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Effect of balanced nutrition intervention based on local food on young women of *orang rimbo* in Bukit Duabelas National Park, Jambi province

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ABSTRACT

The prevalence of anemia in Indonesian teenagers is still high, namely 32%, or more than 6,000 Indonesian teenagers suffered from anemia. Long-term anemia has an impact during pregnancy, thus affecting the health of the mother and baby. The population of the Anak Dalam Tribe in Jambi Province is 200 thousand people who still live in the forests and around the TNBD forests at risk of experiencing malnutrition, including their teenage daughters, due to socio-economic status factors, limited access to health services, food security, family empowerment, and low levels of knowledge and education. . The research analyzed the effect of local food-based balanced nutrition interventions on Orang Rimbo adolescent girls. Quasi Experimental Design, totaling 70 people. The research results showed that there was significan relationship between dominan food sources consumed (p-value = 0.000) and the type of local food consumed (p-value = 0.007) with balanced nutrition (BMI), as well as the influence of interventions carried out in food processing among young women of the Orang Rimbo people in TNBD (p-value = 0.000). It was concluded that there was an influence of interventions carried out in food processing on young women of the Orang Rimbo people in Bukit Duabelas National Park.

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Introduction

Malnutrition is a state of deficiency, excess, or imbalance of energy, protein, and other nutrients that causes adverse effects on body shape, body function, and clinical outcomes (Sari and Septiani, 2019). Then, malnutrition can also be defined as a condition that develops when the body does not get the right amount of nutrients needed to maintain healthy tissue and organ function. This includes conditions such as undernutrition, overnutrition, and micronutrient deficiency diseases (such as vitamin A deficiency, iron deficiency anemia, iodine deficiency disorder, and zinc deficiency) (USAID, 2015).

One of the causes of malnutrition in adolescent girls is anemia, which is a decrease in the proportion of red blood cells. Anemia is not a diagnosis, but a description of an underlying condition. Whether or not a patient experiences symptoms depends on the etiology of the anemia, the severity of onset, and the presence of other comorbidities, especially the presence of cardiovascular disease. Most patients experience some symptoms associated with anemia when hemoglobin falls below 7.0 g/dL (Turner, Parsi and Badireddy, 2023). The

prevalence of anemia in adolescents in Indonesia was still high at 32% in 2018 or more than 6,000 Indonesian adolescents experience anemia. The direct impact of anemia includes causing dizziness, foggy eyes, pale eyelids, lips, tongue, skin and palms, lethargy, weakness, fatigue, and sluggishness. Long-term anemia in adolescent girls has an impact on pregnancy, affecting the health of the mother and baby.

Deficiency anemia can have a marked effect on physical ability to perform activities and cognition. This is usually the case in children from low-income families (Gopaldas, 2002). Anemia can have many causes, including nutritional deficiencies, acute and chronic infections, blood loss, cancer, and hemoglobinopathies. Anemia in adolescence that continues into pregnancy can increase the risk of maternal perinatal mortality, low birth weight babies, preterm labor, and other disorders (Mustafa and Maulidiana, 2019).

In the Balanced Nutrition guidelines, there is a one-time meal message described as "Piring Makanku", where the portion of staple food is 2/3 of ½ plate, the portion of vegetables is equal to the portion of staple food, the portion of side dishes is 1/3 of ½ plate, the portion of fruit is equal to the portion of side dishes. The most appropriate IEC method is counseling using attractive flipchart media by displaying examples of a balanced menu using local food ingredients and presented with the concept of serving my plate. The menu presentation is equipped with the nutritional value of each menu according to the adequacy of pregnant women according to the Nutrition Adequacy Rate (AKG) in 2019 (Nurjaya, Faisal and Aslinda, 2021). By providing nutrition education on balanced nutrition recommendations based on local specific foods, it is very effective to increase knowledge, nutrient intake (protein and iron), and hemoglobin levels in adolescent girls (Mustafa and Maulidiana, 2019).

Malnutrition is a public nutrition problem experienced by all countries in the world, especially in poor and developing countries. The triple burden of malnutrition is currently a very serious nutritional problem, which can be seen from its high prevalence. Triple Burden of Malnutrition is the triple burden of malnutrition: undernutrition, overnutrition, and micronutrient deficiencies. Undernutrition includes stunting and wasting, overnutrition includes overweight and obesity, and micronutrient deficiency includes anemia. One of the risk groups for malnutrition is adolescents. Nutritional problems in this group will have implications for the health and productivity of current and future generations. The nutritional status of adolescent girls is closely related to pregnancy and childbirth output in the First 1000 Days of Life (HPK) period. Addressing adolescents nutrition requires integrated activities across sectors through specific and sensitive interventions (Sandra, 2017).

Currently, the total population of Suku Anak Dalam (SAD) in Jambi Province is 4,978 people who live in the Bukit Dua Belas National Park (TNBD) area in Sarolangun Regency and Batang Hari Regency. There are 64.7 percent of women of childbearing age in the Suku Anak Dalam Terap River Region, Batanghari District suffering from anemia. (Asparian, Perdana and Nurdini, 2022). Those who still live in the forest and around the TNBD forest (Orang Rimbo) are currently at risk of malnutrition, including adolescent girls. This condition is caused by socioeconomic status factors, limited access to health services, food security, family empowerment, and low levels of knowledge and education.

Method

Research with a quantitatif approach with Quasi-Experimental design, which is a research design such as an experimental design to test causal hypotheses in population groups before and after treatment (White and Sabarwal, no date). This research was conducted at nine points (groups) in two areas, namely the Sungai Terap area representing Batanghari Regency and the Pematang Kabau area representing Sarolangun Regency. The activity time was 8 months from April to November 2023. The population in this study were young women of Orang Rimbo in the TNBD Area taken in total population. Which was represented by Cluster Sampling in the Sungai Terap Region and Pematang Kabau Region. The number of samples amounted to 70 people (37 people from Sungai Terap Region and 33 people from Pematang Kabau region. Data analysis using the non-equivalent group design model, the Sungai Terap region group is categorically still included in the Remote Indigenous Community category 1-2, while the Pematang Kabau region group is already in Category 3. Partially, each sample group was given treatment to assess how much influence the intervention had on the two groups.

Results and Discussions

Respondent Characteristics

The limited number of samples was due to the limited number of adolescents living in settlements due to family cultural patterns that are still melangun (moving to live in the forest because a family member died).

Statistically, based on the results of the study, it was known that the characteristics of body mass index (BMI) in the category of thin 41 people (58.6%) and normal 29 people (41.4%). Furthermore, it was also known that the Recommended Dietary Allowances (RDA) in the deficient category was 30 respondents (42.9%) and the sufficient category is 40 respondents (57.1%). As for the dominant food source variable, it was known that the consumption of carbohydrate sources was 42 people (60%) and non-carbohydrate sources was 28 people (40%). The variable of food processing ability was mostly boiled as many as 55 people (78.6%) and fried only 15 people (21.4%). Variable types of local food consumed were 41 people (58.6%) whose number was <4 types and 29 people (41.4%) whose number was ≥4 types. Furthermore, related to the education variable, it was known that 32 respondents (45.7%) are not in school and 38 respondents (54.3%) have been to school. The characteristics of these respondents can be seen in table 1 below.

Table 1. Respondent Characteristics

Variable	Total (n=70)	Percentage (%)
BMI		
Underweight	41	58,6
Normal	29	41,4
RDA		
Less	30	42,9
Enough	40	57,1
Dominant Food Source		
Carbohydrates	42	60
Non-carbohydrate	28	40
Processing Ability		
Deep-fried	15	21,4
Boiled	55	78,6
Local Food Quantity		
<4 types	41	58,6
≥4 types	29	41,7
Education		
Not in school	32	45,7
Never been to school	38	54,3
Total	70	100

Source: primary data

Bivariate Analysis

Based on the research results obtained, bivariate analysis was then carried out to determine the relationship between variables on balanced nutrition (BMI).

Based on table 2, it was known that the relationship between the Recommended Dietary Allowances (RDA) with balanced nutrition (BMI) in adolescent girls of Orang Rimbo Bukit Duabelas National Park. The results of the analysis obtained a p-value of 0.132> 0.0, meant that there was no relationship between RDA and balanced nutrition (BMI) in adolescent girls of Orang Rimbo National Park Bukit Duabelas. Bivariate analysis of the relationship between dominant food source consumed with balanced nutrition obtained a p-value of 0.000 <0.05 which indicated that there was a significant relationship between the dominant food sources consumed with balanced nutrition (BMI) in adolescent girls Orang Rimbo. Statistically testing the relationship between Processing Ability and balanced nutrition (BMI) in adolescent girls of Orang Rimbo Bukit Duabelas National Park, the p-value is 1> 0.05 which indicated that there was no relationship between local food processing practices and balanced nutrition (BMI) in adolescent girls of Orang Rimbo.

Bivariate analysis of the relationship between the type of local food consumed with balanced nutrition (BMI) in Orang Rimbo adolescent girls in Bukit Duabelas National Park obtained a p-value of 0.007 <0.05, meaning that there was a significant relationship between the type of local food consumed with balanced nutrition (BMI) in Orang Rimbo adolescent girls. Bivariate analysis to see the relationship between maternal education and balanced nutrition (BMI) in adolescent girls of Orang Rimbo Bukit Duabelas National Park obtained a p-value of 0.392> 0.05 which indicated that there was no relationship between maternal education and balanced nutrition (BMI) in adolescent girls of Orang Rimbo.

Table 2. Relationship Between RDA, Dominant Food Source, Processing Ability, Local Food Types, And Mother's Education With Balanced Nutrition (BMI)

Variable	BMI				Total		*P – Value*	PR (95% CI
	Less		Enough					
	N	%	N	%	N	%		
RDA								
Less	14	20	16	22,9	30	42,9	0,132	0,691 (0,446 -1,027)
Enough	27	38,6	13	18,6	40	57,1		
Dominant Food Source								
Carbohydrates	33	47,1	9	12,9	42	60	0,000	2,750 (1,499 - 5,044)
Non-carbohydrate	8	11,4	20	28,6	28	40		
Processing Ability								
Deep-fried	9	12,9	6	8,6	15	21,4	1	1,031 (0,645 - 1,650)
Boiled	32	45,7	23	32,9	55	78,6		
Local Food Quantity								
<4 types	30	42,9	11	15,7	41	58,6	0,007	1,929 (1,169 - 3,184)
≥4 types	11	15,7	18	25,7	29	41,5		
Mother's Education								
Not in school	21	30	11	15,7	32	45,7	0,392	1,247 (0,842 - 1,846)
Never been to school	20	28,6	18	25,7	38	54,3		
Total					70	100		

Source: primary data

Analysis of Pre and Post Test

Table 3. Results Of Pre-Test And Post-Test Of Local Food Processing On Young Women Of Rimbo People

Group	Period	Frequency	Descriptive		Bivariate
			Mean	SD	P-Value
SAD	Pre test	70	1,33	0,473	0,000
	Post test	70	1,71	0,455	

Source: primary data

Based on the pre-test and post-test test of research data to see the effect of food processing interventions on adolescent girls of Orang Rimbo Bukit Duabelas National Park. The results of the analysis obtained a p-value of 0.000 <0.05 indicating that there was a significant effect of providing local food processing practice interventions carried out on the young women of Orang Rimbo respondents.

Based on the results of the study, it is known that in this study there was no significant relationship between the Nutrition Adequacy Rate (RDA) and balanced nutrition (BMI) in adolescent girls of Orang Rimbo (p-value = 0.132). This is due to the limitations of local food sources in terms of type and quantity due to the increasingly limited resources available in the forests where they live. These results are in line with research conducted by Parewasi (2021) that carbohydrate intake is 85.4% less and 14.6% sufficient with nutritional status there was no relationship with a P-Value of 0.698 > 0.05, protein intake is 62.5% less and 37.5% with nutritional status there was no relationship with a P-Value of 0.369 > 0.05 and fat intake is 46.9% less and 53.2% sufficient with nutritional status there was no relationship with a P-Value of 0.583 > 0.05 (Febriani *et al.*, 2021).Other research relevant to this study also states that between energy intake, protein, and respondents' nutritional knowledge were not significantly related to nutritional status with a P-value of 0.264 for energy intake and p = 0.343 for protein intake (Usdeka Muliani, Sumardilah and Mindo Lupiana, 2023). Indeed, from this study all respondents consumed food containing nutrients every day.

However, their consumption intake was not sufficient in accordance with the RDA for adolescent girls. Adolescent age requires adequate nutrition, RDA for adolescent girls after 13-15 years requires 2125 kcal of energy, 69 grams of protein, 71 grams of fat, and 292 grams of carbohydrates (Setiawati and Subroto, 2021). The nutritional adequacy rate of purti adolescents who were in the deficient category could be motivated because respondents had bad eating habits so that their macronutrient needs were inadequate. Meeting the needs of protein and fat mainly comes from animal or vegetable side dishes provided by parents. It was possible that the standard portion provided did not meet the recommended needs (Rokhmah, Muniroh and Nindya, 2017).

From the results of the study, it was also known that there was a significant relationship between the dominant food sources consumed with balanced nutrition (BMI) in adolescent girls of Orang Rimbo (p-value

= 0.000). This research was the same as that conducted by Idral Purnakarya et al that there was a relationship between carbohydrate intake and nutritional status and there was no significant relationship between the level of knowledge, intake of fat, protein, vitamin A, vitamin C with nutritional status (Purnakarya, Zulliadi and Elnovriza, 2011). Adequate carbohydrate consumption should be able to encourage nutritional adequacy, but if consumption is lacking, of course, it has a negative impact on the body. This is supported by Afifah's research (2019) which stated that the level of carbohydrate intake was less in the majority of respondents with a nutritional status of thin 11.9%, then the level of carbohydrate intake was enough in respondents with a nutritional status of fat 33.35% and from statistical tests conducted carbohydrate intake with nutritional status has a significant relationship with p = 0.045. This was because the main source of energy that was most dominant comes from carbohydrate consumption (Afifah, 2019).

The results showed that there was a significant relationship between the type of local food consumed and balanced nutrition (BMI) in adolescent girls of Orang Rimbo (p-value = 0.007). In line with research conducted by Julia Rahman that there was a significant relationship (p<0.05) between food consumption patterns and overweight status in adolescents at SMAN 47 Jakarta (Rahman *et al.*, 2021). In addition, Hidayat and Uliyah's research showed similar results, namely that there was a relationship between food patterns and overnutrition in adolescents at SMAN 5 Surabaya (Hidayat and Uliyah, 2018). The type of local food ingredients can actually be a potential that has a good impact on health and also the economy in an area. Local food is beneficial for health because with a diet of local food consumption that is easily found because it is around the environment. So that all the needs of nutritious food intake can be met easily. Rural and mountainous areas are generally agricultural, whose residents actually have a lower prevalence of obesity and micronutrient deficits compared to urban residents. This is supported because most of the energy intake is obtained from local vegetables with higher vitamin content compared to energy intake from cereals which are even lower in content (Marrero *et al.*, 2021).

Based on the results of the study, it was known that there was no relationship between local food processing practices and balanced nutrition (BMI) in adolescent girls of Orang Rimbo (p-value = 1). Different results with the research of Yosephina Maria Hawa Keytimu et al (2022) that there is an influence between local food utilization training and pis-pk method on improving the nutritional status of toddlers so that local food utilization training with pis-pk method had a positive impact because it can increase body weight and nutritional status (Keytimu, Ringgi and Guru, 2022). The practice of good ocal food processing skills will have a positive impact on diet, food variety and also health in adolescents.

The finding of no relationship between maternal education and balanced nutrition (BMI) in Orang Rimbo adolescent girls (p-value = 0.392), is in line with Shodikin's research where from the statistical test he conducted the p-value = 0.427 which means there is no relationship between the level of maternal education and the incidence of undernutrition in Kaloran Village, Gemolong District, Sragen Regency (Shodikin *et al.*, 2023). In general, knowledge can be obtained from non-formal educational institutions, especially considering the very low level of education and years of schooling of the Anak Dalam tribe. This condition can actually be overcome when mothers are accustomed to and routinely participate in posyandu activities and counseling related to nutritional fulfillment so that it can have a good impact on mothers to gain sufficient knowledge and be able to take care of children properly, including those related to adequate nutritional intake. The limitations of this study were that it was difficult to meet with the research sample due to their nomadic lifestyle, low level of education and the difficulty of using the local language. Based on the results of the study, the p-value test obtained was 0.000 < 0.05, indicating that there was an effect of the intervention carried out on respondents in the food processing of young women of Orang Rimbo.

This means that indeed when respondents were given training on how to manage food ingredients there was an increase in their knowledge and ability to manage the food around them in order to meet balanced nutritional needs. In line with research conducted by Kapmawati et al, that the increase in knowledge after the research was carried out with a percentage before 14.12% and after 71% where the training was carried out with demonstrations so that the information they got was much easier to digest and practice again (Naelasari *et al.*, 2022). Activities related to food processing practices certainly aimed to improve skills in food selection, cooking and serving. Respondents were given training to choose local ingredients consisted good nutritional value and high content so that it is very good to be processed and consumed by adolescent girls. The existence of interventions related to food processing of local ingredients will add insight to respondents in meeting balanced nutritional needs. Although different regions have different potential food sources, the training/intervention would influence their perspective on food processing. Of course, with each local food that is selected and has a complex content, it can fulfill the RDA. Future research is recommended to conduct research on a larger population and use more specific variables.

Conclusions

In this study it was found that there was no relationship between RDA, local food processing practices maternal education with balanced nutrition (BMI) in Orang Rimbo Adolescent Girls, and there was a relationship between the dominant food sources consumed and the type of local food consumed with balanced nutrition (BMI) in Orang Rimbo Adolescent Girls, and there is an effect of Intervention (pretest-postest) conducted in food processing on Orang Rimbo Adolescent Girls in TNBD. It is recommended that the Jambi Provincial Government and the Health Office routinely provide education and specific nutrition interventions in order to maintain normal nutritional status and improve the health status of the Orang Rimbo community.

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