

THE EFFECT OF SNAKEHEAD FISH NUGGETS AND COLORED FRUIT EXTRACTS ON CLINICAL MANIFESTATIONS, BMI, TLC, ALBUMIN AND CD4 IN PLHIV

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1 THE EFFECT OF SNAKEHEAD FISH NUGGETS AND COLORED FRUIT EXTRACTS ON CLINICAL MANIFESTATIONS, BMI, TLC, ALBUMIN AND CD4 IN PLHIV

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ABSTRACT

Snakehead fish has a high content of zinc and albumin so it can be given to people with immune disorders. Snakehead fish can be made into various kinds of food products that are high in nutrients and have aesthetic value, taste like nuggets. The effectiveness of zinc and albumin functions can work optimally when its consumption is combined with food ingredients that are high in bioactive substances such as flavonoids, karetonoid, anthocyanin, bromelain and quecetin as well as food ingredients that contain high antioxidants such as vitamin C. The purpose of this study was to analyze the effect of snakehead fish nuggets administration and colored fruit juices on clinical manifestations, BMI, TLC, albumin and CD4 in HIV-infected people at “Bahagia” Social Rehabilitation Center, Medan. This type of research was Quasy Experimental with Pre and Post Test Design. The sample selection used total sampling technique of 40 people living with HIV and given snakehead fish nuggets and colored fruit juice for 24 days. The data analysis used the dependent T test, after the data normality test had previously been carried out. There was an effect before and after administration of snakehead fish nuggets and colored fruit juice on clinical manifestations, BMI, TLC and CD4 levels with a p value <0.05. It is necessary to provide treatment in the longer term as a preventive measure for the emergence of various clinical manifestations as well as to increase BMI, TLC, albumin and CD4 in people with HIV at “Bahagia” Social Rehabilitation Center, Medan.

Keywords : HIV, TLC, CD4, BMI, Clinical Manifestations

2 INTRODUCTION

Acquired Immune Deficiency Syndrome (AIDS) is a collection of symptoms caused by the Human Immunodeficiency Virus (HIV). This virus damages the human immune system which causes a decrease or loss of immunity.

(Kemenkes, 2010). It is marked the decreasing number of TLC and CD4 among PLHIV (Pitri, 2013). As a result, PLHIV sufferers will experience malnutrition, which is marked by a low BMI value (Brennan, 2019). Excessive catabolism occurs followed by lower levels of

albumin in the blood. (Yuniarti, 2013, Adiningsih, 2017)

The state of malnutrition will worsen the nutritional status of PLHIV as assessed by the lower body mass index of PLHIV. The causes are multifactorial, mainly due to lack of food intake, impaired absorption and metabolism of nutrients, the emergence of opportunistic infections, marked by a decrease in the total immunity response of cluster of differentiation 4 and total lymphocyte count (Anderson, 2017). Macro nutrients such as proteins, which are part of antibody-forming substances, also play a role in building cells damaged by opportunistic infections. Other nutrients such as vitamin C can suppress the formation of free radicals and can also increase the resistance of PLHIV (Almatsier, 2018).

Snakehead fish is a food ingredient that has been researched by many people. It can be made into various kinds of food products that have high aesthetic value and taste but still contain nutrients, one of which can be used as snakehead fish nuggets with the addition of red beans. In 100 grams of snakehead fish nuggets contain 2.28 grams of albumin, 18.66 grams of protein, and 6.70 mg of zinc. 100 grams of snakehead fish nuggets was given every day. The results of Pettalolo's research in 2015, zinc and albumin content in snakehead fish extract was proven to increase the amount of TLC in PLHIV.

The effectiveness of snakehead fish nuggets should be combined with foods containing vitamin C and bioactive substances

derived from natural ingredients which can be obtained from the content of colorful fruits and vegetables such as dragon fruit, pineapple, red guava, tamarillo, papaya, passion fruit, watermelon (red and yellow), star fruit, sunkist oranges, mango, cucumber, tomato and carrot. These colored fruits and vegetables are used as a fruit juice. These colored fruit juices contain bioactive substances in the form of lycopene, anthocyanins, flavonoids, karetonoid, beta-carotene, bromelain, papain and quercetin. Colored fruit juice is given together with 250 cc of snakehead fish nuggets. (Winarti, 2017).

METHOD

This research was quasi experimental study with one group pre and post test design (Rahmat, 2015). The research was conducted at Bahagia Social Rehabilitation Center in Medan. The population in this study was all PLHIV who received education and free treatment from the government and was quarantined for 6 months in "Bahagia" Rehabilitation Center, Medan. Sampling by total sampling, namely the entire population sampled, amounting to 40 respondents. .

The treatment was given for 24 consecutive days directly by the researcher who was assisted by 7 enumerators who were first briefed to share perceptions. The snakehead fish nuggets were given 2 pieces once a day (1 piece = 50 gr) for 24 consecutive days (following one of the blood component tests, namely albumin, half-life 19-24 days). (Supariasa 2016, Prastowo 2016). Snakehead fish nuggets are made in the food technology

laboratory, majoring in nutrition from the ingredients of snakehead fish, carrots, red beans, wheat flour and eggs. The seasonings used include shallots, garlic, a little pepper then used as nuggets per piece of nuggets = 50 g.

Nutritional content of snakehead fish nuggets of 100 gr :

No	Type of Nutrient	Content
1	Albumin	2,28 gr
2	Ca	81,59 gr
3	Fe	2,95 mg
4	Carbohydrates	9,12 gr
5	Fat	13,76 gr
6	Protein	18,66 gr
7	Zn	6,70 mg

Laboratory of MIPA Unibraw, 2019.

While colored fruit juice is selected every day for one colored fruit / vegetable as much as 200 grams by adding enough water and sugar then blended and filtered to get one glass of colored fruit juice as much as 250 cc. Colored fruit juices do not prioritize nutritional content, but rather focus on the function of bioactive substances contained in colored fruits and vegetables.

BMI data was obtained by measuring body weight using a digital scale with the camry brand with an accuracy of 0.01 kg, while the height using microtoise with an accuracy of 0.1 cm then interpreted the BMI results obtained into the BMI standard table according to Western Pacific Region of WHO Criteria Pertaining to Obesity (WPRO) criteria 2000.

Blood sampling for blood biochemical examination was carried out twice during the study before and after treatment administration. Blood was drawn using a 3 cc syringe from the left arm, the work was carried out by health analysts and then checked in the Path Lab laboratory. Checked blood biochemical levels include:

1. TLC data is obtained from examination of the type of leucocytes and total leucocytes on routine blood tests with the cyanmethemoglobin method using a spectofotometry tool.
2. CD4 data is done using Flow Cyto-metri method.
3. Blood albumin data were examined by the BCG method (Brom Cresol Green).

Clinical manifestation data were collected through direct interviews with the sample and direct observation using the clinical manifestation form. Each questionnaire contains 16 items of clinical manifestation symptoms, each of which if the sample has clinical symptoms listed on the clinical manifestation form, the score was 1.

Data analysis consisted of univariate and bivariate using the dependent T test (paired), after previously having tested the data normality with the Kolmogorov Smirnov test.

The research has obtained permission from the research ethics commission in the field of health at Medan Health Polytechnic of Ministry of Health with no: 044 / KEPK / POLTEKKES KEMENKES MEDAN / 2019.

RESULTS AND DISCUSSION

Sample characteristics include age, sex and education, amounting to 40 people. The percentage of the sample age was dominated by the 21-30 year old group as much as 47.5% (19 people), with the youngest being 20 years old and the oldest being 54 years old.

The percentage of the most dominant sex was male as much as 90% (36 people). The percentage of education in the sample mostly has education at the latest sample, most of them have high school education as many as 30 people (75%). Sample characteristics can be seen in Table 1.

Table 1. Distribution of Sample Characteristics

Sample Characteristics	Total	
	N	%
Age	11-20 y.o	2 5
	21-30 y.o	19 47,5
	31-40 y.o	15 37,5
	41-50 y.o	3 7,5
	51-60 y.o	1 2,5
Sex	Male	36 90

	Female	4	10
Education	Elementary	1	2,5
	Junior High	4	10
	Senior High	30	75
	University	5	12,5

For the average value of TLC, albumin, CD4, clinical manifestations and BMI before and after treatment can be seen in Table 2 below:

Table 2. Distribution of TLC, Albumin, CD4, Clinical Manifestation and BMI

No	Indicators		N	Min	Max	Mean	Deviation Std.	p value
1	TLC Level	Before	40	9	54	32,2	10,8	0,016
		After	40	19	59	34,9	8,8	
2	Albumin Level	Before	40	2,70	5,10	4,0850	0,42580	0,009
		After	40	2,10	5,00	4,4350	0,50614	
3	CD4 level	Before	40	18	750	315,3	169,3	0,001
		After	40	8	856	362,9	183,2	

4	Clinical Manifestation	Before	40	3	14	5,45	2,3	0,001
		After	40	2	14	4,05	2,5	
5	BMI	Before	40	13,6	29,5	21,2	3,9	0,008
		After	40	13,4	30	21,5	4,0	

Table 2 showed that the TLC, albumin, CD4, clinical manifestations and BMI levels of 40 PLHIV samples were found to mean that before treatment, the TLC level was 32.2 and after treatment was 34.9. The average before giving treatment was 4.08 Albumin levels and after giving treatment to 4.43. The average CD4 level before treatment was 315.3 and after treatment it increased to 362.9. The average before giving clinical manifestations treatment was 5.45 and after giving treatment 4.05 and the average before giving BMI treatment was 21.2 and after giving treatment was 21.5.

The results of the Paired T Test value showed that an increase was obtained by the value of $p = 0.000 < 0.05$ so that H_0 was rejected where there was a significant difference before and after treatment, meaning that there was an effect of treatment of snakehead fish nuggets and colored fruit juice on TLC levels, albumin, CD4, clinical manifestations and BMI.

Nugget is a popular snack (distraktion), eliminates hunger for a while, provides a small supply of energy to the body, or something to eat to enjoy the taste and would be better if consumed with colored juice.

The snack that was used as a treatment contains 198.7 kcal of energy, 12.8 grams of protein, 3.25 grams of fat, 25.1 grams of

carbohydrates, 29.2 mg of zinc, 331.5 mg of iron and bioactive substances as a function of functional food. This snack is given in the form of snakehead fish nuggets and colored fruit juices which have a tendency to increase the TLC, albumin, CD4 values, clinical manifestations and nutrient intake to increase the Body Mass Index value which tends to decrease in people with HIV at Bahagia Social Rehabilitation Center, Medan.

Providing treatment of snakehead fish nuggets and colored fruit juices containing the necessary macronutrients and micronutrients to PLHIV. Snakehead fish contains proteins needed by the body to build and maintain body tissues and replace damaged cells.

Protein also serves to protect the body from foreign substances or foreign organisms that enter the body. Protein acts as an antibody-forming component in the body, with the fulfillment of protein needs, the formation of antibodies will also be more optimal and more protective, so the body can defend itself from diseases such as HIV. The more adequate protein intake, the formation of body tissue and muscle will occur which can be seen from changes in BMI values (Kartasapoetra in Restiana et al., 2011, Petalolo, 2015).

The albumin content in snakehead fish nuggets helps in metabolism and the formation of new tissue in the body. Albumin also plays

a role in increasing the metabolic rate of Zn and binding to drugs and heavy metals that do not dissolve easily in the blood. Albumin is also able to work as trapping and scavenging against oxidants and free radicals and its ability to improve immune function. (Awan, 2014). Albumin is suitable to be given to patients who have not experienced severe infections such as the sample in this study that did not examine people with AIDS. This is also in accordance with the criteria for patients admitted to the center, especially people who are newly infected with HIV (PLHIV). The increase in albumin levels in PLHIV patients is expected to help the process of replacing damaged cells and increase the immune response where albumin is able to bind Zn where this metal functions to increase the effectiveness of the work of T and B lymphocytes and the function of leukocytes. By increasing albumin levels after administration of snakehead fish albumin, it can help the wound healing process by helping the formation of new tissue.

Research by Wahyuni Sri et al., in 2014 showed that as many as 85% of postoperative patients with hypoalbumin were in the Graha Hita Room of dr. Iskak Tulungagung hospital experienced an increase in albumin levels after being given snakehead fish extract for 7 consecutive days.

In this study, the administration of snakehead fish nuggets together with the provision of colored fruit juices containing vitamin C, which comes from natural ingredients. Vitamin C in colored fruit juices

can function as an antioxidant that suppresses cell damage due to infection, helps stop the process of cell destruction, as an anti-inflammatory (Puertollano et al, 2011, Almatsier, 2016). In conditions of prolonged fever that generally occur in people infected with HIV, bioactive substances and vitamin C also function to regulate lymphocyte formation and transport lymphocytes to the site of infection (Arifin, 2009).

The effectiveness of snakehead fish extract should be combined with drinks containing vitamin C sourced from natural ingredients that can be obtained from fruit content because it contains bioactive substances in the form of flavonoids, karetonoid, anthocyanin, papain, bromelain, and quercetin such as watermelon, orange, mango, star fruit, red guava, pineapple, carrots, dragon fruit, papaya, cucumber, tomato, passion fruit, tamarillo.

This content can help recovery from infection because of its benefits that can play a role in protecting cells and tissues against damage. Meanwhile, the enzyme content of bromelain in pineapple juice has the potential for alternative treatments to reduce the pain of people with HIV / AIDS (Winarti, 2017).

The effectiveness of Zn can be combined with vitamin C which comes from colored fruit juices, where vitamin C acts as an antioxidant and increases immunity so that PLHIV do not get sick easily and catabolic processes that can reduce BMI do not occur (Warouw et al., 2016). The content of bioactive substances in fruits can work as

proteolytics, to destroy the HIV virus hom made of protein. Bioactive substances (papain, bromolain, anthocyanins, lycopene, etc.) can damage the protein walls of the HIV virus so that helper T lymphocytes and CD4 do not experience destruction due to HIV infection (Wardani, 2016)

Research by Pettalolo SR (2015) stated that there was an increase in the number of lymphocytes, CD4 and leukocytes in the snakehead fish extract group with the mineral content of zinc which can affect immune function as well as being useful in restoring the immunity of organisms by increasing the activity of the enzyme catalase and superoxide dismutase (SOD) and increase lymphokine production so that leukocyte cells are able to differentiate and proliferate, while Warouw' study in 2016 stated that snakehead fish and red beans contain essential amino acids that can increase CD4 cytokine levels. The greater the CD4 count in PLHIV people is a predictor of decreasing clinical symptoms and it is hoped that PLHIV can live longer.

CONCLUSIONS AND SUGGESTIONS

There was an effect before and after the provision of snakehead fish nuggets and colored fruit juices on clinical manifestations, BMI, TLC and CD4 levels with a p value <0.05. It is necessary to provide treatment in a longer term as a preventive measure for the emergence of various clinical manifestations and to increase TLC, CD4 and BMI in people with HIV at Bahagia Social Rehabilitation Center, Medan.

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