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Effectiveness of Infant Massage on Increasing Baby Weight and Length in Nosarara Community Health Centers during the Covid-19 Pandemic

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Abstract

BACKGROUND: One indicator of the health of infants and toddlers is an increase in body weight and length/height following age. This fact has attracted the attention of many parties trying to find solutions and innovations, including re-examining the local wisdom of Indonesian culture, which is believed to have been passed down from generation to generation to help increase the baby's weight and length.

AIM: This study aims to determine the effectiveness of baby massage on increasing a baby's weight and length in the work area of the Nosarara Community Health Center, Palu City.

METHODS: This type of research was a quasi-experimental research design with pre- and post-test control group design. The population in this study were all infants aged 0−11 months in the Nosarara Health Center's working area, involving 60 infants; 30 were the intervention group for a month of massage and 30 were the control group. The sampling technique in this study used the purposive sampling method based on certain considerations. The statistical test used was parametric and the paired t-test.

RESULTS: The age of the mother in this study is mostly 28−30 years old, namely, 23.3% with an education level of Senior High School at 63.3% and the mother's work is Mother's work, which is 95%. Then, the age of most children aged 4−7 months, namely, 38.3%. There is a difference in children's weight before and after the intervention where the initial weight is 5.8 kg–6.43 kg after 1 month of intervention. There are differences in the child's body length before and after the intervention where the initial body length was 56.97 cm–60.03 cm after 1 month of intervention.

CONCLUSION: This study showed no significant difference in the increase in body weight and length of infants between the intervention and the control groups. The average increase of massaged infants was 600 g in weight and 3.01 cm in length. Those who were not massaged were 400 g in weight and 1.26 cm in length.

Introduction

Growth is an increase in physical size and body structure or an increase in the number and size of cells that can be easily measured, such as weight and height. Growth is an increase in physical size and body structure due to the multiplication of cells and an increase in the size of cells that can be measured quantitatively, including an increase in body weight, height, and head circumference [1]. Weight gain and loss must be considered in infancy. Increased body weight indicates a good nutritional status. Good nutritional status can be achieved when the body gets enough better nutrients, thus allowing physical growth to occur [2]. Low birth weight (LBW) is a health problem that requires attention in various countries, especially in developing countries or countries with low socioeconomic conditions. The WHO (World Health Organization) defines LBW as a baby born weighing 2500 g. The WHO also said that 60−80% of the infant mortality rate (IMR) was caused by low birth weight [3]. Based on the Central Sulawesi Health Office profile, the percentage of babies with low birth weight in Palu is still below the national target of the RPJMN for LBW. In 2019, there were two neonatal deaths due to LBW.

Baby weight at birth is the most crucial determinant of the chances of survival, growth, and development in the future [4]. LBW can be caused by several things such as maternal factors (nutritional status, age, parity, and economic status), pregnancy history, poor condition (have given birth to LBW and abortion), poor antenatal care, and condition of the fetus. Women with low economic status tend to have inadequate food intake and poor housing sanitation, and the ability to seek care during pregnancy is less to affect the birth weight of their babies [5]. The child's weight gain in the 1st year of life if the child gets good nutrition, from birth to the first 6 months of weight gain every week, is 140−200 g. The baby's weight is double the birth weight at the end of the first 6 months. Meanwhile, at the age of 6−12 months, weekly weight gain ranges from 85−400 g. Bodyweight will increase by 3 times birth weight at the end of the 1st year. Weight gain and loss must be considered in infants; therefore, assessing body weight is an important first step in nursing care and preventive health services. Achieving optimal growth and development has resulted from various interrelated

factors, including genetic, environmental, behavioral, and useful stimulation factors (Simbolon, 2012).

One form of stimulation that the community has given to their children is touching or massage [6]. Touch (massage) given to the baby after birth has great benefits on the growth and development of the baby. Scientifically, massage stimulates hormones in the body, such as appetite, sleep, memory, temperature regulation, mood, behavior, blood vessel function, muscle contraction, endocrine system regulation, and depression. Other studies have shown that baby massage can increase a baby's weight [7]. Another benefit of massage is that it keeps the baby calm. The effect of infant massage on neonatal weight gain 12 improves baby's sleep, improves baby's concentration, makes it easier for parents to recognize their baby, and is fun for family entertainment. Most mothers who have given birth do not know the benefits and how to massage their babies. The reason is that they do not know how to massage a baby, do not know the benefits and how to do it, and also because they are afraid that problems will occur with their baby if they massage the wrong one [6]. Massage is one of the oldest methods of the treatment in the world. Massage includes the art of health care and medicine that can relax overly stiff joints and unite the body's organs with strong rubbing. Massage therapy is used in salons and spas and various hospitals and health-care centers. Massage techniques have been widely used for health and weight gain in infants [4].

Based on the data above, this research needs to be carried out, so that accurate information is obtained regarding the baby's increase in weight and length by providing intervention, namely, baby massage, a very supportive method for overcoming the problem of malnutrition and low birth weight. The results of this study can be used as initial data to carry out a prevention program at the Nosarara Health Center against the incidence of LBW and malnutrition in infants. Besides, this study is also expected to help related agencies so that health education programs or other intervention programs run well and are on target.

This study aims to determine the effectiveness of baby massage on increasing a baby's weight and length in the work area of the Nosarara Community Health Center, Palu City.

Methods

This research was conducted in the working area of the Nosarara Public Health Center, Palu City, with an experimental research design, a research conducted to determine the effect of giving treatment to the subject or object of research with a quasi-approach with pre- and post-test control group research designs. The population in this study were all infants aged 0−11 months in the working area of the Nosarara Health Center, involving 60 infants, of which 30 were the intervention group and 30 were the control group. The sampling technique in this study used a purposive sampling method based on certain considerations. The statistical test used was parametric, namely, paired t-test.

Results

Table 1 shows that the age of the mother in this study is mostly 28−30 years old, namely, 23.3% with an education level of Senior High School at 63.3% and the mother's work is Mother's work, which is 95%. Then, the age of most children aged 4−7 months, namely, 38.3%.

Table 1: Characteristics of respondents

Respondent characteristics	n = 60, n (%)
Mother age (years old)	
19–21	6 (10)
22–24	15 (25)
25–27	4 (6.7)
28–30	14 (23.3)
31–33	10 (16.6)
34–36	4 (6.7)
37–40	7 (11.6)
Education	
Primary school	4 (6.7)
Junior high school	13 (21.7)
Senior high school	38 (63.3)
University	5 (8.3)
Infant age (months old)	
0–3	16 (26.7)
4–7	23 (38.3)
8–11	21 (35)
Mother's work	
Housewife	57 (95)
Honorary	3 (5)

Table 2 shows that there is a difference in children's weight before and after the intervention where the initial weight is 5.8 kg–6.43 kg after 1 month of intervention.

Table 2: Baby's weight before and after intervention

Statistical size	Before	After
Mean	5.841379	6.434483
Variance	2.819655	2.945911
Observations	29	29
Pooled variance	2.52314	2.566429
Hypothesized mean difference	0	0
Df	56	56
t Stat	0.735708	1.237651
p (T< = *t*) one-tail	0.23249	0.110505
t critical one-tail	1.672522	1.672522
p (*T*< = t) two-tail	0.464979	0.22101
t Critical two-tail	2.003241	2.003241

Table 3 shows that there are differences in the child's body length before and after the intervention where the initial body length was 56.97 cm–60.03 cm after 1 month of intervention.

Table 3: Baby's length before and after intervention

Statistical size	Before	After
Mean	56.97241379	60.03448
Variance	41.90921182	45.14734
Observations	29	29
Pooled variance	41.77615764	43.02115
Hypothesized mean difference	0	0
Df	56	56
t Stat	-0.611488441	0.430411
p (T< = t) one-tail	0.271675391	0.334274
t Critical one-tail	1.672522303	1.672522
p (T< = t) two-tail	0.543350781	0.668549
t Critical two-tail	2.003240719	2.003241

Discussion

Effect of baby massage on bodyweight

The baby's weight at birth is the most important determinant to determine the chances of survival, growth, and development in the future. Mothers who always maintain their health by consuming nutritious food and adopting a good lifestyle will give birth to healthy babies; on the other hand, mothers who experience nutritional deficiencies risk giving birth to low birth weight. LBW reflects the health and nutrition situation and shows the survival rate and psychosocial development [2].

One of the manifestations of growth is body weight. The age of 1−3 months is a period of very rapid growth, so it is necessary to maintain the baby's weight according to the age. Bodyweight is strongly influenced by genetics, environment, health level, nutritional status, and physical exercise. In the growth and development of babies, many factors influence, so it needs to be maintained a normal weight according to age. It can be conducted by meeting the nutritional needs of babies both in quantity and quality, maintaining a conducive environment, including creating a comfortable living environment and good sanitation, maintaining baby's health by providing immunization and control to health services, and finally providing a stimulus [6]. The achievement of optimal growth and development results from the interaction of various interrelated factors. The types of stimulation given to children are visual, auditory, kinetic, and tactile stimulation. One form of stimulation that the community has given to their children is by touch or massage [5].

The study results found that there was no significant difference between the mean weight of the final infants after receiving the intervention and the weight of the final infants who did not receive the intervention. Even though it was seen that the average weight gain of the infants who received the intervention was higher (600 g) than the mean of weight gain of infants who were not intervened (400 g). According to that research, the massage stimulates parasympathetic nerve activity, which can improve gastric sensory and motor function, making gastric emptying faster and making babies hungry so that the frequency of milk consumption increases, which means better absorption of nutrients to increase body weight.

Baby massage can increase a baby's weight. This is because babies who are massaged have increased levels of absorption enzymes and insulin to absorb food juices better. As a result, the baby becomes hungry quickly and therefore feeds more often, increasing milk production. Massage also increases the mechanism of food absorption by the vagus nerve so that the baby's appetite will also increase, which can directly increase the baby's weight.

In theory, it can be explained that the most of the nervous system is an autonomic system, one of which is the innervation of the gastrointestinal tract. The parasympathetic nerve supply is conveyed from the abdomen through the vagus nerve. The vagus nerve is the 10th nerve that regulates organs' function, including the chest and abdomen. Stimulating the vagus nerve (parasympathetic nerve) will stimulate the stomach to secrete the hormone gastrin. Gastrin hormone will stimulate insulin secretion, hydrochloric acid, pepsinogen, pancreatic enzymes, mucus, increase liver bile flow, and stimulate gastric motility. The gastrin hormone also facilitates gastric receptive relaxation (temporary relaxation) so that the stomach can increase its volume very easily without increasing pressure [8].

The release of insulin will make it easier to metabolize glucose. Secretion of hydrochloric acid, pepsinogen, pancreatic enzymes, and increased hepatic bile flow will facilitate the digestion of food. When food reaches the duodenum, it will stimulate the release of cholecystokinin, which wil l stimulate intestinal motility so that an increase in gastric and intestinal motility will facilitate mixing, propulsion of food, and better absorption of nutrients [8].

The best time to massage is in the morning before going through the bath because it is practical. After all, the rest of the massage oil will be easier to clean. Massage can also be done at night before going to bed because after the massage, usually the baby will relax and feel sleepy, sleep will be more restful. Massaging can also be done when the baby is relaxed and calm using coconut oil; however, this study using baby oil [9].

Baby massage is usually called stimulus touch and can be interpreted as a comfortable touch of communication between mother and baby. For centuries, this therapy has been known in various nations and cultures, with various forms of therapy and purposes. It is an expression of love between parents and children through the touch of the skin, which has a tremendous impact. Besides can stimulate muscles, bones, and organ systems to function optimally [10]. Baby massage is the oldest and most popular touch therapy known to man.

Baby massage has long been practiced almost worldwide, including in Indonesia, and passed down from generation to generation. Touch and massage of the baby after birth can assure continuous body contact that can maintain a feeling of security in the baby. Baby massage can be done in the morning and evening, once or twice when the baby is well awake [4].

The art of massage is taught from generation to generation, although it is not clear how massage and touch can positively affect the human body and low-stress level. Massage in infants for more than 6 weeks can further increase weight, show better progress in

emotional, social skills, calmer temperament, and a decrease in stress hormones in the urine. In Korea, infant massage in research can reduce morbidity and infant visits to health facilities [11].

The benefit of baby massage is that it can increase the baby's weight with massage, which can have positive biochemical and physical effects. Because babies get a massage on the abdomen, this massage can facilitate the baby's digestive process. Baby massage causes an increase in vagus nerve activity and will stimulate digestive hormones, including insulin and gastrin. Insulin plays a key role in metabolism, causing an increase in carbohydrate metabolism, glycogen storage, fatty acid synthesis, amino acids, and protein synthesis. Thus, insulin is an important anabolic hormone; increasing insulin and gastrin can stimulate digestive function so that nutrition absorption becomes better and will cause babies to be hungry faster [7].

Along with the development of science and technology, modern health science experts have scientifically proven that touch and massage therapy for babies has many benefits, especially when done by the baby's parents to increase milk production and increase baby weight. Research in Australia proves that babies whose parents massage will gain weight and have better emotional and social relationships. Baby massage can be done in the morning and night [3]. Baby massage can be done once or twice when the baby is well awake [12]. Various risk factors for infant mortality are influenced by the characteristics of the mother and child and the circumstances of birth. Causes of infant mortality include lack of stimulus and nutrition, low birth weight (LBW), pneumonia, and others. Therefore, the government and experts have agreed to work together to improve infant health in various ways. One of them is to instill and define the concept of touch/massage therapy to increase body resistance and bonding between mother and child.

Conclusion

The results of this study showed that there was no significant difference in the increase in body weight and length of infants between the intervention group and the control group, with an average increase in body weight of infants who were massaged 600 g and those who were not massaged 400 g, as for the body length of babies who were massaged increased by 3.01 cm and those who were not massaged 1.26 cm.

It is suggested that mothers should continue the infant massage along with exclusive breastfeeding, complementary feeding, parenting, history of infectious diseases, and the environment.

Ethical Clearance

All data obtained will be kept confidential the identity of the subject and the confidentiality of the data is only for research purposes.

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