points ST36, ST25, Li4, PC6 was 102,175%.
2. The level of macronutrient intake after being given acupressure therapy at points ST36, ST25, Li4, PC6 amounted to 136.05%.
3. Therapy for acupressure at points ST36, ST25, Li4, PC6 has an impact on increasing the level of macronutrient intake.

### Suggestion

1. Regional Government institutions, should carry out the policy to routinely reduce the incidence of poor nutrition and malnutrition through the application of holistic care services, one of them is by providing acupressure therapy in an effort to improve public health in general and toddlers in particular.
2. Health care institutions can use acupressure therapy as an alternative intervention in handling cases of children under five with poor nutrition or malnutrition.

- [13]. Mazarina Devi, Factors that influence the nutritional status of children in rural, technological and vocational settings, Vol. 33, No. 2, September 2010: 183-192.
- [14]. Roesli, Utami. Introduction to exclusive breastfeeding, Jakarta: Trubus Agriwidya; 2007.
- [15]. Hidayat, A, Aziz Alimul. Introduction to child nursing volumes 1. Jakarta: Salemba medika; 2009.
- [16]. Sukanta, P.O. Acupressure Massage for Health. Jakarta: Spreader Plus; 2008.

**How to cite this article:**Mery Tresiana Effendi, Diyah Fatmasari, Mateus Sakundarno Adi. The effect of acupressure point LI4 PC6 ST25 ST36 to the level of macronutrient intake. Int J of Allied Med Sci and Clin Res 2019; 7(3): 756-763.

**Source of Support:** Nil.**Conflict of Interest:** None declared.