

The providing of Striped Catfish Dumplings with Moringa Leaf Puree and Tuna Fish with Chayote Leaf Puree to Increase Hemoglobin (Hb) Levels in Teenage Girls in Nelayan Indah District

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Abstract

This objective of study employed the effectiveness before and after providing pureed moringa leaf of Striped Catfish dumplings and tuna pureed leaves dumplings on increasing Hemoglobin (Hb) levels in teenagers in Nelayan Indah District. The research method used a pre-experimental design method with a pretest-posttest control group design. The intervention group was given treatment for 30 days. The population was all teenage girls who experienced mild anemia, namely 21 teenage girls. The data analysis technique was bivariate analysis to determine the analysis of the effect of giving Striped Catfish dumpling puree from moringa leaves and tuna fish puree from chayote leaves in increasing hemoglobin (Hb) levels in teenage girls using the one way ANOVA statistical test. The results of the statistical test used a paired simple T-test obtained a p-value of $0.000 < 0.05$ which shows that there was an increase in the hemoglobin (Hb) levels of teenage girls in the Fisherman Indah sub-district when given the pureed moringa leaf fish dumplings and given the tuna pureed pumpkin leaf pureed fish dumplings equally. -The average hemoglobin level for teenage girls has a difference of 1.5429 gram/dl. Meanwhile, giving tuna dumplings with an average hemoglobin level had a difference of 1.1286 grams/dl between before and after the intervention. For this reason, it is recommended that young women consume good foods such as processed Fish Striped Catfish Puree Moringa Leaves dumplings and processed Tuna Fish Dumpling Puree Chayote Leaves to increase Hemoglobin levels.

Keywords: Striped Catfish, Tuna Fish, Moringa Leaves, Chayote Leaves, Hemoglobin

Introduction

The initial 1,000 days of life represent a critical period for teenage females to avoid and address nutritional deficiencies (Reni 2021). It would seem that anemia is a health issue that affects a significant number of young women. Compared to young men, the risk of anemia is approximately ten times higher (Kulsum 2020). A lack of nutrients is the main cause of anaemia, which affects around 85.5% of people and is marked by disruptions in hemoglobin synthesis. According to the 2018 Riskesdas results, 26.8% of children aged 5-14 and 32% of those aged 15-24 suffer from anemia (Riskesdas 2018).

In 2018, Basic Health Research (RISKESDAS) clearly showed that the incidence of anemia in young women is on the rise. In 2013, 37.1% of young women were affected by anemia (Riskesdas 2018). In 2018, the figure increased to 48.9%. Data on the prevalence of anemia in North Sumatra province revealed a significant rise from 57.1% in 2015 to 54.5% in 2016, and subsequently to 58.2% in 2017 (Dinkes Propinsi Sumatera Utara 2020). The prevalence of anemia among teenage girls in Medan remained a significant public health concern, with a

prevalence exceeding 25%. The incidence of anemia among teenage girls was found to be 26.5% in Medan (Us and Safitri 2023). The data obtained from rural areas in Deli Serdang district indicate that the prevalence of anemia is 71%. This clearly demonstrated that anemia in teenagers is a significant public health concern, particularly given the pivotal role of teenage health in the success of future health development, especially in terms of producing a generation of future national leaders with optimal health and well-being (Hastuty, Khodijah, and Hasibuan 2021).

It is recognized that teenage girls with anemia are at an increased risk of becoming anemic themselves, and subsequently of experiencing chronic energy deficiency during pregnancy. Maternal energy deficiency can increase the likelihood of a low-birth-weight baby (LBW) and stunting (GERMAS 2019).

Many teenage girls are lacking in nutrients because of the food they eat every day. In most cases, teenage girls are deficient in iron, calcium and vitamin A. One potential cause of the reduced hemoglobin levels observed in teenage girls is inadequate dietary intake. A common habit among female teenagers attending school is the purchase of food and snacks near the school, which may not provide an optimal iron content (Azhara 2023).

Dim sum is a Chinese dish comprising meat, seafood, or vegetables wrapped in a pastry skin and steamed or boiled (Murdiasa, Suparthana, and Ina n.d.). Dumpling is a type of dumpling that is widely available for purchase in both Chinese restaurants and street vendors. In Mandarin, dumpling is known as shaomai. It is a minced meat wrapped in a thin flour tortilla and steamed. Initially, dumpling was made with pork, but it has since been developed with chicken, fish, and shrimp as the primary ingredients. (Soechan 2006).

The main nutritional component of dumpling is protein obtained from chicken, shrimp, and fish. However, because the basic ingredients of dumpling consist of animal foods and a small part consists of plant foods, dumpling contains almost no antioxidants, vitamins, and fiber. Fish is a significant contributor to the provision of healthy and secure sources of nutrition for humans in developing countries. (MURSALINA n.d.). The striped catfish is a marine fish that is rich in nutrients, particularly protein, which is beneficial for cell membrane growth. Tuna fish is a source of high-quality protein, with a range of 22.6-26.2 g/100 g meat, as well as containing varying amounts of fat, with a range of 0.2-2.7 g/100 g meat. Additionally, the fish contains several minerals (calcium, phosphorus, iron, and sodium), vitamin A (retinol), and vitamin B (thiamin, riboflavin, and niacin) (Department of Health, Education, and Welfare 1972, as cited in (Safitri, Susiana, and Suryanti 2021).

One method of enhancing the antioxidant, vitamin, and fibre content of dumpling is to incorporate plant-based ingredients that are rich in these nutrients, such as moringa leaves and pumpkin leaves (Nana 2023). The moringa plant is a subject of considerable research interest, particularly with regard to its nutritional composition and potential applications. The leaves of the moringa plant are notable for their high nutritional value, including calcium, iron, protein, vitamin A, vitamin B and vitamin C. (Rahma et al. 2022). Chayote leaves (*Sechium edule* Sw.) are a type of vegetable that are used by the Indonesian population as a medicinal plant. The leaves of chayote plant contain saponins, alkaloids, tannins, and flavonoids, which are believed to have the ability to treat anemia (Khoerunnisa 2023). Both moringa and Chayote leaves can be processed into purée, which can then be used as an additional or substitute ingredient in the production of various products. (ISTIKOMAH 2018). The processing of moringa and chayote leaves into purée preserves the nutritional content of the moringa and chayote leaves, as the absence of heating and drying processes ensures that the nutritional value is not compromised

(Sasmita 2022). The addition of moringa leaves puree to chicken dumpling will undoubtedly enhance its nutritional value, particularly in terms of vitamin C and antioxidant activity.

Methods

The research phase begins with observations of the sample, the implementation of interventions, and evaluations. The research design employed a pre-experimental method with a pretest-posttest control group design. The intervention group receives treatment daily for 30 consecutive days, while the control group is not treated.

Results and Discussion

The obtained data are primary and interval scaled, so a quantitative analysis using parametric statistical tests (paired samples t-tests and one-way ANOVA) was conducted. This was done using the SPSS 20.0 for Windows program. The following steps were taken:

Requirements Test

The Requirements Test is carried out before the Paired Simple T test and ANOVA analysis is carried out, first the data normality test and data homogeneity test are carried out.

Normality Test

Normality test was conducted to determine whether the data was normally distributed or not. Based on the results of Table 1, it was obtained that in the pre-test group of Striped Catfish fish dumplings with Moringa leaf puree with a sig value of 0.584 and the post-test group of Striped Catfish fish dumplings with Moringa leaf puree with a sig value of 0.668, the Hb post-test group of Tuna fish dumplings with pumpkin leaf puree with a sig value of 0.119 and the Hb post-test group of Tuna fish dumplings with pumpkin leaf puree with a sig value of 0.174 while in the control group with a sig value of 0.140. The values obtained from 5 groups showed that all sig values were > 0.05 which indicated that the data was normally distributed.

Table 1. Normality Test

Group	Shapiro-Wilk		
	Statistics	f	Sig.
Hb pre test Striped Catfish dumplings pureed Moringa leaves	0.934	7	0.584
Hb pre test Striped Catfish dumplings pureed Moringa leaves	0.959	7	0.668
Hb pre test Striped Catfish dumplings pureed Chayote leaves	0.848	7	0.119
Hb pre test Striped Catfish dumplings pureed Chayote leaves	0.916	7	0.174
Control	0.856	7	0.140

Homogeneity Test

This study uses the Levene test in the homogeneity test obtained from the results in table 1, namely in female teenage hemoglobin with a sig value of $0.332 > 0.05$, which means that hemoglobin data on the provision of Striped Catfish fish dumplings puree Moringa leaves, hemoglobin data on the provision of Tuna fish dumplings puree chayote leaves, hemoglobin data in the control group showed homogeneous data.

Table 2. Uji Homogenitas

Hb on Teenage Girls	Statistics	Df	Sig.
Hb on Teenage girls	0.682	18	0.332

Hypothesis

Table 3. Hypothesis Results with Sample T-Test

Variable		Intervention			P
		Mean	Deviation	SD	
Striped Catfish Dumpling Puree Moringa leaves	Catfish Dumpling Before	10.957 1	1.5429	0.78498	0.000
	After	12.500 0		0.82664	

Based on table 3. The average haemoglobin level of teenage girls before giving moringa leaf puree striped catfish dumplings was 10.9571 grams/dl and after giving moringa leaf puree striped catfish dumplings with an average of 12.5000 grams/dl with a difference of 1.5429gram/dl.

The results of statistical tests with paired simple T-Tests obtained a p-value of 0.000 <0.05 which indicated an increase in haemoglobin (Hb) levels of teenage girls in the Nelayan Indah District.

Table 4. Hypothesis Results with a Samples T-Test

Variable		Intervention			P
		Mean	Derivation	SD	
Tuna Dumpling Pureed Chayote Leaves	Before	11.157 1	1.1286	0.78499	0.000
	After	12.285 7		0.82664	

Based on table 4. The average hemoglobin level of teenage girls with the provision of Tuna fish dumplings pureed chayote leaves was 11.1571 grams / dl and after giving Tuna fish dumplings pureed chayote leaves with an average of 12.2857 grams / dl with a difference of 1.1286 grams / dl.

The results of the statistical test, a paired simple t-test, yielded a p-value of 0.000, indicating a statistically significant increase in haemoglobin (Hb) levels among teenage girls in the Nelayan Indah fishing village.

Table 5. Hypothesis Results with One Way ANOVA Test

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	6.643	2	3.321	5.921	0.011
Within Groups	10.097	18	.561		
Total	16.740	20			

The results of the statistical test, a paired simple t-test, yielded a p-value of 0.000, indicating a statistically significant increase in hemoglobin (Hb) levels among teenage girls in the Nelayan Indah fishing village.

The Effect of Giving Striped Catfish Dumplings Puree Moringa Leaves on Increasing HB Levels in Teenage Girls

Based on table 3. The average hemoglobin level of female teenages before being given Striped Catfish dumplings puree Moringa leaf was 10.9571 grams/dl and after being given it with an average of 12.500 grams/dl with a difference of 1.5429 grams/dl. The results of the statistical test showed that there was a significant increase in the level of haemoglobin (Hb) in young women in the Nelayan Indah Dsistrict.

Anemia is a prevalent health issue among teenage girls, with a tenfold increased risk compared to their male counterparts. One of the primary causes of low hemoglobin levels in teenage girls is inadequate intake of iron and protein. (Sholicha and Muniroh 2019). The habits of teenage girls, especially at school, are buying food or snacks around their school, which cannot be guaranteed to contain iron that is good for teenagers.

Dumpling is a foodstuff that is particularly popular among the teenage population. The principal nutritional components of dumpling are protein, derived from chicken, shrimp and fish, although the dish is deficient in antioxidants, vitamins and fibre due to the use of animal products and a limited number of plant-based ingredients. Fish is a significant commodity in the context of ensuring a healthy and secure diet for humans in developing countries. (Yumiko Murdiasa, Suparthana, and Timur Ina 2021).

Protein intake affects hemoglobin levels, this can be seen from the results of the statistical test of Sholicha's research (2015) the relationship between protein intake and hemoglobin levels obtained p -value=0.000, so it is known that there is a significant relationship between protein intake and hemoglobin levels in teenage girls. The Spearman correlation value $r=0.663$ shows there is a fairly strong relationship between protein intake and haemoglobin levels. The lower the protein intake, the lower the haemoglobin level. (Sholicha and Muniroh 2019).

The study conducted by Iswandi (2021) indicated that the striped catfish is a marine fish with high nutritional value, particularly in terms of protein content, which ranges from 60 to 75%. This protein content is beneficial for cell membrane growth. The protein content of striped catfish meat was found to be 16.98%, while the protein content of the skin was found to be 33.49% (Acid 2021).

One method of enhancing the antioxidant, vitamin and fibre content of dumpling is to incorporate plant-based ingredients that are rich in these nutrients. The study conducted by Hastuty (2022) revealed a statistically significant difference in Hb levels between the pre- and post-treatment groups ($p < 0.05$). The mean Hb level before treatment was 10.83 with a standard deviation of 0.864, while the mean Hb level after treatment was 12.72 with a standard deviation of 0.9399 (Hb 2022).

Research conducted by Oktavianis (2022) shows that from statistical tests, the value of Hb levels after intervention has increased from a minimum value of 11.0 gr / dL to 11.5 gr / dL with a p value of 0.000 ($p < 0.05$), meaning that there is an effect of giving chicken dim sum combined with Moringa Oleifera flour on hemoglobin levels of teenage girls (Fort and Bukittinggi n.d.).

In line with the results of research conducted by Djaba (2023) showed that the hemoglobin levels of pregnant women before being given moringa vegetables with an average of 10,525 g/dL. Then the hemoglobin level of pregnant women after being given moringa vegetables with an average of 11.219 g/dL. The results of the paired t-test showed that the p value = 0.000,

meaning that there is an effect of giving Moringa leaves on increasing hemoglobin levels in pregnant women. (Surya and Djaba 2023).

The consumption of fast food may result in a deficiency of dietary fibre. Therefore, the incorporation of vegetables is essential to enhance the fibre content of the diet. In this context, pumpkin leaves, which are rich in iron and easily accessible, can serve as a valuable alternative source of nutrients, particularly iron, and may contribute to the prevention of anemia in teenagers.

Effect of Giving Tuna Fish Dumplings Puree Chayote Leaves on increasing HB levels in Teenage Girls

Based on table 4, the average hemoglobin level of teenage girls with the provision of Tuna fish dumplings pureed chayote leaves was 11.1571 grams / dl and after giving Tuna fish dumplings pureed chayote leaves with an average of 12.2857 grams / dl with a difference of 1.1286 grams / dl.

The results of statistical tests with paired simple T-tests obtained a p-value of 0.000 <0.05 which indicated an increase in hemoglobin (Hb) levels of teenage girls in the beautiful fishermen village.

The results of research conducted by Ruaida (2020) showed that the highest average iron content in nugget products with spinach addition was the A3B3 product, which was 3.45 ppm and the lowest was the A0B0 product at 1.13. The results of the analysis obtained the iron content of fish nuggets substituted with spinach is higher than without the addition of spinach. (Maluku and Soumokil 2020).

Research conducted by yusri (2023) using the Wilcoxon Test states that the average before and after the administration of chayote leaf steeping obtained a p-value of 0.003 <0.05 which means there is a significant difference between before and after treatment, and bay leaf steeping obtained a p-value of 0.278 > 0.05 which means there is no significant difference between before and after treatment. (Seduhan, Labu, and Salam 2023).

Research conducted by Siwi (2024) shows that the average hemoglobin level of respondents before receiving Tuna fish treatment is 10.3 gr/dL, after receiving Tuna fish treatment is 12 gr/dL, before receiving Moringa Oleifera treatment is 10.3 gr/dL, after receiving Moringa Oleifera treatment is 1 gr/dL. The results of the analysis $p = 0.001 < 0.05$, so H_1 is accepted, meaning that giving Tuna and Moringa Oleifera fish is effective in increasing hemoglobin levels in pregnant women with anemia. (Palupi, Siwi, and Wulandari 2024). Providing additional food from local ingredients such as Tuna fish and Moringa Oleifera as an additional source of iron is one alternative solution to increase hemoglobin levels in pregnant women.

Routines or habits of teenage girls that cause anemia to occur easily are the lack of iron and protein intake in the daily diet and teenage girls often make the wrong diet by limiting food consumption and not diversifying the food they consume. Irregular eating habits in teenagers result in teenagers being unable to meet the recommended daily nutritional needs.

Differences in Increased HB Levels in Teenage Girls Given Striped Catfish Dumplings puree Moringa Leaf versus Tuna Dumplings puree Chayote Leaf

Differences in Increased HB Levels in Teenage Girls Given Striped Catfish Dumplings puree Moringa Leaf versus Tuna Fish Dumplings pure Chayote Leaf.

The results of this study showed that the average hemoglobin level of teenage girls before the administration of moringa leaf puree Striped Catfish dumplings was 10.9571 grams/dl and after

the administration of moringa leaf puree Striped Catfish dumplings with an average of 12.5000 grams/dl with a difference of 1.5429gram/dl.

Then in the provision of Tuna dumpling puree chayote leaf has an average hemoglobin level of teenage girls with the provision of Tuna Dumpling puree chayote leaf as much as 11.1571 grams/dl and after giving Tuna Dumpling puree chayote leaf with an average of 12.2857 grams/dl with a difference of 1.1286 grams / dl.

From the results, there was a difference in the average Hb level after the treatment of the group giving Striped Catfish Dumpling Puree Moringa Leaf (12.50 grams / dl) to the giving of Striped Catfish Dumpling Puree Moringa Leaf to Tuna Dumpling Puree Chayote Leaf (12.28 grams / dl) with a difference (0.22 grams / dl).

The problem of anemia that occurs in teenagres should be addressed or treated immediately. The effects of anemia include impaired growth and development, fatigue, increased susceptibility to infection due to a weakened immune system, decreased body function and endurance, susceptibility to addiction, and impaired cognitive function. (Yulianti, Hadju, and Alasiry 2016).

Teenage girls generally have unhealthy eating habits. Among them are skipping breakfast, being too lazy to drink water, eating unhealthy foods because they want to be slim (ignoring sources of protein, carbohydrates, vitamins, and minerals), and the habit of eating low-nutrient foods, including the habit of consuming fast food. Therefore, teenagers are unable to meet the various nutrients needed by their body for the synthetic process of hemoglobin (hb) formation (Suryani, Hafiani, and Junita 2017).

Protein plays an important role in iron transport in the body, so if the body lacks protein, iron transport will be hampered. By consuming protein and iron, it is hoped that it will increase hemoglobin levels as well. Hemoglobin is a protein that is rich in iron. Protein and iron play an important role in the formation of hemoglobin. Therefore, when the body lacks iron, it will result in lower than normal hemoglobin levels in the blood (Almatsier 2010).

Dumpling is a snack that is savour by many Indonesians including teenage girls. In addition, dumpling is easily found in hawker centre or at parties, even many people who make dumpling their daily routine food as their alternative side dish. Dumpling that we often find in hawker centres or other places still do not have many choices of flavour variation value or diversity of raw materials used (Rosmana and Mahmudah 2022).

According to the researcher's assumption, by consuming good food such as processed Striped Catfish Dumplings puree with Moringa Leaf and processed Tuna Fish Dumplings puree with Chayote Leaf can improve the nutritional status of teenage girls, improve nutritional intake and increase teenage girls' interest in nutritious food, in addition to improving healthy eating habits, increasing community participation, and increasing community income through increasing the use of simple processed products.

Acknowledgments

It was advised to teenage girls to consume good foods such as processed Striped Catfish Dumpling Puree Moringa Leaf and processed Tuna Dumpling Puree Chayote Leaf which can improve the nutritional status, improve nutritional intake and increase young women's interest in nutritious foods besides improving healthy food habits, increasing community participation, and increasing community income through increased use of simple processed products.

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