

How to Cite:

Mahalia, L. D., & Ramadhani, J. (2022). The utilization of shredded snakehead fish in an effort to prevent stunting in children in Palangka Raya. *Linguistics and Culture Review*, 6(S4), 174-181. <https://doi.org/10.21744/lingcure.v6nS5.2182>

The Utilization of Shredded Snakehead Fish in an Effort to Prevent Stunting in Children in Palangka Raya

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Abstract--Background: Children need adequate nutrition intakes to avoid stunting. One thing that we can do is by giving them an adequate protein intake. Snakehead fish is one of the foodstuffs that have a high protein composition. Objective: This study was carried out in an effort to improve the nutritional status of children to avoid stunting by using snakehead fish which is processed into shreds (commonly called shredded fish). Methods: This study used a post-test only design approach with a control group. The subjects of this study were 30 children with inclusion criteria: subjects were in good health, aged 36-72 months, could receive an oral diet, could consume shredded fish and fish, and had no history of protein allergy. Children were given lunch with a side dish of shredded snakehead fish continuously for 30 days. Results and discussion: Shredded fish that produced is using snakehead fish has a brownish yellow color and is dry, fibrous, crunchy and tasty. Shredded Snakehead fish, which is consumed regularly for 30 days, can improve the nutritional status of children. It is proven by the results of the t-test which showed that there was a significant relationship between the provision of shredded snakehead fish and children's weight gain (significance = 0.01). Conclusion: Giving shredded snakehead fish can increase the weight of preschool-aged children (children under five years old), so it is expected to be useful for preventing stunting.

Keywords---children, shredded fish, snakehead fish, stunting.

Introduction

Stunting problem in children is directly caused by children not getting enough food intake with balanced nutrition (Wong et al., 2014). The results of Riskesdas

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Manuscript submitted: 27 Jan 2022, Manuscript revised: 18 April 2022, Accepted for publication: 09 May 2022

in 2018 showed that the prevalence of stunting preschool-aged children (children under five years old) in Palangka Raya was 16.40% (based on the BW/A indicator). The adverse effects that can be caused by this nutritional problem in the short term are disruption of brain and intelligence development, impaired physical growth and metabolic disorders in the body. Meanwhile, in the long term, the adverse effects include decreased cognitive ability and learning achievement, and decreased immunity so they are prone to getting sick and in a high risk of becoming stunted to the occurrence of non-communicable diseases (Direktorat Gizi Masyarakat Kementerian Kesehatan RI, 2019).

Stunting is a condition where weight-for-age (BW/A) is not in accordance with how it should be (Department of Nutrition and Public Health, Faculty of Public Health, UI, 2010). Study results show that there is a significant relationship between food intake and stunting preschool-aged children. Preschool-aged children with less food intake have a 9.677 times greater chance of experiencing stunting compared to those with good/adequate food intake (Lestari, 2016).

A balanced diet is needed by the body for preservation, repair of body cells, growth and development (UNICEF, 2013). Nutrition intake is one of the direct causes that can affect the nutritional status of preschool-aged children (UNICEF, 2016). One of the nutrition intakes can be obtained from protein. The level of protein consumption can affect the nutritional status of preschool-aged children. This is supported by a previous study that there is a relationship between the levels of protein consumption and the nutritional status of preschool-aged children. Preschool-aged children with an adequate level of protein consumption that fulfill the body's needs will be directly proportional to having good nutritional status (Lutviana & Budiono, 2010).

Protein intake is strongly influenced by protein quality, while protein quality is determined by the type and proportion of amino acids it contains. Protein from animal sources is complete protein or protein with high biological value because it contains all types of essential amino acids in adequate amounts for growth (Hardiansyah & Supariasa, 2016). Snakehead fish is a source of complete and high-quality animal protein because it contains complete essential amino acids whose composition is close to the amino acids needed by the body. Also, it has high digestibility so the amount that can be absorbed is also high. The advantages of snakehead fish include higher protein content than other foodstuffs like eggs, chicken and beef. In addition, snakehead fish collagen protein is also lower than livestock meat, which is around 3-5% of the total protein. Low collagen causes snakehead fish meat to be more easily digested by babies, the elderly as well as people who are recovering from illness (Widodo et al., 2015).

In Palangka Raya, snakehead fish is better known as haruan fish. The potential of snakehead fish is indeed large, but if it is consumed directly, there are still people who are reluctant to eat it because the original head shape of snakehead fish resembles a snake and if it is consumed fresh it requires more seasoning because snakehead fish has a very fishy smell. This causes the amount of snakehead fish consumed to be also limited. The development of additional food formulas can be an alternative to reducing the fishy smell and increasing the acceptance and consumption of snakehead fish (Widodo et al., 2015). One of the efforts made is

by processing snakehead fish into shredded form. The results of this study are expected to enrich knowledge, especially those related to local food products, where one of the efforts made to improve the nutritional status of children in order to avoid/ prevent stunting is through the utilization of snakehead fish which is processed into shreds (shredded snakehead fish) (Utami et al., 2019; Humphrey et al., 2019; Dranesia et al., 2019).

Method

The subjects of this study were 30 children aged 36-60 months who were accompanied by their parents/guardians. Children were given lunch with a side dish of shredded snakehead fish continuously for 30 days, accompanied by a medical examination and consultation by a doctor. The stages carried out were through the preparation and implementation stages; the preparation stage in this study included coordination with the research location school, setting research time, determining target and target participants, planning for shredded fish provision, and measuring/ checking children's weight and providing health consultations with doctors (Perkins et al., 2017; Sereebutra et al., 2006; Sun et al., 1997).

The materials/ ingredients used in this study were snakehead fish and seasonings. The snakehead fish used in this study was obtained from fish farm. The selected snakehead fish was 2 weeks old (Haswadi et al., 2018; Marafad & Niampe, 2018; Semba et al., 2008). The tools used were cooking utensils and anthropometric measuring instruments. This study was carried out in the Food and Culinary Technology Laboratory at the Department of Nutrition, Poltekkes Kemenkes, Palangka Raya and 'X' Kindergarten, Palangka Raya. This study used a post-test-only design approach with a control group which was carried out in the following stages.

- Application for consent to participate in the research.
- Making shredded snakehead fish.
- Health examination of research subjects.
- Giving shredded snakehead fish to children for 30 days.
- Body weight measurement was carried out on day 0 and day 31.

The method of selecting research subjects was based on the following inclusion and exclusion criteria:

Inclusion criteria:

- The subject was in good health, as evidenced by the existence of a health certificate from a doctor.
- Aged 36-72 months.
- Could receive an oral diet.
- Could consume shredded fish and fish.
- Had no history of protein allergy.

Exclusion:

- Did not consume shredded snakehead fish according to the specified number of days.
- Had a history of protein allergy.
- Had kidney disorders/ diseases.
- Transfer children

The results of data collection were analyzed quantitatively using the independent t-test (independent samples t-test). Changes in the weight of preschool-aged children were measured on day 0 and day 31. The study was conducted with the permission of the Ethics Committee of the Faculty of Medicine, Universitas Palangka Raya (No. 839/UN24.9/KM/2017) and the consent of the parents/guardians by first asking for informed consent.

Results and Discussion**Making shredded snakehead fish**

The materials/ ingredients used to make the shredded snakehead fish were snakehead fish and seasonings such as shallots, garlic, brown sugar, granulated sugar, galangal, lemongrass, coriander, turmeric, bay leaves, candlenut and coconut milk. The making step starts from the process of cleaning the fish, cutting the fish into three parts and boiling it until cooked. After the fish is cooked, the bones and fish meat are then separated. After that, the snakehead fish meat is put into a frying pan and mixed with coconut milk, bay leaves and seasonings that have been mashed. Next, stir the shredded fish mix over medium heat. When the shredded fish mix is almost cooked, turn down the heat. Then, keep stirring it until it turns golden brown. The cooked shredded fish is then cooled and packaged in plastic clips (15 grams per pack). The resulting shredded snakehead fish has a brownish yellow color; is dry, in the form of shreds, crunchy and savory. The cooked shredded snakehead fish can be seen in Figure 1.



Figure 1. Shredded snakehead fish

Results

Nutritional status is a parameter that can be used to determine health problems in an area. To determine a person's nutritional status, one of which can be done by anthropometric measurements which can classify an individual's nutritional status based on the type of anthropometric index used (Kementerian Kesehatan RI, 2011). Weight-for-age (BW/A) plays a role in the classification of very poor nutrition, poor nutrition, good nutrition, and overnutrition (Regar & Sekartini, 2014). Therefore, to see the effectiveness of giving shredded snakehead fish to improve the nutritional status of children, the researchers made a comparison of BW/A.

Changes in the weight of the test subjects, in this case preschool-aged children, were seen based on the difference in measurement results between before and after giving shredded fish for 30 days. The calculation of the difference in the results of this weight measurement was carried out per child, both in the treatment and control groups. By using the t-test, the results obtained are presented in Table 1.

Table 1. The results of the t-test on the difference in measurement results between before and after the provision of shredded fish

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.624	.436	3.618	28	.001	.61267	.16932	.26583	.95951
Equal variances not assumed			3.497	22.125	.002	.61267	.17518	.24950	.97584

The results of the t-test showed that there was a significant relationship between the provision of shredded snakehead fish and children's weight gain (significance = 0.01) where giving shredded snakehead fish for 30 days continuously was proven to be able to increase children's weight.

Discussion

Food diversification is one of the efforts that can be done to improve the nutritional status of the community. Food diversification can be done by using existing food ingredients and then developing them into diverse foods (Salman, et al., 2018). Interventions for the prevention of nutritional problems in the form of food based on local foods have been shown to have equal effectiveness compared to supplementation. The use of food ingredients that are local wisdom is more easily accepted by the local community and has higher sustainability as well as can build local independence (Nadimin & Lestari, 2019). One of the food diversification can be done on fish that is processed in the form of shredded.

Fish is one of the local food ingredients in Palangka Raya which is consumed by many people and contains saturated fat and protein in the form of essential amino acids that are important for the body. One of the fish that has this content is snakehead fish. The albumin content of snakehead fish is quite high, which is about 6.2 grams. In addition, in 100 grams of ingredients, it contains 25.2 grams of protein and 9 mg of iron (Salman, et al., 2018).

Shredded is a type of dry food made from raw meat with a distinctive shape and taste. Shredded meat is made from shreds or separated fiber which is then seasoned with seasonings and fried. The meat commonly used for making shreds is beef or red beef. However, all types of meat including fish meat can be used for making shreds (Aditya et al., 2016). The results of this study indicate that giving shredded snakehead fish for 30 days can increase the weight of preschool-aged children (significance = 0.01). This is supported by the results of previous studies which state that shredded snakehead fish is eligible to be developed in terms of health because snakehead fish shows functional functions such as increasing body protein levels (Candra & Tunoq, 2018; Nugroho, 2013; Kusumawardhani et al., 2016).

Conclusion

Giving shredded snakehead fish can increase the weight of preschool-aged children. It is expected that the results of this study can be utilized as source information, both for the public and for the development of knowledge in an effort to prevent stunting (Semba et al., 2016; Berkman et al., 2002; Grantham-McGregor et al., 1996).

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