Effect of Nutritional Education on Improving Mother's Knowledge and Nutritional Status of Malnourished Toddlers in Pekanbaru City Indonesia

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Submission date: 25-Aug-2020 11:19AM (UTC+0700)
Submission ID: 1259964297
File name: Effect_of_Nutritional_Education_on_Improving_Mother_Edit.pdf (487.23K)
Word count: 3262
Character count: 17873

Effect of Nutritional Education on Improving Mother's Knowledge and Nutritional Status of Malnourished Toddlers in Pekanbaru City Indonesia

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Abstract

The low nutritional knowledge of mothers creates greater risk for malnutrition of infants. The study aimed to examine a model design of nutritional education concerning mothers' knowledge and the changes of nutritional status among malnourished children in Pekanbaru. The research design was quasy experiment, pre and post test with control. The intervention group was 30 mothers who had underweight malnourished children who received nutrition education and modules, while the control group was 30 mothers, only getting modules. Nutrition education was provided 4 times through the provision of materials and modules and using interactive teaching aids. Nutritional status was based on weighing every month and observed for 3 months after the intervention. Data analyzed using the T Test. A significant differences was found in mothers' nutrition knowledge about exclusive breastfeeding ($p < 0.001$), menu settings ($p < 0.001$) and parenting ($p < 0.001$) between the intervention and control groups. The intervention group had a higher increase in knowledge scores than the control group. After three months of nutrition education, there was an increase in the average Z score in the intervention group, from -2.39 to -1.96 while values in the control group increased from -2.26 to -2.02. Nutrition education can improve mother's nutritional knowledge, but it has not significantly improved nutritional status in under-fives.

Keywords: Nutrition Education; Toddler; Malnutrition; Nutrition Status; Mother's Knowledge

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1. Introduction

The prevalence of malnutrition and severe malnutrition in children under five in Indonesia based on the 2013 Basic Health Research Report was 19.6% [1]. In Riau Province, the prevalence of malnutrition was 13.5% [2]. This prevalence presents a public health problem because it has an impact on morbidity and mortality, development and growth as well as intellectual development and productivity so it must be reduced.

Based on a preliminary study with samples of infants aged 6-12 months, it was found that the lack of variety in the types of food provided and the same menu was given at different times of meal. Lack of knowledge and awareness of the mother about the amount of food, the type and time of proper feeding contributes to the nutritional status of toddlers [3].

Inappropriate feeding practices, such as the introduction of food too early (before the baby is 6 months old), less diverse amounts and types of food consumed are identified as one of the main causes of malnutrition in children in developing countries [4], [5]. In addition, low nutritional knowledge from caregivers is also a cause of nutritional problems in infants [6]. The main cause of malnutrition in infants is due to incorrect beliefs about food and health and poor feeding and health practices rather than lack of basic food data sources [6]. There are still many myths circulating to the public related to feeding infants. For this reason, it is necessary to provide correct information to mothers through nutrition education so that they can improve their knowledge and skills in food processing in accordance with the existing economic and cultural capabilities.

Nutrition education is needed for malnourished toddler handling, so they could grow and develop appropriately. Generally, the training is conducted in the form of discourse, and the method is insufficient to increase the mothers' knowledge. Other efforts are needed to improve the mothers' knowledge and skills. One of the efforts made is by changing the discourse method to constitute a more interactive method through interactive teaching aids. With the interactive method, education participants and facilitators have a two-way interaction, less monotonous and more stimulating so that the participants could understand the materials provided more easily The purpose of the study was to examine the effects of nutrition education on maternal knowledge and nutritional status of malnourished toddlers in Pekanbaru City in 2018.

2. Materials and Methods

2.1. Research Design

The research design was quasy experiment, pre and posttest with control. The intervention group was mothers who have malnourished children who receive nutrition education and modules. The control group was mothers who have underweight malnourished children who only get modules.

2.2. Recruitment of Nutrition Education Participants

The intervention group participants were drawn from the Sri Meranti Integrated Healthcare Center working area of the Rumbai Health Center in Pekanbaru City which is a special Integrated Healthcare Center for underweight children. The number of malnourished children under five in Sri Meranti Integrated Healthcare Center was 37 respondents, but in this study those who met the inclusion criteria were 30 nutrition mothers attending the nutrition education activities. The control group was taken from the Rejosari Health Center in Pekanbaru City which had the same demographic characteristics as the Rumbai Health Center. Screening is done to get toddlers with poor nutritional status and obtained 89 underweight toddlers. Then a simple random sampling was taken and 30 mothers who had undernourished toddlers were obtained as a control group. Criteria for underweight nutrition is Z score <-2 Standard deviation based on the Weight/Age index.

2.3. Nutrition education curriculum

Nutrition education is carried out 4 days a week, with the provision of material for ± 180 minutes. Pre-test and post-test is done before and after the delivery of material. After 2 weeks of training, post test was conducted again. Weighing is done every month for three months. The weighing is carried out by an integrated healthcare cadre who has received anthropometric training. The dependent variable was included the nutritional status and mother's knowledge of growth, exclusive breastfeeding, menu settings and parenting. The methods used in nutrition education was recording the weight and height on a growth charts based on age, playing cards on concerning myths and facts about exclusive breastfeeding and complementary foods, and compiling a complementary feeding menu. In addition, how to make complementary foods for infants aged 6-8 months and 8-12 months was demonstrated. Another method used involved role playing using parenting materials. Nutritional status was measured by weighing toddlers with a body weight index for age. Mother's knowledge was measured before and after conducting nutritional education and two weeks after conducting the nutritional education.

Table 1 : Nutrition Education Activities

Day	Lesson	Activities	Learning Media
Day 1	Growth and development of infants and toddlers: - The importance of 1000 HPK - Toddler Nutrition Status - Hygiene and Sanitation - The importance of immunization - Child's play	- Weight Weighing and Height Measurement - Pre Test - Explanation of growth and development of infants and toddlers - Growth Curve Exercise to determine toddler's nutritional status - Stimulation through Game Growth and Development	- Weight Scales (Dacin) and Microtoise - Pre-Test and Post-Test Questionnaire - infocus projector - Growth Curve from WHO, 2005 - Healthy, Smart and Quality Toddler Module.

		- Post Test	
Day 2	Parenting for Infants and Toddlers - Daily care - Environmental Hygiene - Immunization according to the age of the child - The role of fathers and families in the care of infants and toddlers	- Pre Test - Explanation of Baby and Toddler Caring - Role Play - Quiz - Post Test	- Pre and Post Test Questionnaire - infocus projector - Healthy, Smart and Quality Toddler Module
Day 3	Exclusive breastfeeding - Benefits of exclusive breastfeeding - Colostrum - Fast Growth Period - The right way to breastfeed - Various breastfeeding positions - Myths and facts about breast milk	- Pre Test - Explanation of Exclusive breastfeeding - Myths and Facts Games about breast milk - Post Test	- Pre and Post test questionnaire infocus projector - Poster - Card Game Myths and Facts about ASI - The Toddler Module is healthy, smart and quality
Day 4	Preparation of toddler menus: - Complementary food - Complementary food Requirements - Infant feeding - Prepare Complementary food - Toddler Feeding Schedule - Complementary food recipe - Myths and Facts related to Complementary food	- Pre Test - Explanation of Toddler Menu Preparation - Myths and Facts Games about Complementary food - Exercise Preparation of toddler menus - Cook demonstration - Post Test	- Pre Test and Post Test Questionnaire - infocus projector - Menu Forming Display Board - Myth card or fact card about Complementary food - Healthy, Smart and Quality Toddler Module - Toddler Menu Book - Equipment for Cooking Demo

2.4. Test Validity and Reliability of the Questionnaire

The questionnaire was developed from the Mitra's Dissertation, 2016 [7]. The questionnaire was tested for validity and reliability, with a sample of 25 mothers who had undernourished children under the same characteristics as the study area. Respondents in the validity and reliability test were not used as research samples.

2.5. Data Analysis

Data analysis using Paired Samples T Test and Independent T Test if normally distributed. Paired Samples T Test is used to determine differences in knowledge and nutritional status before and after nutrition education. Independent Test T Test is used to determine differences in knowledge scores and nutritional status of the intervention and control groups. Wilcoxon and Mann Whitney tests were used when not distribution data.

3. Results

3.1 Characteristics of research subjects

Table 1 show that the average age of mothers in the intervention group was 30.67 years, the youngest age was 23 years and the oldest age was 40 years. Mother's education in general comprised High School Graduate (45.0%). In the intervention group, the most education was elementary school graduates (33.3%) and high school graduates (33.3%), while in the control group, the majority were high school graduates (56.75%). Most of the mothers were unemployed, both in the intervention group (90.0%) and in the control group (56.7%). Based on parity, the majority had 2 children (the intervention group) and the majority in the control group had 1 child and 2 children.

The average age of the head of the family was 36.5 years with a range of 25-51 years. The average age of the head of family was higher in the control group compared to the intervention group. Most education of the head of family was graduated from high school (50.0%) both in the intervention group (43.3%) and the control group (53.3%). Most head of family worked as laborers (46.7%). The average family income is Rp. 2,435,000. In the control group, the average family income was higher compared with that of the intervention group.

The sample in this study were toddlers with malnutrition status, as many as 41.6% were born with low birth weight (LBW). Obtained 43.3% of mothers who exclusively breastfed.

Table 1. Characteristics of Socio demography in the intervention and control groups

Socio demographic characteristics	Category	Intervention Mean (SD) Min-Max n (%)	Control Mean (SD) Min-Max n (%)	Total Mean (SD) Min-Max n (%)
Mother's characteristics				
Mother's age	Age in years	30.67 (5,774) 23-40	33.23 (4,869) 23-39	31.95 (5,451) 23-40
Mother's Education	No school	4 (13.3)	0 (0.00)	4 (6.7)
	Elementary school	10 (33.3)	4 (13.35)	14 (23.3)
	Junior High school	6 (20.0)	5 (16.75)	11 (18.3)
	Senior High school	10 (33.3)	17 (56.75)	27 (45.0)
	College/University	0 (0.0)	4 (13.35)	4 (6.7)
Mothers Occupation	Not working	27 (90.0)	17 (56.7)	44 (73.3)
	Civil servants	0 (0.0)	1 (3.3)	1 (1.7)
	Private employees	1 (3.3)	10 (33.3)	11 (18.3)
	entrepreneur	2 (6.7)	2 (6.7)	4 (6.7)
Parity	1 child	6 (20.0)	9 (30.0)	15 (25.0)
	2 children	14 (46.7)	9 (30.0)	23 (38.3)
	3 children	4 (13.3)	8 (26.7)	12 (20.0)
	4 children	4 (13.3)	4 (13.3)	8 (13.4)
	5 children	2 (6.7)	0 (0.0)	2 (3.3)

Number of toddlers in the family	1 toddler	21 (70.0)	21 (70.0)	42 (70.0)
	2 toddlers	9 (30.0)	9 (30.0)	18 (30.0)
Characteristics of Head of Family (Father)				
Age of Head of Family	Age in years	36.5 (6.90) (25-51)	38.63 (6.59) (25-49)	36.6 (6,902) 25-51
Education of Head of Family	No school	4 (13.3)	0 (0.0)	4 (6.7)
	Elementary school	4 (13.3)	0 (0.0)	4 (6.7)
	Junior High School	9 (30.0)	11 (36.7)	20 (33.3)
	Senior High School	13 (43.3)	17 (56.7)	30 (50.0)
	College/University	0 (0.0)	2 (6.6)	2 (3.3)
Occupation of Head of Family	Civil servants	2 (6.7)	2 (6.7)	4 (6.7)
	Private employee	2 (6.7)	7 (23.3)	9 (15.0)
	entrepreneur	13 (43.3)	6 (20.0)	19 (31.6)
	Laborer	13 (43.3)	15 (50.0)	28 (46.7)
Family Income	Family income in Rupiah per month	1,883,333 (836,161) (750,000-3,500,000)	2,986,667 (1,350,061) (1,000,000-5,500,000)	2,435,000 (1,237,847) 750,000-5,500,000
Child characteristics				
Birth Status	Low Birth Weight	11 (36.7)	14 (46.7)	25 (41.7)
	Normal Birth Weight	19 (63.3)	16 (53.3)	35 (58.3)
Exclusive breastfeeding	Yes	14 (46.7)	12 (40.0)	26 (43.3)
	Not	16 (53.3)	18 (60.0)	34 (56.6)
Gender of child	Male	6 (20.0)	10 (33.3)	16 (26.7)
	Female	24 (80.0)	20 (66.7)	44 (73.3)
Age of child	Age in months	26.87 ± 11.3	42.87 ± 8.98	34.87 ± 12.95

3.2 Nutrition Education

Table 2. show that maternal knowledge scores increase after nutrition education. The difference in maternal knowledge scores was higher in the intervention group compared to the control group. The nutritional status of children under five in the intervention group showed significant results on improving the nutritional status of children under five. In the intervention group, the Z score increased from -2,39 to -1.96 while in the control group the Z score increased from -2.27 to -2.09. After 3 months of nutrition education, there was a change in nutritional status from underweight to mildly underweight (-2SD - <- 1SD) in the intervention group by 40% and the control group by 26.7%. (Figure 1).

Table 2. Effects of Nutrition Education on changes in maternal knowledge and nutritional status of toddlers

Variable	Before Mean ± SD	Pvalue	After Mean ± SD	Pvalue	d Mean ± SD	Pvalue
Knowledge of Growth						
Control	3.73 ± 0.868	0.887 *	6.97 ± 2,076	0.593 *	0.57 ± 1.07	0.007 **

Intervention	3.63 ± 0.964		6.33 ± 1,845		0.43 ± 0.68	0.002
Knowledge of Parenting						
Control	6.97 ± 2,076	0.217	7.87 ± 1,978	<0.001	0.90 ± 2.04	0.022
Intervention	6.33 ± 1,845		9.60 ± 1,380		3.27 ± 1.68	<0.001
Knowledge of exclusive breastfeeding						
Control	8.87 ± 2.488	0.260	10.13 ± 1,332	<0.001	1.27 ± 2.12	0.003
Intervention	9.53 ± 2,030		12.47 ± 1,167		2.93 ± 2.53	<0.001
Knowledge of Menu Settings						
Control	6.53 ± 1,776	0.582 *	6.80 ± 1,495	<0.001 *	0.27 ± 1.64	0.380 **
Intervention	6.40 ± 1,610		8.73 ± 1,311		2.33 ± 1.42	<0,000
Toddler Nutrition Status (Z-score)						
Control	-2.27 ± 0.29	0.403	-2.09 ± 0.49	0.406	0.17 ± 0.40	0.027
Intervention	-2.39 ± 0.48		-1.96 ± 0.76		0.43 ± 0.51	<0.001

d = difference in score after and before nutrition education
Changes in nutritional status after 3 months of intervention
Man Whitney *
Wilcoxon Test **
Paired T Test samples
Independent T Test
Sig p <0.05

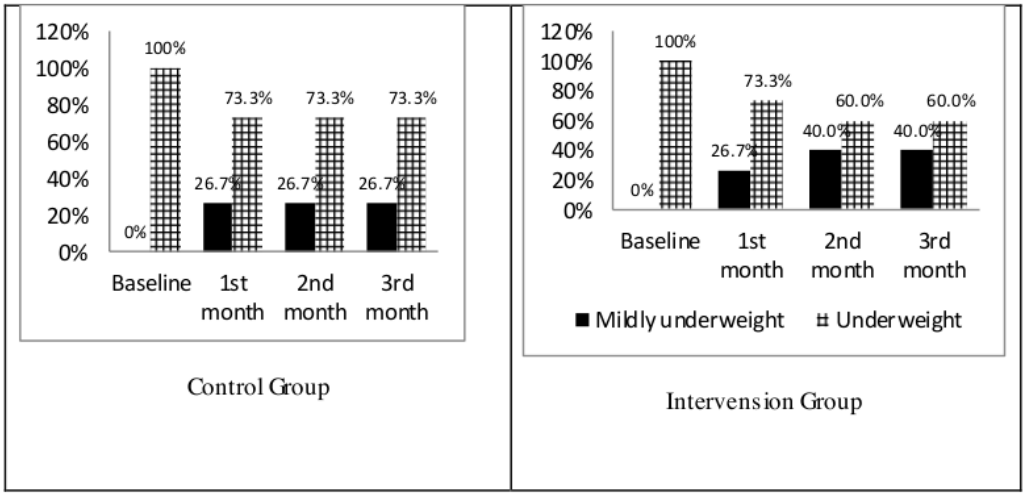

Figure 1. Comparison of the nutritional status of the intervention and control groups after 3 months of nutrition education.

4. Discussion

One of the efforts made to improve the knowledge of mothers is by conducting nutrition education. In developing countries, nutrition education provided to primary caregivers can improve knowledge and nutritional status of toddlers [8]. Increased knowledge of mothers is expected to improve the practice of caring for mothers and children [9]. Lassi's research shows that education about complementary feeding significantly increases height and can significantly reduce stunting levels. Interventions with complementary feeding education have the potential to improve the nutritional status of children in developing countries [10]. Another study on nutrition education was carried out by Khillaru shows that nutritional education can produce a longer duration of exclusive breastfeeding, decrease diarrhea morbidity, and increase energy intake [11].

In general, the level of education of mothers in the intervention and control groups is high school and below. Most of the mothers do not work, only as housewives. Low maternal education is related to the level of childcare knowledge for malnourished children [12], [13]. Mother's nutrition knowledge influences children's eating habits level [14]. Improving the mother's education level is very important, to empower the first care provider of children in the community [15].

Proper nutrition education is given by learning to understand through language that is easily understood and can be learned at home [16]. Nutrition education is proven to increase nutrition knowledge maternal and nutritional status of malnourished children under five. Nutrition education methods provided are in the form of interactive cards such as sticky cards, role playing and demonstration of MPASI processing practices. Through nutrition education media the participants, namely mothers who have under-five children, are less able to be active in responding to the material/questions provided. After that the facilitator gives the right direction and explanation to the participants, so that the mother of toddlers is easier to understand and can apply knowledge in feeding and caring for her toddler. Nutrition education media provided by education participants and facilitators have a two-way interaction, not monotonous and not boring so participants are easier to understand the material provided [17]. Interactive teaching materials can be adapted culturally, such as the use of pictures so that messages are more easily accepted by nutrition education participants [6].

The inadequate complementary feeding practices in developing countries have a significant decrease in nutritional intake of 6 to 18 month old children [5]. Nutritional education has a significant influence on nutrition knowledge level [6], [18], attitudes and practices among mothers and nutritional status of toddlers based on the Z score of body weight according to age [18].

Changes in nutritional status of under-fives nutrition could be seen from the Z score. The average of Z score in the intervention group was higher than in the control group after the nutritional education was provided. Research by Rachmadewi and Khomsan showed that nutritional knowledge was significantly related to nutritional attitudes but

unrelated to nutrition practices [19]. Nutrition education was unable to change the nutritional status of toddlers significantly. Nutrition education interventions can improve the nutrition knowledge of mothers or caregivers. However, without the provision of food, the effects of nutritional knowledge gained may not reflect food intake or nutritional status [9]. Nutrition education can be effective in making families aware of the importance of a healthy diet. Families can improve their nutritional health in the resources available to them [20].

This was due to the short implementation of nutrition education that could not be effective in changing the nutritional status of malnourished toddlers overall. Thus, it requires more than three months to be able to change the nutritional status of malnourished toddlers. The nutritional education intervention period is relatively short, not allowing sufficient time for significant physiological changes in the nutritional status of children under five [21].

5. Conclusion

Nutrition education has been proven to increase mothers' knowledge about parenting, exclusive breastfeeding and preparation of complementary foods menu. There is a change in the nutritional status of children under five from underweight to mildly underweight. Nutrition education is expected to be continued by health workers on a regular basis so that it can improve the nutritional status of toddlers. Further research should be conducted to investigate the effect of nutritional education on changes of mothers' behavior in feeding malnourished toddlers and providing more than three months of conducting nutritional education so that the nutritional status of toddlers could be improved.

Acknowledgement

The author would like to thank the Head of the Hang Tuah Pekanbaru Foundation who provided funding for this research, and the Head of the Rumbai and Rejosari Community Health Centers for giving permission for nutrition education and data collection, and to the respondents involved in this study.

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