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The Effect of Nutrition Education based on Local Foods on Mothers' Knowledge and Anthropometry of Malnutrition Children Aged 6 to 21 Months

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ABSTRACT

Background: Child's nutrition is an important factor in child's development, growth, and immunity particularly in the first two years of life. Lack of nutrition about complementary foods (quantity and quality) during this period also causes malnutrition. **Methods:** A quasi-experimental pre-post test design with single group research was aimed to study the effect of Local foods education on mother knowledge and anthropometry of child. Paired-T tests were used to analyze the effects of local foods education on mother knowledge and child anthropometry 6-21 months. **Results:** This study showed the mean differences of mother knowledge 10.91 (p=0.000), anthropometry of child weight-for-age 0.20 ($\pm$0.54) (p=0.037), height/length-for-age 0.01 ($\pm$0.23) (p=0.711), weight-for-height/length 0.31 ($\pm$.76) (p=0.025), head circumference-for-age 0.27($\pm$0.43) (p=0.001), and chest circumference-for-age 9.12($\pm$10.11) (p=0.000). All variables had a significant effect after local food education p<0.05 except height-for-age which p>0.05. **Conclusion:** The results revealed the effectiveness of the local food education to mothers with video recording media and booklets significantly increased mother's knowledge and anthropometry of child except height/length-for-age in the first month follow up.

Keywords: Child's Nutrition; Anthropometry; Education; Knowledge; Local Foods

INTRODUCTION

Linear growth is an indicator to look at the overall well-being including children's nutritional status and a precise marker of inequality in children growth. The first two years of a child's life is recognized as a "golden age" or critical period (Onis & Branca, 2016). Globally, millions of children fail to achieve their linear growth potential due to sub-optimal health disorders and inadequate nutrition (Onis & Branca, 2016). Lamongan regency is one of the stunting-affected regencies in East Java Province Indonesia which must be tackled immediately with a stunting prevalence of 48.87% in 2013 (Adji *et al.*, 2019). One of the causative factors is the lack of knowledge in preventing stunting and parents' insufficient understanding of food patterns suitable for the children's growth and development (Hadi, 2018). Handoko's (2013) study about mother knowledge of complementary feeding in Lamongan Regency mentioned that 55% of mothers had inadequate knowledge about complementary feeding. Mothers played a major role in the decision of providing complementary foods to their children (Notoatmodjo, 2014). One of the methods to increase mothers' knowledge of complementary feeding especially for toddlers aged 6-24 months is nutrition education utilizing media. Some of the media that can be used are print media such as booklets, leaflets, flyers, flip charts, rubrics, posters and photos or electronic media such as video recordings, television, radio, slides, film strips or media boards (Notoatmodjo, 2014). Health education must be done to improve mothers' knowledge. Health education can help mothers in taking care of their children and choosing appropriate food based on locally available food. Health education is also hoped to affect child's anthropometry. Based on the description, the researchers are interested in determining the effect of the local complementary food education, namely booklet and video recording, for increasing mothers' knowledge and anthropometry of children aged 6-21 months.

METHODOLOGY

One group was in this quasi-experimental study with

a pre-test and post-test design with purposive sampling. Due to COVID-19 pandemic in Indonesia during March to July 2021, the researcher was not permitted to use other sampling techniques which more suitable for the pre-posttest design for a quasi-experimental study. The sampling method was used because the number of villages with the most malnourished children in Lamongan was in the work area of the Sumberaji Health Center. There were 4 villages having children with malnutrition.

The population of this study were the mothers with children aged 6-21 months at Sumberaji Primary Healthcare area, East Java, Indonesia. The sample size were 35 pairs of mothers and her child based on the sample size calculation using formula pre-test and post-test design (Dharma, 2011). There were 34 pairs of mothers and her child were included. Exclusion criteria was mothers who had babies suffering from chronic diseases which had effect on nutrition. However, the data collection was carried out only to 34 pairs of mothers with their children due to the crisis of COVID-19 pandemic. The researchers were not allowed to continue the study for safety reason.

This program continued for four weeks combined with two parts in the first week and fourth week. The first week included program orientation, pre-test session, and local food education session, then in the fourth week was post-test session.

Program orientation and pre-test session took around 15 minutes. Firstly, the researcher created a relationship with participant by using self-introduction method. On the pre-test session the researcher gave a questionnaire for the pretest of knowledge about complementary feeding. After mother's filled the questionnaire, the researcher measured children's anthropometric assessment including weight, height, head circumference, and chest circumference.

Local foods education session lasted for around 30 minutes. This education was carried out after the introduction session and the pre-test session. This session contained a demonstration session and a group discussion session. On the demonstration session the researcher applied local foods education using video records. Starting with the first topic about the importance of complementary feeding-related with stunting in children age 6-24 months. Then, the second topic was about appropriate food preparation methods and household measurements to ensure that children got enough energy and nutrients for growth and development. Then the third topic was about complementary feeding guides and recipes for children of different age groups according to the local available food. After demonstration the researchers made a group discussion about the topic in video which took around 10 minutes. After group discussion the researcher explained the booklet and gave the participant a booklet. This booklet was given to the mothers to review it by themselves so that the content was made easy to remember and they could remember the recipes in the booklet.

The second session was the follow up session for the post-test (4th weeks). The researcher gave a questionnaire for the post-test of knowledge about complementary feeding and questionnaire of appropriate complementary feeding assessment. After mothers completed the post-test, the researcher measured children' anthropometric assessment on weight, height, head circumference, and chest circumference to evaluate the child's nutrition.

The knowledge of mothers was accomplished by a structured questionnaire consisting of two sections for pre-test and post-test. The mother knowledge about the questionnaire consisted of the complementary feeding, it were developed by researcher based on WHO's Guidelines for appropriate complementary feeding and previous research (Dewey, 2003; Saleem *et al.*, 2014; Susanto *et al.*, 2017; WHO, 2009) consisted of 34 questions.

The Anthropometry of child tools were combined with four tools, firstly the weight scale using a digital baby scale (Laica babyscale BF 2051), capacity of 20 kilograms with measurement sensitivity 10 grams. Secondly, the OneMed infant ruler was used as a height measurement tool, with a maximum length of 99 centimeters with an accuracy of 1 millimeter for children aged 0-3 years. Thirdly, the measurement of head circumference was measured by the Seca 212 tape, scale from 3 to 59 centimeters. Finally, the chest circumference was measured by the OD235 OneMed, it ranged up to 150 centimeters with an accuracy level of 1 millimeter. The growth charts by WHO 2006 based on child age and child gender were used to evaluate the nutritional status of the child. There were three types of growth charts as following; 1.the weight chart according to age is adjusted to the child's age using growth charts for children aged 6 months – 2 years (z-scores) for boys and girls, 2. the height/length-for-age was used a growth chart for children aged 6 months– 2 years (z-scores) for boys and girls and the weight-for-height/length uses a

growth chart for children from birth to the age of two (z-scores) for boys and girls. The Head Circumference-for-age uses a growth chart for children from birth to the age of two (z-scores) for both boys and girls. The Chest Circumference-for-Age uses a growth chart by Shiraz (Iran) for children from birth to the age of two (percentile).

The content validity was evaluated by 3 experts whose specialties are in the pediatric nursing area. The content validity demonstrated over 0.80 in all categories. The Statistical Product software and Service Solution (SPSS) version 24.0 was used to analyze the data. Descriptive statistics was accomplished to identify the characteristics of the research subject on demographic data in the term of mother's age, mother education, mother's occupation, child's age, child sex, and the number of families who lives in the same house. The value of these variables was presented in terms of frequency or amount and percentage.

The interferential statistic, the independent *t*-test was utilized in this study to determine the effectiveness of local foods education on the mean pre-test and post-test of mother's knowledge and anthropometry of the child in the terms of weight-for-age, height/length-for-age, weight-for-height/length, head circumference-for-age, and chest circumference-for-age. Parametric test (Paired *T*-Test) was used because the variable was distributed normally. The test was carried out with a significant level of P α (0.05) which meant that local complementary foods nutritional education programs had significantly improved the mother knowledge and anthropometry of the child.

Ethical Consideration

The Institutional Review Board (IRB) granted ethical approval for this research at Khon Kaen University Ethics Committee for Human Research number HE632287 with Record Number 4.2.02: 41/2020, date of approval was on 02 February 2021.

Informed consent forms were signed by respondents who were eligible to participate in the study. All participants were guaranteed confidentiality and anonymity as they were assigned a coded number for identification purposes. The researcher requests a community nurse at the Posyandu (Integrated Service Post) to explain the purpose of the study to decrease the possible bias on the researcher. The researcher gae a travel compensation as a token of gratitude to the participants who are willing to participate in this study.

The researcher was following the protocols of COVID-19 prevention.

RESULTS

Most of the mother age were in the age range 21-25 years old with 47.1%. Most of the respondents 73.5% had completed high school. In this study, the great majority of the respondents 91.2% were housewives. The gender of children was almost the same between males and females, namely 55.9% and 44.1%. The children in this study were predominantly between the ages of 12 and 24 months, accounting for 70.6% of the total.

Table 1: Mother's Knowledge and Mean Differences in Pre-Test and Post-Test (N=34)

Mother's knowledge	Mean (SD)	t (34)	p Value	95% CI	
				Lower	Upper
Pre-test Mother knowledge	18.58 (5.19)	14.26	<0.001	9.35	12.47
Post-test Mother knowledge	29.50 (3.15)				

Note. CI = confidence interval
*p≤0.05 level (two-tailed)

According to the table 1 the paired *T*-test of mother knowledge indicated that the mother's knowledge had significantly improved with a *p*-value of <0.001. However, this was inseparable from the role of cadres in the community in controlling the achievement of maternal knowledge about optimal complementary foods, which was influenced by several factors, namely maternal knowledge, mother's occupation, maternal education and activeness of health workers.

Table 2: Anthropometry of the Child

Variable	M (SD)	t (34)	p Value	95% CI	
				Lower	Upper
Weight-for-age	0.20 (0.54)	2.173	0.037	0.13	0.39
Height/ length-for-age	0.01 (0.23)	0.373	0.711	-0.06	0.95
Head circumference-for-age	0.27 (0.43)	3.673	0.001	0.12	0.42
Weight-for-height/ length	0.31 (0.76)	2.357	0.025	0.04	0.57
Chest circumference - for-age	9.12 (10.11)	5.258	<0.001	5.59	12.64

(Weight-for-Age, Height/Length-for-Age, Weight-for-Height/Length, Head Circumference-for-Age, and Chest Circumference-for-Age) Mean Differences in the Pre-test and Post-Test (n=34)

From Table 2, the paired *T*-test was used to evaluate the anthropometry of child (weight-for-age, height/length-for-age, weight-for-height/length, head circumference-for-Age, and chest circumference-for-

age). There was a significant increase on the pre-test and post-test on weight-for age with mean (±SD) 0.20 (±0.54), the 95% CI value (0.13) to (0.39) with a p-value 0.037, head circumference-for-age with mean (±SD) 0.27 (±0.43) the 95% CI value (0.12) to (0.42) with a p-value 0.001, weight-for-height/length with mean (±SD) 0.31 (±0.76) the 95% CI (0.04) to (0.57) with p-value 0.025, chest circumference-for-age with mean (±SD) 9.12 (±10.11) the 95% CI value (5.59) to (12.64) with a p-value <0.001, and there were not significant improve on the pre-test and post-test height/length-for-age with mean (±SD) 0.01 (±0.23) the 95% CI value (-0.06) to (0.95) with a p-value 0.711.

DISCUSSION

This study was proposed to determine the effects of local complementary nutrition education programs. Mother had a different higher score of knowledge than before, and the anthropometry of child improved after giving local complementary foods nutrition education program.

After completing the local complementary foods nutrition education program, the knowledge of mothers who participated in this program had a different higher score than before. The mean score of knowledge before and after the intervention illustrated statistically significant at the level of p-value <0.001. Thus, the result answered the hypothesis that the knowledge was a very important factor on the formation of a person's actions. The method of changing a person's action is by providing health education to increase maternal knowledge through educational interventions. The intervention in this study was to increase the knowledge of complementary foods in mothers by providing local nutrition education using video record media and booklets that could be seen and studied at anytime, anywhere.

The findings of this study are consistent with other studies which stated that health education using audio-visual media can increase maternal knowledge about complementary foods for breastfeeding in infants aged 6-12 months (Munianti & Indrayani, 2019). Another study stated that health education using booklet media can improve third-trimester pregnant women's knowledge and attitudes about exclusive breastfeeding (Rosa, Tyastuti, & Rahmawati 2019). A study showed that the use of video tutorials increase pregnant women' knowledge and skills in giving prenatal stimulation

(Wahyuni, 2020). Knowledge played a major role in breastfeeding practices among nurses to provide health-education to mothers of new-born babies (Chan, Daud, & Isa, 2012) It can be concluded that the intervention of local complementary nutrition education using video record media and booklets has an effect in increasing the knowledge of mothers aged 6-21 months about complementary foods.

Anthropometry of children (weight-for-age, height/length-for-age, weight-for-height/length, head circumference-for-age, chest circumference-for-age) of children aged 6-21 months whose mothers participated in the nutrition education program for local complementary foods improved after the provision of a local foods education. The increase in anthropometric z-scores occurred partly because of the mothers' knowledge of the right complementary foods for breastfeeding for children, which included carbohydrates, proteins, fats, as well as vitamins and minerals. The nutrition education program for local breast milk complementary foods included how to provide appropriate complementary foods for children aged 6-24 months. This is in line with other research which stated that integration with environmental, educational, and stimulation interventions could have a positive effect in reducing linear growth barriers (Sudfeld et al., 2015). Another study stated that parenting and feeding behavior plays an important role in children's weight and BMI (Polfuss et al., 2017) .

This study found that mean pre-test and post-test height/length-for-age was 0.01 with a p value of 0.711, which means that there was no statistically significant increase after the local complementary food nutrition education program. This is because the increase in height every month in children aged 6-12 months is only 1-2 cm and 10-12 cm per year in children aged more than 1 year. This study was only conducted for one month so that the growth in height was not seen significantly.

The advantage of this research was that it used video media along with booklets in providing education as a means of mother's knowledge so that it could be repetitively played and read wherever located. As well as respondents in this study, focuses on children with malnutrition, so that the education provided were right on target. The limitation of this study was that there was no repeated evaluation and it was only carried out for 1 month.

CONCLUSION

According to the results of this study, nursing in the community should take intervention and must be able to use the contents of education intervention about local complementary foods nutrition education to mother who have children aged 6-21 months as a prevention of malnutrition. Future research should be done with a larger number of participants to provide more quality of representation. Three months' program must be introduced to evaluate the anthropometry of child to get the optimal difference in child growth.

Conflict of Interest

The researcher declares that there were no conflicts of interest declared by the authors.

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