

Education of Nutrition and Food Technology Practice in Food Insecurity Group of 1000 First Day of Life Escalated Nutritional Concern

Ancah Caesarina Novi Marchianti¹, Elly Nurus Sakinah², Nurud Diniyah³

¹Department of Public Health, Medical Faculty, University of Jember

²Department of Pharmacology, Medical Faculty, University of Jember

³Department of Agricultural Product Technology, Agricultural Technology Faculty, University of Jember
Kalimantan street No. 37, Jember, Indonesia, 68121

Abstract: *There are still many nutrition problems in the food insecurity group of the 1000 First Day of Life (1000 FDL), which require intensive handling. Health report data from Jember Health Office showed that in 2015, there were 40 percent underweight and 23 percent stunted children. Efforts to improve the quality of nutrition for 1000 FDL groups can be done by providing knowledge and practice. The study objective was to determine if education of nutrition and food technology practice improved knowledge and attitude toward nutritional concern. The method used was to proactively educate on nutrition and food technology practices on diversification of baby's meal in the target group and assessed changes by comparing the level of nutritional knowledge and attitude before and after receiving education by using questionnaires. Data were analyzed using Wilcoxon Signed Rank test and showed in percent or median \pm Inter Quartile Ranges (IQRs). The results showed that there were significant differences ($p < 0.001$) in the level of nutritional knowledge and attitude between before and after the education of nutrition and food processing technology. The knowledge level on 1000 FDL nutrition increased from enough to very good and the positive attitude level increased by 15.3%. N Gain levels were 0.6 and 0.5 for knowledge and attitude, showing that the impact is effective enough. It can be concluded that this method is quite effective to raise awareness of food insecurity group of 1000 FDL on nutrition and can be used as a model to help improving nutritional status of this group in other places.*

Keywords: *food insecurity, nutrition education, food processing technology*

1. Introduction

Nutrition status in the first 1,000 days of life (1000 FDL) of 270 days during pregnancy and 730 days in the infant's first life is a critical period, since the resulting consequences are permanent and irreparable. Group of 1000 FDL is the food insecurity group include pregnant mother, breastfeeding mother, and children under 2 years. Those nutrition program policy focused on this 1000 FDL group.

Since 2010, the program in the international world known as SUN (Scaling Up Nutrition) movement and in Indonesia this effort developed into Nutrition National Movement in to Accelerate Nutrition Improvement on 1000 FDL. Specific indicators for assessing the attainment of specific nutritional interventions include maternal protection against iron deficiency, folic acid and chronic energy and protein deficiencies, protection of protein adequacy for breastfeeding mothers, protection of children under two years of breast milk containing enough protein and iron, as well as treatment of diarrhoea [1,2]

Data from Jember District Health Office in 2015 showed that in the circle area of University of Jember there are still many problems in group of 1000 FDL, i.e. pregnant women who suffer from malnutrition anaemia 33%, who suffer from chronic lack of energy equal to 16,4%, children under 2 years of stunting (short children) of 8%

and children under 2 years with malnutrition status of 11%. This requires intensive treatment to improve the nutritional status.

Efforts to improve the quality of nutrition for groups of 1000 FDL can be done by providing knowledge [3] about nutrition (through lectures and multimedia information), production, diversification, and consumption of nutritious food based on local beans soy substitutes. According to recent data, 70% of soybean needs in Indonesia are got from imports [8]. The Ratio of Import Dependency increased from 48.89% to 62.29 [4]. Local nuts are a potential that can be used as an alternative of soy substitutes [10], these nuts also contain high protein [5] to meet the nutritional needs of 1000 FDL groups. Nuts can be processed into a variety of nutritious foods that all groups like nuggets, soy-yoghurts, pudding or jelly sticks, croquettes, juices and red bean puree.

Through this activity the group of 1000 FDL food insecurity as the target of Posyandu (integrated pre- and post-natal care in Indonesia) in University of Jember campus area will get counselling, training and mentoring through a series of activities so that they are more aware of nutrition, to improve the quality of health, quality of life, and the future quality of the nation. To know how far the effects of these activities, it need to be assessed through an evaluation of the level of knowledge and attitude of nutritional concern before and after the activity.

2. Methods

This study was categorized as quasi experimental research using one group pre-test post-test design. The method used is to proactively advise on nutrition and food technology practices in the target group and assessed changes by comparing the level of nutritional knowledge and attitude before and after receiving counseling. Therefore, it can be evaluated whether the activity is quite effective in pushing the target group on nutritional concern.

The population were Posyandu Catleya A participants that located in Karimata, Sumbersari Sub-district and Posyandu Catleya B located in Tidar, Karangrejo Subdistrict, Sumbersari District, Jember Region, about 150 people. From the population, samples were taken with concecutive sampling of 23 persons from Posyandu Catleya A and B respectively so that 46 samples were obtained. Data collection methods used in this study is to provide a questionnaire to the sample research. The questionnaire instrument consists of 10 questions on knowledge assessment and 10 attitude assessment questions. The same problem is used in the pre-test and post-test so that it can evaluate changes before and after getting education. The respondents' knowledge interval on the nutrition of 1000 FDL is as follows: (10-9) excellent knowledge, (8-7) good knowledge, (6-5) sufficient knowledge, (4-3) less knowledge and (2-0) knowledge very less. While respondent attitude interval on nutrition 1000 FDL is as follows: (20-11) positive attitude and (10-0) negative attitude. Proximate analysis of the products (red beans nugget and croquette) was also being done to ensure nutritional adequacy as substitute foods.

The statistical analysis test used was Wilcoxon Signed-rank test because the data included as non-parametric data and N-Gain calculation. N-Gain is the normalization of the gain obtained from the pre-test and post-test results. The calculation of N-Gain values can show the effectiveness of the treatment in this study. The normalized low gain (N-gain) can be classified as follows: (1) if $g \geq 0.7$, then the resulting N-gain belongs to the high category; (2) if $0.7 > g \geq 0.3$, then the resulting N-gain is categorized as moderate, and (3) if $g < 0.3$ then the resulting N-gain belongs to the low category.

3. Results

3.1. Respondents Characteristics

Respondents in this study were Posyandu Catleya A and B participants and were not limited to pregnant women, nursing mothers, and mothers with children under the age of 2 years, because the mothers of childbearing age would eventually become a food insecurity group of 1000 FDL. The age range of respondent's children, the occupation of householder and the number of family members can be seen in TABLE 1. Respondents mostly were young mothers and there is also a pregnant respondent so that her child age in the

respondent's children age data was consider as 0 month. The majority occupation of the householder is as an employee and averagely respondent has 3 or 4 family members.

TABLE 1: The Characteristics of Respondents.

Characteristic	Catleya A		Catleya B		Total	
Child age:						
0-24 months	9	39.1 %	11	47.8 %	20	43.5 %
25-60 months	11	47.8 %	11	47.8 %	22	47.8 %
> 60 months	3	13.0 %	1	4.3 %	4	8.7 %
Householder occupation:						
Employees	23	100 %	7	30.4 %	30	65.2 %
Entrepreneurs	0	0 %	12	52.2 %	12	26.1 %
Others	0	0 %	4	17.4 %	4	8.7 %
Number of family member:						
2 members	1	4.3 %	0	0 %	1	2.2 %
3 members	12	52.2 %	6	26.1 %	18	39.1 %
4 members	8	34.8%	9	39.1 %	17	37.0 %
5 members	2	8.7 %	8	34.8 %	10	21.7 %

3.2. Respondents Knowledge

Assessment of respondent knowledge about nutrition in this study was conducted by using questionnaires in the form of statements with the answer of yes and no. Results of research on respondent knowledge can be seen in TABLE 2. The results showed that from the median knowledge of respondents classified as enough knowledge. After the information dissemination, the respondent knowledge increased to be very good and from the Wilcoxon Signed Rank test the increased proved significant. N-Gain values of 0.6 are classified as moderate so that this program activities are quite effective to improve the knowledge of respondents.

TABLE 2: The Total Distribution of Pre-Test Scores and Post-Test of Respondents Per Item of Knowledge Statement About Nutrition of 1000 FDL.

Item of knowledge	Pre-Test		Post -Test	
	n	%	n	%
1. Understanding 1000 FDL	24	52.2	36	78.3
2. Understanding Lack of Chronic Energy	30	65.2	38	82.6
3. Fe function	38	82.6	41	89.1
4. Effects of iodine deficiency	6	13.0	28	60.9
5. Definition of Early Breastfeeding Initiation	30	65.2	42	91.3
6. Definition of colostrum	31	67.4	38	82.6
7. Benefits of colostrum	39	84.8	41	89.1
8. Exclusive breastfeeding period	21	45.7	41	89.1
9. Effect if too fast on giving first meal	24	52.2	39	84.8
10. Effect if too long on giving first meal	18	39.1	43	93.5
Median	6 ± 2	60%	9 ± 3*	90%

Total data were expressed in median ± IQR. * $p < 0.001$ pre-vs. post-test using Wilcoxon Signed Rank test.

3.3. Respondents Attitude

Assessment of respondent attitude about nutrition in this research is done by using questionnaire in the form of statement with answer of A (Agree), D (Doubtful) and DS (Disagree) with value of 0, 1, 2 in negative statement at number 1, 2, 3, 4, 5, 7 and 8 and value of 2, 1, 0 in the positive statements at number 6, 9 and 10. Positive attitude values were almost on all items of the statement except on two items at the pre-test. Results of research on the attitude of respondents can be seen in TABLE 3. The results showed that from the median attitudes of respondents classified as a positive attitude. After educating, positive attitude of respondents increased and the results of Wilcoxon Signed Rank test of the increased proved significant. N-Gain values

obtained was 0.5, classified as moderate so that this program activities are quite effective to improve the attitude of respondents.

TABLE 3: The Total Distribution of Pre-Test and Post-Test Scores of Respondents Per Item of Attitude Statement on Nutrition of 1000 FDL.

Item of Attitude	Pre-Test (%)				Post -Test (%)			
	Agree	Doubt full	Dis-agree	Score (+/-)	Agree	Doubt full	Dis-agree	Score (+/-)
1. 1000 FDL nutrition is not important	28.3	17.4	54.3	58 (+)	23.9	10.9	65.2	65 (+)
2. Nutritional states is not Important	23.9	26.1	50.0	58 (+)	13.0	6.5	80.4	77 (+)
3. Iron tablets (Fe) are not needed by pregnant women	43.5	15.2	41.3	45 (-)	15.2	19.6	65.2	69 (+)
4. Folic acid are not needed by pregnant women	28.3	26.1	45.7	54 (+)	13.0	30.4	56.5	66 (+)
5. Early Breastfeeding Initiation is not necessary	32.6	19.6	47.8	53 (+)	10.9	10.9	78.3	77 (+)
6. Exclusive breastfeeding is necessary for 6 months	76.1	13.0	10.9	76 (+)	71.7	15.2	13.0	73 (+)
7. Formula milk is more nutritious than breast milk	21.7	19.6	58.7	63 (+)	4.3	4.3	91.3	86 (+)
8. Baby's first meal is for replacing breast milk	58.7	13.0	28.3	32 (-)	23.9	8.7	67.4	66 (+)
9. Breastfeeding mothers need to take Vitamin A capsule	69.6	13.0	17.4	70 (+)	63.0	13.0	23.9	64 (+)
10. Baby's first meal needs to be given in variety	67.4	13.0	19.6	68 (+)	69.6	8.7	21.7	68 (+)
Median	12 ± 6.8				16 ± 6*			

Total data were expressed in median ± InterQuartile Ranges (IQRs). * $p < 0.001$ pre- v.s. post-test using Wilcoxon Signed Rank test.

3.4. Proximate Analysis

The content of protein, fat, water, ash and carbohydrates from red bean nugget and croquette products can be seen in proximate analysis result in TABLE 4.

TABLE 4: The Proximate Analysis of Red Bean Products.

No.	Content	Red bean nugget	Red bean croquette
1.	Protein	13,88 %	8,31 %
2.	Fat	3,85 %	1,28 %
3.	Water	54,21 %	59,27 %
4.	Ash	1,55 %	1,85 %
5.	Carbohydrate	26,51 %	29,29 %

4. Discussions

The knowledge to be investigated in this study, is all information about the nutrient in 1000 FDL because to ensure a person behaves well is not enough with education alone, needed a basic knowledge and understanding of why something must be done to arise motivation to willing to do [11]. The pre- and post-test results showed the largest number of wrong answers were on question number 1, 4, 8, 9 and 10. Many of the respondents do not know about the meaning of the first 1000 days of life, the effects of iodine deficiency, period of exclusive breastfeeding, effects if too fast or too slow giving baby's first meal. This showed that there were important materials that were not yet known. Therefore, the education was given, and results after education showed there was an increase in the number of correct answers on each question.

The pattern of feeding habits in toddlers including the diversification of food consumption is a good causal of good nutritional status of children [9]. Food and nutritional problems and low quality of food consumption can be found not only in the middle and lower economic layers but also in economically capable families who are less concern in the care of their toddlers. As shown by Catleya A respondents who are economically and

educationally more established than Catleya B respondents when looking at the level of knowledge and attitude, there is no significant difference except the level of post-test knowledge. In post-test knowledge, respondents from Catleya B are more likely to change their level. This is possibly because of the nutritional problems faced were more due to economic adequacy, not because of a lack of concern for childcare, so counseling is more effective than respondents from Catleya B.

Based on the evaluation of respondents' responses to the attitude questionnaire, all statements were responded positively by 28 respondents (60.9%) during pre-test and increased to 43 respondents (93.5%) at post-test. However, when viewed in detail from each statement there were still respondents responded negatively as described in Table 3. Negative attitudes of 45% and 32% of the total 46 respondents shown in statements number 3 and 8 at the pre-test. Less than half of the respondents supported iron intake (Fe) during pregnancy but at the time of post-test there was a positive attitude increase of 23.9%. Iron supplements of 90 tablets during pregnancy are necessary although the nutritional status of pregnant women is good, starting at 12 weeks of pregnancy and continued for up to 3 months after delivery and need to be given daily. Fe deficiency during pregnancy can increase complications in pregnancy and childbirth, increasing the risk of maternal death, infant mortality, premature birth, and low birth weight babies (low birth weight).

At the pre-test, only a small percentage of respondents agreed or acted that baby's first meal was not a substitute for breast milk, but in the post-test attitude was changed to a positive increase 39.1%. Breast milk should still be given even after baby start consuming meal. Breastfeeding stop early may occur because the mother works in urban areas or because of maternal malnutrition so that production decreases, happened among the economically weak community. Both of this require different handling although the problems faced are similar, because the cause in it is different.

An attitude has not been automatically manifested in an action [11]. Action is a rule that is carried out to make rules to overcome something or the act of a close relationship between attitudes and actions supported by the notion of attitude that states that the attitude is a tendency to act. So that to the occurrence of changes in the nutritional care behavior of 1000 FDL is not enough just by increasing the knowledge and attitude of the respondents, it is necessary to step further in the form of food technology training of soybean substitute material. This is to support the diversity of baby first meal at an affordable price.

Protein content of red bean nugget (13.88%) is similar with chicken meat (18.20%) (Ditjenak, 2001) so it can be used as a protein substitute. The minimum protein content of SNI (Indonesia National Standard) nugget is 12%, so it is above the minimum limit of SNI. Red beans as well used as vegetable sources, it contains higher amino acids than chicken meat. The amount of red bean amino acids such as methionine (10.56 mg) and cysteine (8.46 mg) was higher than in chicken meat. In consuming the food needs to be varied because there are amino acids content those are not in chicken meat but are in the red beans which needed by the body such as aspartic acid, glutamic acid and serine (Kay, 1979). The protein content in the croquette is 8.31%, including high for just a snack.

Sternin and Marsh [14] from the Save The Children Institute noted that there were differences in behavior in families with similar low-income households but had different nutritional status of under-fives, i.e. the mother of a good nutritionist gave additional food of shrimp and crab from the river as well as sweet potato leaf which are rich in protein. The adoption behavior of the experience affects two thirds of Vietnamese children in weight gain and after two years 85% of children no longer have low nutrition. There are differences in the empowerment of poor families from other poor families [13]. The family's ability to use the optimal potential to meet the nutritional needs of children under five indicates that the contribution of appropriate technology training to poor populations is a necessity, especially for handling under-five nutritional problems.

5. Conclusion

Based on results of the research that has been conducted in two Posyandu in Summersari sub-district (Catleya A and B), Summersari district, Jember region, it can be concluded that nutrition education and food technology practice in food insecurity group 1000 FDL quite effective in improving knowledge and attitude of respondents toward nutritional concern. However, the same nutritional problems may come from different causes therefore, the solution cannot be generalized. If the program is applied to different areas it is necessary to make an adjustment to local conditions. Furthermore, it is necessary to do food technology training (act) to improve nutrition awareness so that overall will be able to change the behavior to be more concerned with nutrition.

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7. References

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