Journal Homepage: - www.journalijar.com
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)
Article DOI: 10.21474/IJAR01/6539
DOI URL: http://dx.doi.org/10.21474/IJAR01/6539

RESEARCH ARTICLE

Effect of Purple Sweet Potato Snack and Gabus Fish Flour on Pregnant Women.

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Manuscript Info

Manuscript History

Received: 15 December 2017
Final Accepted: 17 January 2018
Published: February 2018

Key words:-
Effect of Snack, Purple Sweet Potato, Cork Fish Flour and Pregnant Mother.

Abstract

Pregnancy is a natural process that after conception and physical and biochemical changes that result in increased nutritional needs. To undergo a normal pregnancy process requires more nutritional intake than before pregnancy. This addition is 285 kcalories for energy and 12 grams of protein every day. This form of addition can be a full meal or snack with energy nutritional value of 180-300 calories and 12 grams of protein per day. The impact of nutritional problems during this period is permanent (irreparably perfect) and long-term and consequences including future human qualities such as cognitive impairment (lack of intelligence) are less productive and fail to compete in the global era. The cause of nutritional problems is a direct factor of inadequate intake and infectious diseases that mutually interact and reinforce each other. Indirect factors include parenting, access to health care facilities and access to family food that is influenced by socioeconomic, technology, education. This research is quasi experiment with pretest posttest design approach. Samples were taken randomly to pregnant women in the second quarter and 30 samples were obtained. Treatment with purple sweet potato snack and fish meal for 30 days. The aim of this research is to know the effect of sweet potato snack and gabus fish flour. Before and after treatment will be measured body weight, LILA, hemoglobin and albumin levels. Analyze the nutritional value of the product manually by means of DKBM (List of Food Composition). Data analysis is done descriptively and analytically. The results showed a significant increase in body weight of the sample with p 0,000. For LILA, Hemoglobin and Albumin there was a significant decrease (each p value was LILA p = 0.001, Hemoglobin p = 0.000 and Albumin p = 0,000) but still within normal limits. Snacking has not been able to increase these three variables. The weakness of this study is not using control samples. It is recommended for pregnant women to increase daily food consumption. Consumption of protein with good quality comes from animals such as cork fish with various preparations. For further research use control sample.

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Introduction:-

The national movement to accelerate the improvement of nutrition in the first 1000 days of life is very important in the effort to create healthy human resources smart and productive. Goals in the first 1000 days of life are pregnant women, infants and children up to 24 months of age. This period is called the golden period of child feeding to achieve a healthy, smart generation as an investment nation. The program starts from the nutritional care of pregnant women with eating arrangements and the provision of nutritional knowledge, skills and improved nutritional status to achieve optimal health and nutrition conditions.

In pregnancy there is an increase in metabolism and physiological impact on increasing nutritional needs. Nutritional needs increase to meet the needs of the process of pregnancy (placenta, growth and development of fetus, amniotic fluid, breastfeeding, labor preparation and breastfeeding). If the nutritional needs (energy and protein) are not met can result in complications of pregnancy (fetal death, LBW, prematurity) otherwise excessive pregnant women overweight increases the risk of diabetes in pregnancy, labor complications, congenital abnormalities and obesity in children.

Entering the 20th week of pregnancy there is an increase in the volume of maternal fluids, kidney work in which the blood flow increases and causes glomerolus filtration work is also increased and proteins with small molecules can be secreted and found in urine such as albumin. This has to do with hemodilution where there is an increase in the volume of maternal fluid and the increase in its component is not comparable resulting in a decrease in concentration. Decreased hemoglobin levels, protein fractions such as albumin although still within normal limits.

The picture of public health status through maternal and maternal safety improvement program in 2013 as follows maternal mortality rate (AKI) of 16,27 / 100,000 live birth, infant mortality rate (AKB) 6,71 / 1000 birth, mortality rate of children under five age 1-4 years) of 82 / 24,576 live births (3.34 / 1000 live births). Coverage of exclusively breastfed 67.79%. For nutritional status of children under five year of 2013 is malnutrition status 2,66% and nutrition status less equal to 9.73%). Provision of tablets added blood at Public Health Center of Sekota Makassar in 2013 was 103.01% for Fe1 tablets (30 tablets) and 84.78% for Fe3 tablets (90 tablets) (Health Service Makassar City 2013). While the number of anemic pregnant women at Sudiang Raya Community Health Center in 2011 as many as 235 people from 483 or 53.6% (Dhuha, 2012)

In the maternal health improvement program, it is necessary to provide additional food prepared to meet the nutritional needs when the mother's nutritional intake is less. One of them is the provision of purple sweet potato modification with Gabus fish as a snack.

Purple sweet potato is a tuber whose tubers are purple, have some advantages compared to white or yellow sweet potatoes. This tuber contains betakoroten, antioxidant, phenol compounds, vitamins, minerals and carbohydrates but low in protein levels. It has been widely processed like chips, snacks singly or mixed as a natural color or designed with certain comparisons and so on. To improve the quality of the protein can be substituted or coupled with other foods high protein content such as fish. Production of sweet potatoes in South Sulawesi in 2015 reached 151.96 quintals / hectare. The area of production is 4717 hectares so that its production reaches 71,679.5 tons.

Gabus Fish is a freshwater fish including predatory fish and can live wetland waters, trenches, rivers or muddy ponds that were not originally cultivated. It has advantages over other fish species especially high protein and albumin levels. Now cork fish is one of the industry-processed supplements. Production of cork fish is cultivated as a fish cultivated in general. This high protein and albumin has been utilized to help accelerate wound healing (at surgery), increasing the albumin levels of chronic disease patients.

A snack of purple sweet potato with substitution or fish meal can be an alternative to healthy snack choices made at home. This snack is designed with one serving can contribute 200-300 kcal and 5-7 gram protein according to snack standard (Ministry of Health RI 2014).

Pregnant women need an extra meal of about 1-2 servings a day and converted nutritional value to 180 -300 kcal and 20 gram protein (AKG 2013). But in the 2007 AKG expressed energy addition of 285 kkalori and 12 grams of protein per day during pregnancy. This fulfillment can be given in the form of a full meal or snack. It needs to be tested with purple sweet potato snack and fish cork flour for pregnant women and how it affects the change of nutritional status with weight indicator, LILA, hemoglobin and albumin.

Stetement Of The Problem:-

The research problem is formulated as follows:

1. How is the formulation of purple sweet potato snack and gabus fish flour?
2. How is the nutritional composition of the snack produced?
3.Whether this snack can increase weight, LILA, Hb and albumin pregnant mother ?

Research Purposes:-

General purpose:

To know the effect of sweet potato snack and fish meal to change body weight, LILA Hb and albumin pregnant mother.

Special purpose:

Specifically the purpose of this study is to

1. Knowing the composition of sweet potato purple snack and fish cork flour.
2. Knowing the composition of nutritional value of purple sweet potato snack and fish cork flour.
3. Know the effects of snack on weight change, LILA, Hb and pregnant women albumin

Materials and methods:-

Research design:-

The research method used is quasi experiment with pretest posttest design approach. Treatment by providing purple sweet potatoes and gabus fish flour. This snack product is a culinary development by making a snack product made from purple sweet potato and gabus fish flour by exploring the existing recipe. Analysis of product nutritional value is done manually by DKBM. The next product is given to pregnant women for 30 days. Products made as many as 8 kinds.

Implementation phase of research:

1. Manufacture of gabus fish flour:
   Fresh cork fish (life) cleaned the entrails, and scales. Then washed thoroughly then steamed until cooked and chilled. After the cold separate the meat and bones. Meat the fish in suwir suwir and bake until dry. After drying milled and sift. Cork fish flour ready for use.
2. Making snacks Sweet purple sweet potato snack and gabus fish flour are made.
   The type of snack and the nutritional value of the perportions are as follows
   1. Purple sweet potato cake and gabus fish flour (energy 250,2 kcal, protein 6,8 gram)
   2. Purple sweet potato powder and gabus fish flour (energy 301,3 kcal, protein 8,7 gram)
   3. Purple sweet potato calamari and gabus fish flour (energy 218,6 kcal, 5.4 gram protein)
   4. Kroket purple sweet potato and gabus fish flour (energy 287,2 kcal, protein 7,3 gram)
   5. Purple sweet potato ball soup and gabus fish flour (energy 187 kcal, 5.6 gram protein)
   6. Nugget purple sweet potato and fish cork flour (energy 212,4 kkal protein 6,7 gram)
   7. Tarajong purple sweet potato and gabus fish (energy 183.8 kcal and protein 6.6 gram)
   8. Purple sweet potato prol and gabus fish flour (energy 201,8 kcal and protein 10,8 gram)

   Average nutritional value of snack: 230.3 calories of energy and 7.27 grams of protein.
3. Procedures Implementation of treatment (intervention):
   a. Before the treatment is given to pregnant women is done for weight body measurement, LILA, Albumin and Hb.
   b. Treatment snack is given 30 days
   c. After the treatment was done back to measure of weight body, LILA Albumin and Hb and analyzed changes in body weight, LILA, Hb and Abumin

The research flow is illustrated by the following scheme:

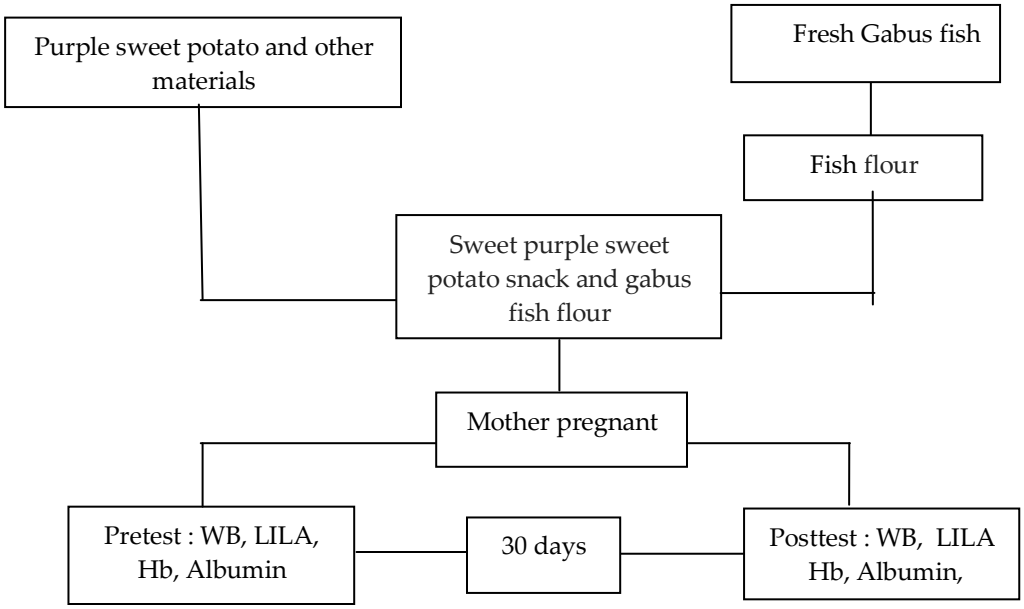

Figure 1. Schematic of research flow

Hypotheses:-
Snack made from sweet potato purple fish flour can increase body weight, Hb, LILA and albumin of pregnant women.

Population And Samples:-
The population is all registered pregnant women in Bonto Marannu Subdistrict and checked the pregnancy at Public Health Center Bonto Marannru Gowa District. Samples were taken rendome with inclusion criteria of healthy pregnant mother (not nausea and vomiting), gestational age of second quarter (4,5 and 6 month) registered and checked of pregnancy at Public Health Center Bonto Marannu Gowa District. The sample size was 32 persons.

Collection, Analysis And Presentation Of Data:-
The types of data collected are primary and secondary data. Primary data includes anthropometric data of the body measured by digital Camry adult body scales, LILA measured with LILA tape, food intake data by 24-hour recall method. Hb concentration was measured by spectrophotometer method and pregnant women's albumin content was measured by BCG (Borlian Creasil Green). Both standard methods of analysis are at the Syeh Yusuf Regional General Hospital and are not available at the Bonto Marannu Community Health Center.

Data analysis was done descriptively and statistical analysis paired T test. The results of the analysis are presented descriptively with narration

Results and Discussion:-

Data collection was conducted from August to September at Bonto Marannu Community Health Center. This Community Health Center is located on the road of Malino axis Bonto Marannu Subdistrict of Gowa District. The initial sample was obtained by 32 pregnant women in the second quarter. Early in the first week one person resigned on the grounds that in the family apply / belief is prohibited from consuming the cork fish called in the local language of kanjilo fish, the first weekend one person suffered a miscarriage. So that a large sample that can follow this research to complete as many as 30 people.

Sample Characteristics:-
Characteristics of the sample include age, gestational age, pregnancy to how much, work and energy and protein bribery. The description of these characteristics is shown in Table 1.

Table 1:- Distribution of sample characteristics

No.	Characteristics	N	%
1	Age : < 20 Years old 20-30 Years old ahun > 40 tahun	 2 18 9 1	 6,6 60,0 30,0 3.4
	Total	30	100
2	Gestational Age 5 Months 6 Months	 15 15	 50,0 50,0
	Total	30	100
3	Pregnancy 1^{st} 2^{nd} 3^{rd} 4^{th}	 5 15 5 5	 16,7 50,0 16,6 16,7
	Total	30	100
4	Occupation Government Employ Housewife	 2 28	 6,7 93.3
5	Intake Average Energy Protein	 2106,4 kkal 66,5 gram	

Weight:-

Weight distribution before and after treatment can be seen in the following table:

Table 2:- Distribution of changes in body weight of samples before and after treatment

Weight (kg) (n= 30)	Before	After	
Mean	56,66	57,90	
SD	9,66	9,35	
Minimum and Maximum	56,66 ±9,66	57,90±9,35	P=0,000
Weight gain average		1,24	

Table 2 shows the weight gain of the sample after all treatment experienced weight gain. Statistical test results obtained p value = 0.000

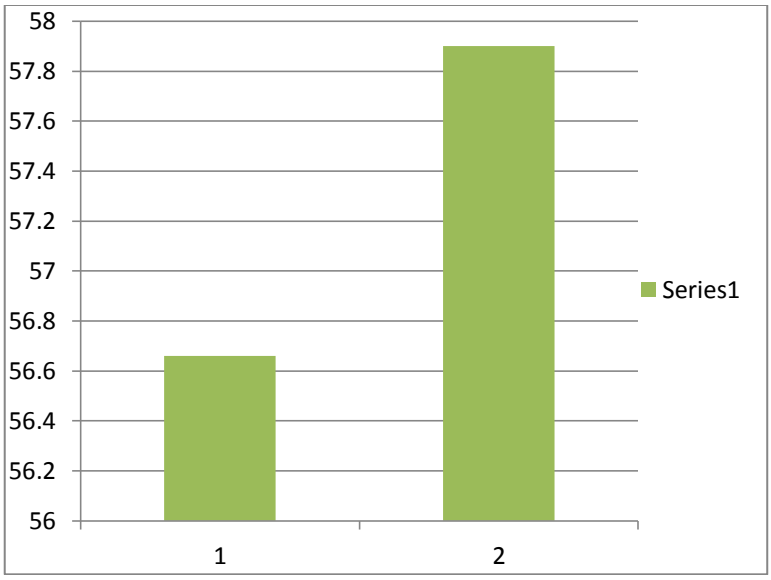

Figure 2:- Differences in body weight of the sample before and after treatment

From table and graph above average weight gain of sample before and after treatment equal to 1,24 kg and p value = 0,000 meaning that weight gain is significant.

The result of the research showed that there were 27 (90%) of mother's weight gain with an average of 1.24 kg. and paired test result p = 0.000. This shows a significant weight gain and hypothesis received. Physiologically in the second quarter began to gain weight, the mother's appetite has improved (nausea, vomiting is gone) and food intake began to improve or start normal. Increased weight describes the growth and development of the fetus and maternal weight (placenta, amniotic fluid, mother's breast and fat reserves). The theoretical weight gain (Arisman, 2004) in the second quarter was about 4.1 kg (average 1.4 kg). The weight gainers of this study were smaller than the theoretical increase. The thing to consider is whether there is an edema or not. The presence of edema in the legs often found in pregnancy will affect maternal weight gain. The presence of edema can be linked to less protein intake where one of its functions is to maintain fluid balance. In pregnancy 20 weeks (second quarter) occurs hemodilution is the increase in fluid volume of the mother. This will physically increase the weight of pregnant women. In this research, there is no physical examination related to the presence or absence of edema. Example of food sample recall obtained by average energy intake 2106,4 kcalori and 66,5 gram protein still not yet reached requirement of mother. Ministry of Health RI (2014) the energy sufficiency of pregnant mother must be added 300 cal and protein 20 gram per day so that become 2400-2500 kcalori and protein about 80 gram. Compared with AKG in 2008, the increase of 285 kcalori and protein 12 grams per day. The addition of one portion of the snack has not been able to meet this requirement especially when compared with both the nutritional adequacy rates for pregnant women. Lack of energy and protein intake will have an impact on the growth of placenta that will supply nutrients to the fetus. If the placenta is small then the supply of nutrients to the fetus is also small so the fetus will grow with a small size but all the cells are complete. The results of this pregnancy process will give birth to a baby with a small birth weight. If intake is not increased until the third trimester. (Sumariyah S).

Lila:-

The value of LILA is one indicator of nutritional status assessment in pregnant women. The value of LILA illustrates maternal fat reserves and long-term energy and protein intake.

Table 3:- Distribution of Change of Sample Value of Before and After Treatment of LILA

LILA Value (cm) (n=30)	Before	After	
Mean	26,82	26,01	
SD	2,77	2,64	
Minimal and maximal	26,82±2,77	28,01±2,64	P=0,001
LILA decrease average		0,813	

From the table above seen a decrease of LILA value is significant with p value 0,001.

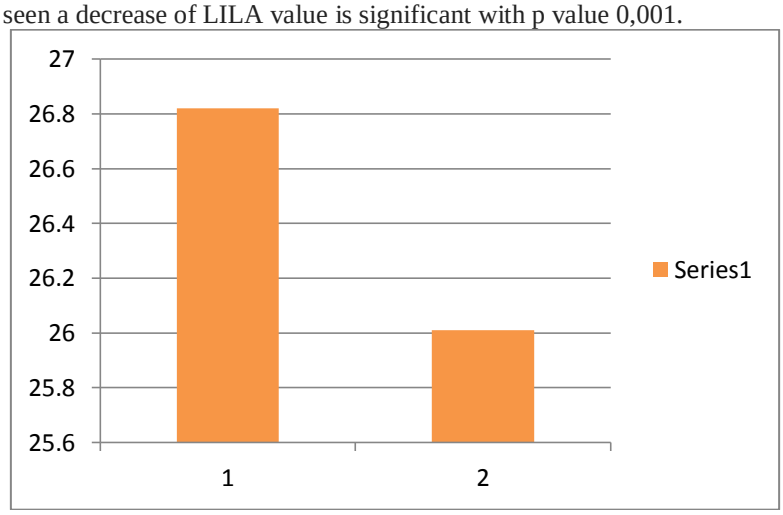

Figure 3:- Differences of LILA values of samples before and after treatment

The value of a person's LILA describes the stock of fat and protein reserves. In the study 66.6% of the sample decreased the value of LILA (mean decrease of 0.813 cm) although still within normal limits. The result of paired T test is obtained p value 0,001 means that this decrease is meaningful and initial hypothesis is rejected, no increase of LILA value. If it is not maintained with adequate daily intake of food then the decline can continue to occur. This decrease is greater than Zilya (2015) in its literature review which states that the reduction of LILA during pregnancy by 0.4 cm. This illustrates the use of protein and fat reserves for maternal physiology needs and low intake of daily protein and protein samples. Snacking has not been able to meet and maintain its nutritional bile so that energy and protein reserves are used for physiological needs. Still to be increased food intake until the end of pregnancy for the body of Janis flowers achieved optimally.

Hemoglobin:-

The distribution of hemoglobin values of the sample before and after the treatment is presented in Table 4 below,

Table 4:- Distribution of Hemoglobin Sample Value Changes Before and After Treatment

Hemoglobin (gr/dl) (n=30)	Before	After	
Mean	11,86	11,12	
SD	0,89	0,92	
Minimal and maximal	11,86 ±0,89	11,12±0,92	p=0,000
Hemoglobin decrease average		0,746	

The table shows the average decrease of hemoglobin value 0.746 gram / dl and p value = 0.000 which means there has been a significant decrease.

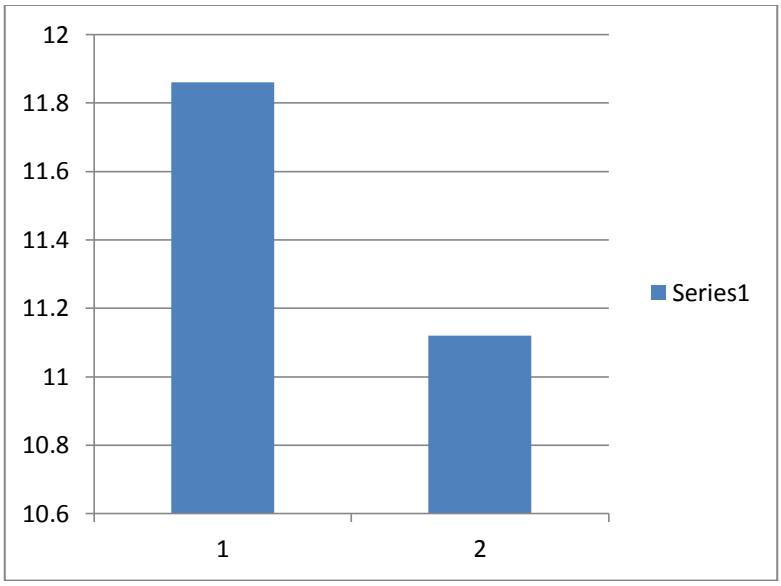

Figure 4:- Differences of Hemoglobin value changes of sample before and after treatment.

The results of this study showed a tendency to decrease the value of Hb samples. Of 30 samples 66.6% decreased Hb value with an average of 0.746 grams / dl. The result of paired T test statistic is obtained p value 0,000. This means that this decline is meaningful and the initial hypothesis is rejected, no increase in Hb value. In this study the decrease was smaller than the physiological decrease (one digit (1 gram / dl) compared with 0.746 gr / dl). The physiological decrease in physiological hemoglobin levels in the second quarter had hemodilution. Increased body fluid volume of the mother is not matched by an increase in blood components including hemoglobin. Mothers need supplemental or nourishment supplementation of hemoglobin. The national program that every pregnant mother is required to obtain a blood-boosted tablet distributed through the Community Health Center and has been run is expected to be consumed by the mother and will improve the value of hemoglobin. The purpose of supplementation is to prevent anemia and improve if swallow anemia with indicators of Hb values of pregnant women. Whether pregnant women actually consume it or not has not been ascertained in this study. This condition is related to the result of Duha (2013) research at Community Health Center Sudiang Raya which found the anemia pregnant woman reach 53,6%. For the process of formation of Hb in addition to iron is required other nutrients such as vitamin C, vitamin B, folic acid, and protein. Provision of 90 grain tablets plus blood during pregnancy should also be considered whether the dose for the prevention or removal of Hb values reached normal. The consumption of added tablets of blood is influenced by maternal education and knowledge and daily dietary intake. The decrease of Hemoglobin level was in line with the result of Emawati (2013) study which stated that pregnant women at the beginning of the second quarter of HB <11 gram / dl rate of 14.9% increased by the end of third trimester to 43%.

Albumin:-

The distribution of sample albumin values before and after treatment can be seen in the following table.

Table 5:- Distribution of Value Changes Sample Albumin Before and After Treatment.

Albumin (gr/dl) (n=30)	Before	After	
Mean	4,11	3,87	
SD	0,213	0,245	
Minimal dan Maximal	4,11±0,213	3,87 ±0,245	p=0,000
Albumin Decrease average		0,24	

Table 5 shows the mean decrease in sample albumin value of 0.24 and statistical test results with p = 0,000, which means that this decrease is significant.

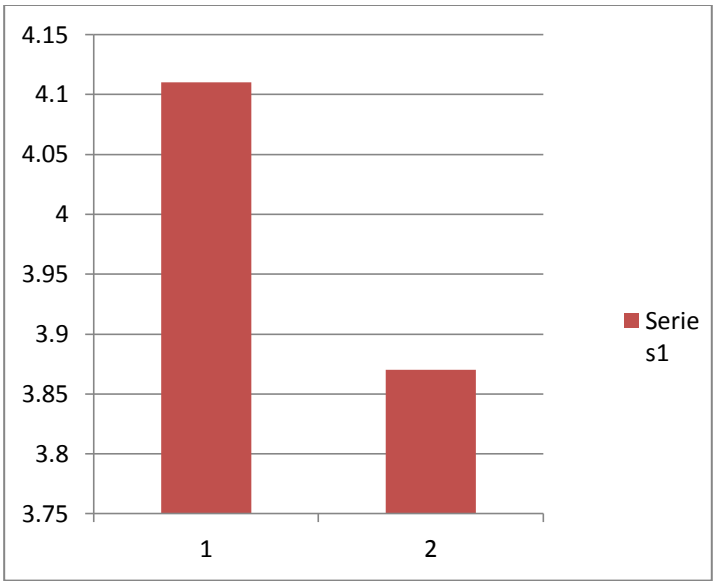

Figure 4:- Differences of albumin values before and after treatment

The results of the analysis of sample albumin assay occurred a decreasing tendency that was eaten with a p value of 0.000. This means that the initial hypothesis is rejected, no increase in albumin value.

The decrease in albumin values is influenced by pregnancy physiology factors, namely the presence of hemodilution and incrising renal work or the presence or absence of infection. In pregnant women who are suspected of having preeclampsia found increased blood pressure and decreased albumin values vary. In pregnancy there is also an increase in blood flow to the kidneys and glomerular filtration rate which affects abnormal albumin excretion in the urine, small proteins such as albumin are found in the urine and blood albumin decreases (Aryani, Endah 2013). In the second quarter of pregnancy and gestational age has been 20 weeks of albumin and protein excretion (proteinuria and albuminuria) but still below the normal threshold. In addition to the urine there is also a decrease in other protein fractions such as albumin, globulin and others (Latitude, Letta Sari 2013). This study is in line with the two results of the study in which the samples experienced a decrease in albumin levels but still within normal limits. When viewed the value of albumin before pregnancy and during pregnancy there is a difference of 1 gram / dl (before pregnancy 4.25 grams / dl and while pregnant 3.25 grams / dl) (Latitude, 2015). The results of this study value of pregnant women albumin levels of 0.24 grams / dl smaller than the standard value of pregnant women albumin. The decline in albumin levels is also in line with the study of Emawati 2013, which states that the number of pregnant women at the beginning of the second quarter of low (<3.4 grams / dl) as much as 5.4% increased at the end of the third quarter to 17.9%.

Looking at the nutritional intake through 24-hour recall, on average 2106.4 kcal and 66.5 grams of pregnant women it is seen that the average daily intake is still less than the needs of pregnant women. The presence of snack with energy value of 230.3 kilocalories and 7.27 grams of protein has an impact on the decrease in the value of LILA and albumin are smaller and still within normal limits.

The above description illustrates that in every pregnancy there is an increase in energy and protein requirements and other nutrients. (Ministry of Health RI 2013) recommends the addition of energy Quarter II of 300 kcal and 20 grams of protein every day. Judging from the quality of protein and albumin is recommended using good quality food ingredients. Foodstuffs of animal protein sources have a better quality than vegetable proteins seen from their essential amino acid sequence. The results of protein sample intake analysis are generally derived from vegetable (tofu and tempeh) than from animal (fish) although there are some samples that consume milk for pregnant women. This situation is in line with Candra 2013 study which states that the source of protein is mostly derived from vegetable (tempe, tofu) and low nutrient intake found low levels of Hemoglohin (10 ± 0.62 grams / dl) and LILA (24.5 ± 1, 78 cm) and 57.1% suffer from anemia and SEZ 17.1%.

The treatments are purple sweet potato snack and fish cork flour which refers to the nutritional standard of snack (energy 200-300 cal and 5-7 gram protein) of its portion. This gift has not been able to achieve the recommended nutritional adequacy of pregnant women. Besides, the low intake (not yet reached) needs have an impact on the use of energy reserves and body proteins for physiological fulfillment of pregnancy as reflected in the impairment of LILA.

Gabus Fish has high protein and albumin content and good quality is very good consumed by pregnant mother. Cork fish can be processed directly (fresh) as a side dish with a variety of processed recipes. The weakness is quickly damaged and not durable. Gabus fish can also be made flour for longer stopping power, can be consumed directly as a sprinkling of food or mixed in the manufacture of snacks or food.

In order for the intake of eating pregnant women can be met is recommended with small portion patterns and frequent frequencies (4-6 times a day) with good quality.

The weakness of this study is the absence of control samples so that there can be no comparison that there is a change in this case because of the consumption or other factors involved. For further research can use the control sample so that it can analyze the cause of the change.

Conclusion:-

1. Purple sweet potato and cork fish flour can be made snack such as cake, mud cake, tuna cake, croquette, ball soccer soup, nugget, tarajong, sweet potato prol
2. The average nutritional value of snack perportion energy 230,3,99 kcalori and 7.27 grams of protein.
3. There was an increase in body weight of the sample with an average value of 1.24 kg. There was a decrease for LILA with an average value of 0.813 cm, Hemoglobin with a mean value of 0.764 grams / dl and Albumin with an average of 0.24 grams / dl.

Suggestion:-

1. Still needed increase in daily energy and protein intake so that sufficiency of nutrition according to AKG achieved. The trick with frequent frequencies and small portions.
2. Gabus fish or fish cork flour can be used as a source of protein and albumin of good quality.
3. Need further research using control samples.

Acknowledgments:-

1. Director of the Polytechnic Health Ministry of Makassar for financial support and opportunity to conduct this research
2. Head of Community Health Center of Bonto Marannu of Gowa District which has given permission of location of this research implementation.

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