Contents lists available at IOCS

Science Midwifery

journal homepage: www.midwifery.iocspublisher.org

Development of a balanced menu based on local food of Southwest Papua with serving the contents of my plate as an effort to improve consumption patterns of stunting children

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ARTICLE INFO

Article history:

Received Oct 30, 2023
Revised Nov 6, 2023
Accepted Nov 13, 2023

Keywords:

Local Food
Menu
Southest Papua
Stunting

ABSTRACT

People need to know that many natural healthy foods come from local foods with high nutritional value to prevent various nutritional problems. The general aim of this research is to develop a balanced menu based on local Southwest Papuan food with the contents of Piringku as an effort to improve the consumption patterns of stunted children. The type of research used is experimental with a development research method approach. Research was carried out to prepare a 7-day food menu pattern using a local food menu based on balanced nutrition and to test the effectiveness of the product.This local food-based menu is made on a 7-day cycle to avoid boredom and refers to the dietary requirements of children under five, namely providing adequate nutrients for body growth and development. From the results of the hedonic test, it was found that the 7-day menu based on local food from Southwest Papua was varied, the portions were appropriate, the colors were attractive, liked, the taste was good and the texture was appropriate.

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INTRODUCTION

Nutritional problems in children can also be triggered by mistakes in choosing food ingredients for consumption. This can result in nutritional problems in the form of stunting, excess or reduced body weight, pica, dental caries and allergies (Arisman MB, 2008). Stunting is one of the nutritional problems in Indonesia that has not been resolved. Stunting has a big impact which ultimately causes long-term impacts, namely disrupted physical, mental, intellectual and cognitive development (Putri et al., 2023). The results of the 2022 Indonesian Nutritional Status Survey show that the prevalence of stunting in Indonesia is 21.6%, where this figure shows a decrease of 2.8% from the 2021 SSGI results, namely 24.4%. Meanwhile, the SSGI results at the provincial level in West Papua are at 30.0%. This figure is still relatively high so special treatment is needed to deal with stunting (Kementerian Kesehatan, 2023). Problems with intake and eating patterns are one of the causes of stunting. This is because one of the specific indicators of stunting is the provision of additional food for toddlers and pregnant mothers and two other sensitive indicators include

family food security and food diversity for toddlers (Ministry of Health, 2023). Food diversification, which is a form of food security, aims to change food habits towards a better one, namely diverse, nutritionally balanced, safe and based on regional potential. Anticipation of the era of food globalization needs to be considered and anticipated so that people remain healthy, one of which is by maintaining food traditions even though the food appears modern or developing food by utilizing regional potential food ingredients. Understanding of food management, especially regional potential food ingredients, needs to be developed so that people increasingly understand that healthy food does not always come from expensive food ingredients. People need to know that many natural healthy foods come from local foods with high nutritional value to prevent various nutritional problems (Rizqie Auliana, 2011). My plate outlines healthy eating recommendations, at where 50% of the total food content of each diet is vegetables and fruit, and the remaining 50% is staple food and supplement. My dinner plate also recommended eating more lots of vegetables instead of fruit and more food staple rather than side dishes. My dinner plate also recommend drink water before and after every meal (Aisyah dkk 2022).

Southwest Papua is one of the Expansion Provinces which was previously called West Papua Province. Food availability in Southwest Papua is dominated by corn, beans, sago, rice, several types of vegetables and eggs. Sorong City is a center for cassava and fish, Sorong Regency is a center for corn and egg production, Raja Ampat Regency is a center for peanut and sweet potato production, green beans are mostly produced in Maybrat Regency, and a lot of sago production is in the South Sorong Regency area (Widati, 2015) With so much local food in the Southwest Papua region, the availability of food to make healthy and varied food is quite good, it only requires the understanding and ability of the community to process food that is nutritionally balanced and prevents nutritional problems. The problem raised in this research is how to develop a balanced menu based on local Southwest Papuan food with the contents of my plate as an effort to improve the consumption patterns of stunted children. The general aim of this research is to develop a balanced menu based on local Southwest Papuan food with the contents of Piringku as an effort to improve the consumption patterns of stunted children.

RESEARCH METHOD

The type of research used is experimental with a development research method approach. Research was carried out to prepare a 7-day food menu pattern using a local food menu based on balanced nutrition and to test the effectiveness of the product. This research analyzes by describing and describing the data that has been collected without intending to make generalization (descriptive) conclusions. To be able to produce this product, an analysis is carried out in the nature of a needs analysis and to test the validity of the food menu pattern so that it can function in the wider community, an acceptability test is carried out by carrying out a liking test and an acceptability test regarding the 7-day meal menu including breakfast, lunch and dinner with an assessment. based on interpretation intervals on a scale of 1-5 as follows: menu variations are categorized on a scale of not very varied to very varied, portions are categorized as very unsuitable to very suitable, colors are categorized on a scale of very unattractive to very attractive, aroma is categorized on a scale of very dislike to really like it, taste is categorized on a scale of very bad to very good, texture is categorized on a scale of very bad to very good which is carried out by 10 somewhat trained panelists. Previously trained to know certain sensory properties. The assessment given for the hedonic test is calculated as an average (mean), by providing an interpretation interval for the mean results. This research was carried out at the Culinary Laboratory of the Nutrition Department, Health Polytechnic, Ministry of Health, Sorong. This research has received approval from the health research ethics commission of the Sorong Ministry of Health Polytechnic.

Table 1. Menu hedonic test interval values

Score interval	menu variations	portion	color	flavour	taste	texture
1,00-1,79	not very varied	very unsuitable	very unattractive	really don't like it	very bad	very bad
1,80-2,59	Not varied	not suitable	Uninteresting	don't like it,	not good	not good
2,60-3,39	moderately varied	quite suitable	quite interesting	quite like it	quite good	quite good
3,40-4,19	varied	Suitable	interesting	like it	good	soft
4,20-5,00	very variable	very suitable	very interesting	like it a lot	very good	very good

RESULTS AND DISCUSSIONS

Preliminary Study Stages

Preliminary study to find out food ingredients with local food characteristics, healthy, cheap, easy to obtain and easy to process. A preliminary study was carried out through a review of literature and the results of a food survey regarding food in Indonesia. Typical foodstuffs from Southwest Papua consist of sweet potatoes, taro, sago, gembili and millet. Food availability in Southwest Papua is dominated by corn, beans, sago, rice, several types of vegetables and eggs. For Sorong City it is a center for cassava and fish, Sorong Regency is a center for corn and egg production, Raja Ampat Regency is a center for peanut and sweet potato production, a lot of green beans are produced in Maybrat Regency, and a lot of sago production is in the South Sorong Regency area. Consuming sufficient food is the main factor in meeting the body's nutritional needs. If the body lacks nutrients. In particular, energy and protein over a certain period of time will have an impact on reducing work productivity. Continuous nutritional deficiencies will lead to deficient and poor nutritional status which, if not addressed, will result in a lost generation (Adquisiciones et al., 2019)

Table 2. Daily menu distribution for children 3-4 years old (1300 ccal)

Food Ingredients	Quantity (Portions)	Breakfast	Snacks	lunch	Snack	Afternoon	Dinner
Rice/Exchanger	3,25p	¾ p	½ p	¾ p	½ p	¾ p	-
Side Dishes/ Exchanges	3 p	1 p	-	1p	-	1p	-
Fruit	2p	-	1 p	-	1 p	-	-
Milk	2p	1p	-	-	-	-	1 p
Oil	1,5p	½ p	-	½ p	-	½ p	-
Sugar	2p	½ p	½ p	-	½ p	-	½ p

Table 3. Daily menu distribution for children 4-5 years old (1750 ccal)

	Quantity (Portions)	Breakfast	Snacks	lunch	Snack	Afternoon	Dinner
Rice/ Exchanger	4p	1 p	½ p	1 p	½ p	1 p	-
Side Dishes/Exchanges	4,5 p	1 p	½ p	1,25 p	½ p	1,25 p	-
Fruit	3p	-	1 p	1p	-	1 p	-
Milk	3p	1p	½ p	-	½ p	-	1 p
Oil	1,5p	½ p	-	½ p	-	½ p	-
Sugar	2p	½ p	½ p	-	½ p	-	½ p

Pattern good feeding has an effect on the nutritional status (growth) of toddlers. Good nutritional status if the body gets it good nutritional intake, so allows physical growth and general health in circumstances general as best as possible. Poor nutritional status occurs when the body experiences a deficiency or excess nutrition (Purwani et al., 2013). If the food consumed can meet

the nutritional needs of the body, both in terms of quality and quantity, the body will maximize the use of nutrients for metabolic functions and to obtain good nutritional health conditions. On the other hand, if food consumption is excessive or insufficient, both in terms of quantity or quality, it can trigger nutritional problems, namely problems of excess nutrition or problems of undernutrition (Juliana et al., 2022).

Table 4. Day menu for children aged 3-5 years based on local southwest papuan food

Time	First day's menu	second day's menu	third day's menu	fourth day's menu	fifth day's menu	sixth day's menu	seventh day's menu
Morning	Bread Stuffed with White Tuna	Papeda Rolls	Sago Porridge	Porridge Cassava	Cake Filled with Brown Sugar	Corned Beef Bread	Dragon Fruit Marrow Porridge
		Milk	Milk	Milk	Milk	Milk	Milk
Snack	Purple Sweet Potato Pudding	Caramel Banana Milk	Bread filled with green beans	Dragon fruit cassava compote	Purple sweet potato mud cake	Candil sweet potato	Cassava klepon
Lunch	Boiled white sweet potatoes	Boiled petatas	Boiled bananas	Mashed taro	Steamed sweet potatoes	Boiled petatas	Boiled bananas
	Fried fish	Sauteed Banana Hearts	fish in bright sauce	satay, tuna fish	fish eggs, Balinese spices	shredded mackerel fish	steamed fish
	Stir fry gedi tofu	Tempeh sempol	Bacem Tempeh	Stir-fried chayote	Soup Green Beans	Stir-Fried Ferns Shrimp	Vegetables Oyong
	Papaya	Crispy Shrimp	Sauteed Fern Vegetables	Corn fritters	Crispy sweet potato fritters,	Tempe crispy Tempeh	Tofu crispy
		Banana	Melon	Orange	Watermelon	Dragon Fruit	Melon
Snack	Sweet Potato Sticks	Milk Pie (Lontar)	Fish Balls	Lamek Cassava	Sweet Corn Pudding	Dragon Fruit Milk Pudding	Sweet Potato Fantasy
	Milk			Milk			
Dinner	Boiled Bananas	Boiled Potatoes	Cassava Steamed	Boiled Bananas	Mashed Taro	Petatas Boiled	Steamed Purple Sweet Potatoes
	Sauteed Cassava Leaves	Omlete Sago Caterpillar	Tuna Breast	Pepes Fish Tengiri	Crispy Shrimp	Fried squid with mackerel	fish satay
	Stir-Fried Fish Wrapped	Chayote Stir	fried Chayote	Urab pakis	Bening gedi	Cassava leaf balls	Red bean soup
	Fried Tempe	Tofu Fried	Tofu Fritters	Petatas Fritters	Potato Fritters	Coconut Fritters	Tofu Fritters
	Watermelon	Watermelon	Papaya	Banana	Melon	Grape	Orange

The menu development in the research was prepared based on food ingredients originating from the West Papua region that were modified and how to make them easily and nutritious to meet the nutritional needs of toddlers. 7 day menu with dishes that have been validated from a daily meal plan and contain 1300 calories. This local food-based menu is made on a 7-day cycle to avoid boredom and refers to the dietary requirements of children under five, namely providing adequate nutrients for body growth and development. Local food is a food ingredient that is produced or can be easily obtained nearby public. Maximizing local food processing by maintaining the nutrition and nutrition it contains so that local food is able to meet

the nutritional and nutritional needs of babies/children. Local food sources of carbohydrates, protein and fat can be easily found in every region because every region have certain characteristics, for example coastal areas have abundant benefits fish so that it can be used to meet the needs of animal protein from fish for babies/children.

Meanwhile, non-coastal areas can use animal protein in the form of chicken and beef eggs (Anita & Sutrisno, 2022). In Southwest Papua, tubers are an agricultural commodity. Tubers are a source of carbohydrates, especially starch. Examples of tubers are sweet potatoes, cassava, ketang, taro, and gemili. Tubers have several benefits for the nutritional intake of pregnant women so that their children do not experience stunting, namely they contain vitamin A. Vitamin A is very important for the expectant mother and the fetus in her womb. Pregnant women should consume 700 mg of Vitamin A daily during pregnancy, Vitamin C, and iron. Vitamin C helps the absorption of iron which is important for the baby's health during pregnancy. women should consume 80-85 mg of vitamin C and 27 mg of iron during pregnancy. Full of potassium nutrition, sweet potatoes contain lots of fiber, sweet potatoes have vitamin B6. The benefits of these tubers can also help pregnant women in preventing stunting which is currently hotly discussed (Ngura, 2022). Sweet potatoes and cassava also contain many benefits for the body, containing fiber, calcium and manganese which function to break down proteins in the body. Mother and cassava are also categories of local food that have a low glycemic index so that if consumed they can reduce the occurrence of diabetes (Hafiza, 2023)

Validation

Validation by carrying out organoleptic tests on the product by panelists(Pratama & Anita, 2022). Somewhat trained is a panel that gets just practice. This panel is used to test likes and dislikes for products (preference test). The results of the hedonic test for 7 (seven) menu cycles in time and food groups can be seen in Figure 1.

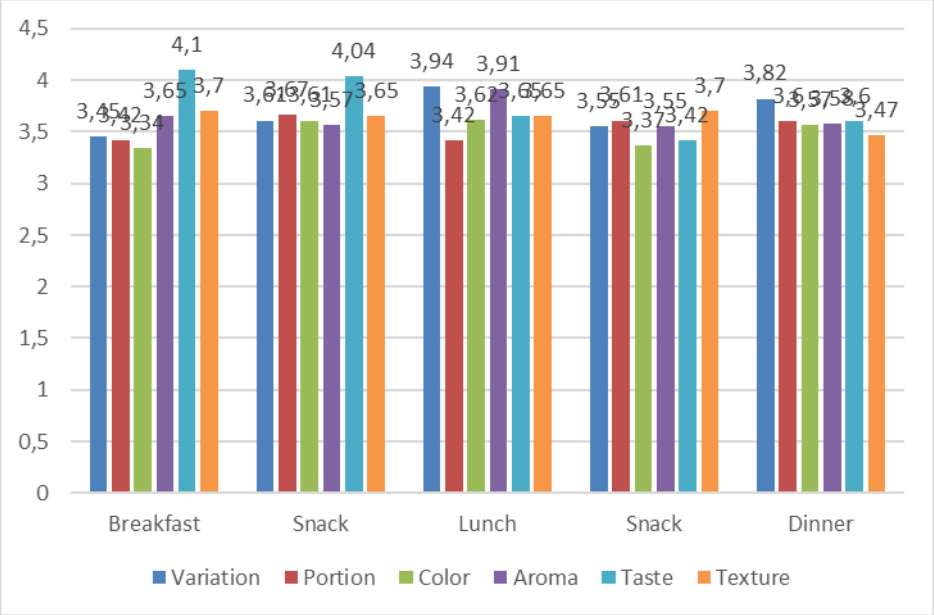

Figure 1. The results of the hedonic test for 7 (seven) menu cycles

Menu variations with an average value of breakfast 3.45, morning 3.61, lunch 3.94, afternoon 3.55 and dinner 3.82 can be explained that the researchers assessed the menu variations varied. Portions with an average value of 3.42 for breakfast, 3.67 for morning snack, 3.42 for lunch, 3.61 for afternoon snack and 3.60 for dinner, it can be explained that the researcher rated it as

appropriate, the color of breakfast 3.34, lunch 3.62 and meal night 3.57 can be explained that the author considers it interesting. The aroma of breakfast 3.65, morning snack 3.57, lunch 3.91, afternoon snack 3.55 and dinner 3.50 can be explained that the writer really liked it. Breakfast taste 4.10, morning snack 4.04, lunch 3.65, afternoon snack 3.42 and dinner 3.60. From the results of the hedonic test, it was found that the 7-day menu based on local food from Southwest Papua was varied, the portions were appropriate, the colors were attractive, liked, the taste was good and the texture was appropriate. This is different from the research results (Anita & Sutrisno, 2022)which stated that people's preferences for 4 variables, namely taste, aroma, texture and color, were in the normal category.

Texture and aroma of local food to prevent stunting as a large part of society argue that babies and children love texture processed local food with a crunchy/crispy texture strong aroma, this can be overcome with technique local food processing such as making chips, dry pastry combined with a strong aroma of spices, or combined with rich peanut butter iron (Lolan et al., 2023).

Ages 1-3 years are grouped as a passive consumer where the food consumed depends from what the mother presented so that the role Mother is very big in determining nutritionally balanced food. On

At this age, children are very curious high so mother must be able to take advantage of this opportunity to introduce food varies in taste, color, and texture(Jatmikowati et al., 2023). Very good nutrition needed for brain growth still ongoing and usually children more susceptible to disease infections and malnutrition with age (Lestari, 2020). The mother's role is very important in choosing types of nutritious food for toddlers and varying the types of nutritious food in the diet every day. The mother's role is also important in serving and giving nutritious food to toddlers who have difficulty eating. The mother's role is not only to vary the way the meal menu is presented to their toddlers in terms of eating place, color, taste, processing and form of food, but also the role of the mother's pleasant situation when eating must be carried out well (Pratiwi et al., 2021). There is a relationship between parenting styles and nutritional status in toddlers. The better the parents' parenting style, the more normal the child's nutritional status(Hidayathillah & Mulyana, 2018) (Diyah et al., 2020) The results of other research show that assessing the nutritional status of toddlers based on the BB/TB of stunted toddlers shows that the nutritional status of toddlers is normal. The nutritional status of toddlers is significantly related to the education level of the father and mother. This means that the higher the level of parental education, the better the nutritional status of the toddler (Wijhati et al., 2021)

Table 5. Energy and nutrient requirements

Menu	Energy (cal)	Carbohydrate	Protein	Fat
I	1399,5	218,7	79,68	24,74
II	1494,8	190,1	78,12	48,55
III	1315,9	183,4	68,21	37,83
IV	1367,4	257,9	50,41	16,12
V	1387,6	232,7	37,2	32,9
VI	1369,3	237,4	47,30	27,83
VII	1339,7	211,6	75,46	23,52

The average need for energy and nutrients has met the requirements as regulated in the Republic of Indonesia Minister of Health Regulation Number 28 of 2019 concerning Recommended Nutritional Adequacy Rates for Indonesian People for children aged 3 - 5 years Energy: 1350 - 1400 kcal, Carbohydrates: 215 - 220 gr Protein: 20 25 gr and Fat: 45 – 50 gr. In terms of micronutrient requirements, this menu can be categorized as meeting the principles of a nutritionally balanced menu (Nasruddin & Haq, 2020)

The need for balanced nutrition in early childhood is very important is important and must be met according to the needs of each child. Because with adequate nutritional needs, children will

grow and develop well and rapidly (Ufiyah Ramlah, 2021). There is a relationship between energy and protein consumption and the nutritional status of toddlers (Hupunau et al., 2019). Energy intake less than requirements over a long period of time will inhibit growth, even reduce energy reserves in the body resulting in a state of malnutrition or poor nutrition (Hoar et al., 2022). The results of other studies state that protein also has a direct relationship with the incidence of stunting. The quality and quantity of protein affects plasma levels of insulin like growth factor I (IGF-I), which is an important hormone in height growth, regulating survival, growth and cell differentiation (Maulida et al., 2023) .

CONCLUSION

The 7-day food menu pattern based on local Southwest Papuan food can be used as a guideline for overcoming the problem of stunting and other nutritional problems because it is prepared according to children's needs. The local food ingredients used consist of tubers, bananas, sago, fish, potatoes, nuts and types of vegetables which are widely found in Southwest Papua. The acceptability test results show that this menu is well accepted in the community. The limitation of this research is that we only modeled a menu based on local food and carried out an acceptability test on trained panelists. Therefore, it is recommended for further research to carry out local food-based menu interventions for toddlers who experience nutritional problems and measure their acceptability and increase in nutritional status directly.

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