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## EFFECT OF BOTEME CONSUMPTION (SETARIA ITALICA) TO DECREASE OF CHOLESTEROL CONDITION IN HYPERCOLESTEROL PATIENTS

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### ABSTRACT

Cholesterol is a fat complex in every cell in the body . In golongan cholesterol as the first material to form the gall ,cell walls ,vitamin and hormone such as sex and other .( Dolfi kid's Bulururan et al). Halmahera Boteme (*Setaria italica*) is a kind of cereal seed or plant seeds.

This research aims to find out the influence of the Halmahera Boteme Consumption (*setaria italica*) To decrease the amount of cholesterol Patients Hyperkolesterol in desasangaji jaya Working area of the clinic Toliwang Kao Sub-district of West North Halmahera 2017. The type of research that is used is "quasy eskperiment research design with Pre-post test control group".with sample size 10 respondents in the village of sangaji jaya sampling with a non probability sampling sampling conform type.

Test results (SPSS statistics) obtained significant value = 0,000 <0.05, or the value of T count (11.244) > T table (2,776) the results of the test analysis (SPSS statistics) using T tests count and T table shows that boteme halmahera have the influence to decrease total cholesterol.

From the results of research has obtained significant value = 0,000 thus has proved that on the group experiment Ho was rejected and Ha received (where sig < 0.05). And on the control group obtained the value of sig = 0.801 it has been proved that the Ho received because the value of sig >0.05.

The conclusion from the results of this is the halmahera boteme penelitian (*setaria italica*) affect cholesterol levels decline.

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## INTRODUCTION

Cardiovascular disease is the largest cause of death in the whole world. According to the World Health Organization report from 57 million deaths world population, 17.3 million (31%) of death caused by cardiovascular disease, especially heart attack (7.3 million) and stroke (6.2 million). One of the main risk factors of cardiovascular disease is high cholesterol (Laddy G Lapien et all 2016).

A research done by the Lipid Research clinics in the United States find the same correlation between total cholesterol blood and the risk of heart disease. This study found that every 1 percent drop in total cholesterol blood, then there would be a reduction of the risk of the emergence of heart disease by 25%. According to the *Framingham Heart Study* the risk of heart disease increases when total cholesterol greater than 200 mg/dL, and will be increased three to five times when beyond 300 mg/dL ( Mapanawang 2016).

According to a report from the World Health Organization (WHO) 2002, recorded as much as 4.4 million deaths due to hypercholesterolemia or 7.9% from the total number of death (Agam,2012). Data gathered by the World Health Organization in the Global status report on non-communicable diseases in 2008 showed that the risk factor for hypercholesterolemia on women in Indonesia is higher which owns 37.2 percent compared to men who only 32,8%. The prevalence of hypercholesterolemia in the older age group 25-34 years is 9.3 percent and increased in accordance with the increase in the age of up to 15.5 percent in the older age group 55-64 years (Ruth Grace, Aurika, Carolin, 2012). The prevalence of the highest total cholesterol is a region of Europe (54%) and United (48%). While the lowest prevalence is a region of Africa (23%) and Southeast Asia (30%)(Brata, Malik, 2011)

Data from the health office in North Maluku Province 2016, the number of reports of non-contagious diseases in patients who were recorded in the hospital or other health facility in each city or district which is located in the province of North Maluku, shows the case with the highest number is patients with hypertension (9.306 people), then DM (1.634 people), Coronary Heart Disease (97 people),and stroke ( 75) ( District Health Profile of North Maluku, 2016).

Data from the Health Service Halut 2016, report the number of cases of the disease is not contagious diseases on the health of the patient is recorded in the Hospital and other health facilities. Shows the case with the highest number is hypertension (1.292 people), DM

(2.170 people),Coronary Heart Disease (44),Stroke ( 4 people) (Profile Health Service Halut 2016).

Based on data from the clinic Toliwang Kao Sub-district of West North Halmahera from January to March 2017 is as much as 15 patients with hiperkolestrol.

Or jewawut Boteme (*Setaria italica*) is a kind of cereal seed in small businesses that never become the staple food of the society for East Asia and the southeast before they plant crops other serealia. Boteme contains omega 6 or lenoleat acid which can reduce the amount of cholesterol.Boteme including plants have nutritional value similar to other food crops such as rice, corn grain, and plants the seeds of the other because the plants boteme itself is classified into the type of plants the seeds. Most people do not know boteme as a food source so that during this plant boteme only made as food for the birds. Even though this plant can be processed into the food source by the public in order to support the food resilience and anticipate hunger problem (Hildayanti,2012) .

Plants boteme (*setaria italica*) is arable crops like grass, which height can reach 2 m, have malai is a meeting and a woman have so that people called with crops tail foxes. The ear a small diameter of only about 3 mm, even still there are smaller. The color of the ear varied, from black, blue, red to orange until it is golden brown.

From the background above the researchers are interested to do research about "Influence Boteme Consumption (*Setaria italica*) To decrease the amount of cholesterol in patients in the village of Hyperkolestrol sangaji jaya Working Area of the clinic Toliwang Kao Sub-district of West North Halmahera".

## METHODS

### Research Design

This research *Quasy Eksperiment design Design Control Group* with the design of the *pretest* and *posttest control group*.

The research design is described as follows :

Pretest	Posttest
O1	x O3
O2	O4

Description :

O1 =measurement results before consumes as boteme cholesterol in the intervention group (experiment )

O2 = The results of the measurement of the amount of cholesterol in the control groups

X = gift boteme Intervention

O3= measurement results after consumes as boteme cholesterol in the intervention group (experiments)

O4 = The results of the measurement of the amount of cholesterol in the control groups

### The population and Samples

The population is the entire amount of that consists of the object or subject that have characteristics and a certain quality that are assigned by the researchers to in detail and then pull the conclusion (Mapanawang 2016)

The population in this research is patients with Hyperkolesterol in villages sangaji jaya in the working area of the clinic Toliwang Kao Sub-district of West North Halmahera which numbered 15 people.

The sample is part of a number of characteristics which are possessed by the population that used for research (Mapanawang 2016).

The sample in this research is 5 patients and control group 5 patients experiment with patients hiperkolestrol group That meet the criteria for the inclusion of :

- 1) Patients with age Hyperkolesterol 35-65 years.
- 2) Hyperkolesterol patients with cholesterol levels reaching >200 mg/dl .
- 3) Hyperkolesterol sufferers who do not currently consume drugs anti cholesterol.
- 4) Patients who want to consume boteme Hyperkolesterol or jewawut (setaria italica).
- 5) Rita Hyperkolesterol Pende are willing to sign the approval sheet (*Informed Consent*).

The criteria eskclusi :

- 1) Hyperkolesterol patients under the age of 35 years
- 2) Patients with Hyperkolesterol that can not be to communicate good.
- 3) Patients who are in Hyperkolesterol consumes as drugs anti cholesterol.
- 4) Patients who do not want to Hyperkolesterol consumes as boteme.
- 5) Patients who are not prepared Hyperkolesterol signed approval sheet.

In this research sampling techniques used is using a *non probability sampling* using the saturated sampling this sampling techniques to take all members of the population become samples. How this is done when the number of small population, such as when the

sampel have less than 30 samples and members of the population is taken entirely for made samples research. Another term is has been saturated samples, where all members of the population made samples ( Hidayat, 2007).

### Data Collection Procedures

Research data collection procedure is as follows:

#### Administrative Procedures

- 1) Data collection was done after getting permission from the Head of the clinic Toliwang and Village Heads (attached permission letter).
- 2) Researchers determine the patients who will be done by the intervention of the amount of cholesterol. The researcher provides information about the purpose and procedures of research done and then ask the patient to become research respondents with signed *informed consent sheet*.
- 3) The selection of respondents in accordance with the criteria for the inclusion of
- 4) Respondents are grouped into two groups consisting of I is the group who received the intervention with the gift of boteme actions (setaria italica) while group II is a group that only get standard action alone without giving boteme (setaria italica).

#### Intervention Procedures

1. The intervention group
  - 1) Researchers ensure patients who will be done cholesterol intervention procedures and to introduce themselves to the respondents.
  - 2) Researchers provide an explanation of the respondents about the sense of purpose how, fruit boteme benefits for the respondents and the implementation of the procedure of granting boteme.
  - 3) To provide the opportunity for the respondents to ask questions and provide *informed consent*, asked for a signature as evidence of approval for respondents who are willing to follow the research activities.

#### 2. Control Group

Patients in the control group performed only checks the amount of cholesterol as much as 1 times without consumes as boteme (setaria italica)

## Data Processing

Data processing will be done by using the computer through stages as follows:

### *The Editing*

This activity is done to check for each data, related to whether or not there is an error and the completeness of the data so that all valid data to be processed.

### *The Coding*

Provide the code on each of the information has been collected on each data, making it easier for data processing. The data in the form of a letter was amended in the form of numbers so easily in analyzing data danmempercepat data entry process. This is done by giving the code (1) for the intervention group and the code (2) to control groups.

### *Data Entry*

The data is collected and then entered into the computer for the next done data analysis by using *Statistical Program for Social Science (SPSS 23.)*

### *Cleaning the data*

The data in the check back to ensure that there is no data that one before the data has been analyzed by computer programs.

## Data Analysis

### Univariat Analysis

Univariat analysis function to summarize data sets the measurement result in such a way that the collection of the data is turned into useful information and data processing only one only variable (V.Wiratna Sujarweni, 2014)

Univariat analysis done to define ecological variables examined in this research is to see the distribution of the data on all the variables. Univariat analysis on this research are the characteristics of respondents age, gender, age data with data display in the form of mean, median,, mode and standard deviation, while display category data data in the form of the frequency and percentage.

### Bivariat Analysis

Bivariat analysis done to know the form of the relationship between the two independent variables (and) (Notoatmodjo dependent, 2007). Now test that is used :

### T Test

Do bivariat analysis for independent variables of type kategorik pairs. The measurement of the pre-test and post test group control, measurements before and after the gift of extracting Boteme halmahera (intervention groups). This test is done to identify the influence of boteme to decrease total cholesterol by comparing the value before and after treatment. The significance of the test results are determined based on the value of the T test count and test the T table $<0.05$ .

## Research Ethics

According to Hidayat (2007) ethics research includes :

### *Informant Consent (approval sheet)*

Informant Consent given before doing research. This Consent Informend be approval sheet to become respondents, with the purpose of this immunization to the subject to understand the intent and purpose of the research and know the impact. If the subject is willing to, then they must be signed approval sheet and if the respondents are not willing to then researchers should respect their rights.

### *Anominity (without the name)*

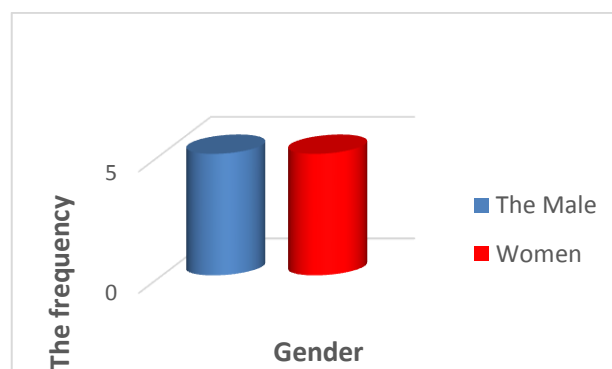
Anominity explain writing with no need to define the name on the data collection sheet, but only write the code on the data collection sheet.

### *Confidentiality (secrecy)*

Privacy Statement explains the problems of respondents should be withheld in research. The confidentiality of the information has been collected guaranteed kerahasiannya by researchers, only the specific data that will be reported in the results of research.

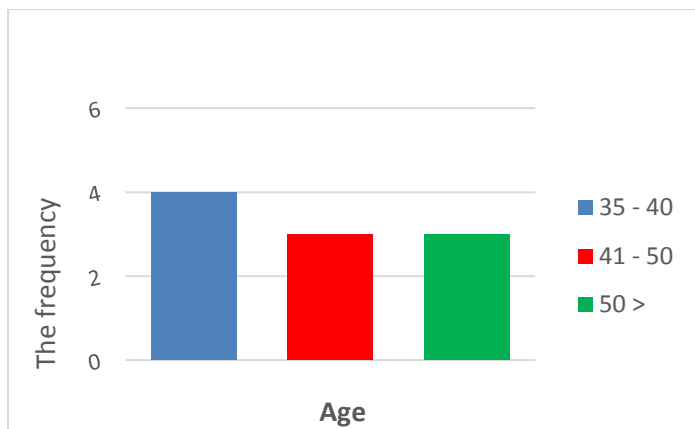
## RESULTS

### Characteritic Respondents



**Figure 1.** frequency distribution of respondents based on Gender in the village of sangaji jaya Kao Sub-district of West North Halmahera

Based on the diagram above, seen that women respondents 5 respondents (50%), and men 5 respondents (50%). The results show that a number of respondents equivalent.

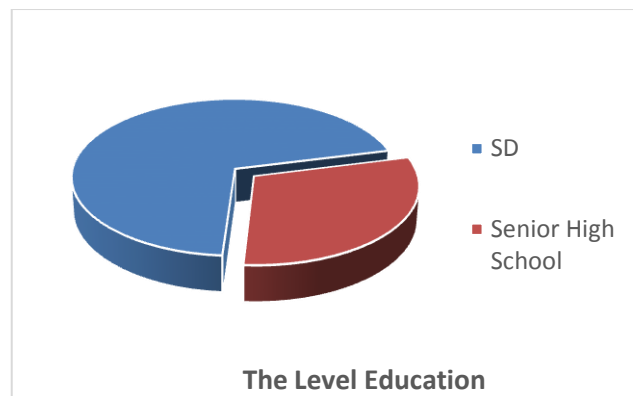


**Figure 2.** frequency distribution of respondents based on age in the village of Sangaji jaya kao Sub-district of West North Halmahera.

Based on the diagram above seen that respondents aged 35-40 year 4 respondents (40%), 41-50 years old respondents 3 respondents (30%) and respondents who was >50 year 3 respondents (30%).

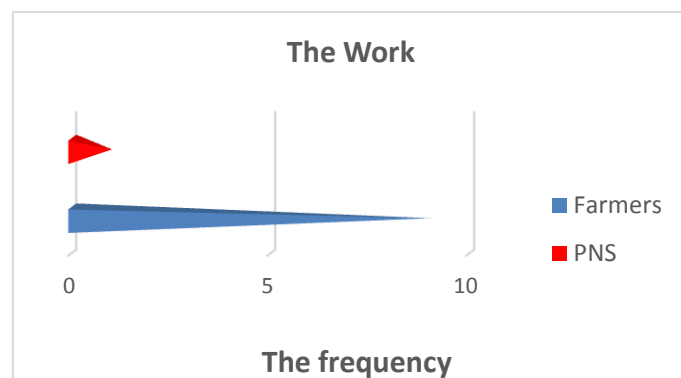
Decline in some types of this hormone causes the decrease of the masses without /fat while increasing the activity of other hormones increase the mass of the fat. It is also due to reduced physical activity increases with age which eventually cause a decrease in the number of Basal metabolism (AMB). (Soetardjo, 2011).

Total serum cholesterol levels increased with increasing age. In men this increase stopped around the age of 45 to 50 years. In women continue to increase sharply until the age of 60 to 65 years (Suiraoaka, 2012). The statement is supported by the research Madupa (2006), that there is a meaningful relationship between the age with total cholesterol. So also Hatma research (2001) on the Minangkabau ethnic populations and Sundanese, that age related positively with total cholesterol. Age contribute 5.02% on the variation of total cholesterol blood. Other research done by Le et al (2006) in Thailand also indicates that there is a relationship between the age with the amount of cholesterol.



**Figure 3.** frequency distribution of respondents based on the level of education in the working area of the village sangaji jaya Kao sub-district of West North Halmahera.

Based on the table above seen that respondents education SD 7 respondents (70%), SMA 3 respondents (30%).



**Figure 4.** frequency distribution of respondents based on the work in the working area of the clinic Toliwang Kao Sub-district of West North Halmahera.

Based on the above digram, seen that respondents who work as much as 9 respondents (90%),PNS 1 respondents (10%).

### Univariat Analysis

Univariat analysis done to see the frequency distribution of independent and dependent variables in research about the influence of the halmahera boteme to decrease total cholesterol in patients with Hyperkolesterol.

Independent variables/ free variable is a variable which affects or to become for the watershed or the emergence of the dependent variables. While the dependent variable is bound variable/variables which influenced or result, due to the free variable.

### The results of the measurement of the Total Cholesterol Control Groups (Pre Test)

**Table 1.** Frequency Distribution Control Groups (Pretest Respondents) in the working area of the Village Sangaji Jaya Kao Sub West North Halmahera District.

No	The Value	The frequency	The Presentation
1	<200		0 percent
2	200-239	3	60%
3	>240	2	40%
<b>Total</b>		5	100

Based on the table 1 shows that examination results total cholesterol in control groups (Pre Test with high Limit (200-239) 3 number of respondents with the percentage of 60 percent while High (>240) numbered 2 respondents with the percentage of 40%.

**The results of the measurement of the Total Cholesterol On KelompokKontrol (Post Test)**

**Table 2.** frequency distribution of respondents Control Groups (Post test) in the working area of the Village Sangaji Jaya Kao Sub-West North Halmahera District.

No	The Value	The frequency	The Presentation
1	<200		0 %
2	200-239	3	60%
3	>240	2	40%
<b>Total</b>		5	100

Based on the table 2 shows that there is no difference between pre and post on the control group/group without consumes as Boteme Halmahera which means that examination results decrease total cholesterol Hyperkolesterol patients on the control group is not different. Where respondents cholesterol levels High Limit 3 respondents (60%) and High 2 respondents (40%).

**First Measurement of total cholesterol in the group experiment (Pre Test).**

**Table 3.** frequency distribution of respondents the Group Experiment (Pre test) in the working area of the Village Sangaji jaya Kao Sub-West North Halmahera District

No	The Value	The frequency	The Presentation
1	<200		0 %
2	200-239	1	40%
3	>240	4	60%
<b>Total</b>		5	100

Based on the table 3 shows that examination results total cholesterol in the group experiment (Pre Test with high Limit (200-239) number of 1 respondents with the percentage of 40 percent while High (>240) numbered 4 respondents with the percentage of 60%.

**The results of the measurement of the total cholesterol in the group experiment (Post Test)**

**Table 4.** frequency distribution of respondents the Group Experiment (Post test) in the working area of the Village Sangaji Jaya Kao Sub-West North Halmahera District.

No	The Value	The frequency	The Presentation
1	<200	5	100%
2	200-239	0	0 %
3	>240	0	0 %
<b>Total</b>		5	100%

From the table above on the group experiment shows that the percentage result examination results decrease total cholesterol patients Hyperkolesterol after consumes as Boteme Halmahera is : Optimal cholesterol 100% (5 respondents), High limit of 0 percent and High (0%). This shows that a drop in total cholesterol in patients after consumes as boteme Hyperkolesterol Halmahera.

Based on the analysis of the amount of cholesterol researchers after consuming Boteme Halmahera and can change the lifestyle, diet and avoid risk factor that can cause increased cholesterol. Very influential in decrease the amount of cholesterol itself.

**Bivariat Analysis**

Bivariat analysis used to see whether or not there is influence between free variables and bound variables in the experiment group and the control group with significant = 0.05.

**The Making of Extracting Boteme**

In Boteme take as much as 300 grams, then are put in a clean container with water and then in the dishwasher to clean, after that are put in a pan containing water as 500 ml then in cook until mature while in stir in the time of 40 minutes at a temperature of 110°c . After the mature in the move to the empty container and let approximately 5 minutes to unpack the boteme quickly cool and became crowded, after that in the cut to pieces with a heavy 50 gram/pieces after that are given to patients in the morning 50 grams before breakfast and the night 50 grams before sleep for 1 week regularly.

## The group of the experiment.

**Table 5.** Test Results Table statistics T Test In the Group Experiment

No Respondents	The code Respondents	The results		The value of $\alpha$	The value of T Count	The Normal Values		Conclusion
		Pre	Post			A	T table	
1	1	248	199					
2	1	243	185					
3	1	254	188	0.00	11.244	0.05	2.776	The Ho was rejected and Ha accepted
4	1	240	198					
5	1	230	187					

Based on the table 5 above then there are the influence of the giving of the halmahera boteme on the group experiment with significant results is  $0,000 < 0.05$ . And Indonesia Recorded Its  $94 = n-k$  (  $5-1 = 4$ ; ) where  $n$ =number of respondents and  $k=1$ .

Test results in SPSS statistics obtain significant value= $0,000 < 0.05$ , or the value of T count ( $11.244$ )  $>$  T table ( $2.776$ ), berartidapat concluded that there is the influence of botemeterhadap decrease total cholesterol.

### Control Group

**Table 6.** Test Results Table statistics T Test On the Control Group

No Respondents	The code respondents	The results		The value of $\alpha$	The value of t count	The Normal Values		Conclusion
		Pre	Post			A	T table	
6	2	258	255					
7	2	229	235					
8	2	240	238	0.801	-269	0.05	2.776	Ho accepted and Ha rejected
9	2	254	260					
10	2	234	230					

Based on the table 6. It can be in the deduce that there is no effect on the control groups with significant results is  $0.801 > 0.05$ . And Indonesia Recorded Its  $94 = n-k$  ( $5-1=4$ ; two sides/ $0,025$  ) where ( $n$ =number of respondents then pour pieces= $1$ )

Test results in SPSS stastik get T count=  $-269$  with significant value =  $0.801$ , means can deduce that there is no impact of the total cholesterol in the control group. This in show of significant value ( $0,801 > 0.05$ ) and T count ( $-269$ )  $<$  T table ( $2,776$ ).

## DISCUSSION

The results of the test analysis (SPSS statistics) using T tests ( T count and T table) shows that boteme Halmahera have the influence to decrease total cholesterol in patients in the village of Hyperkolesterol Sangaji Jaya Working Area of the clinic Toliwang Kao Sub- district of West North Halmahera.

### The group experiment(Pre-Test and Post-Test)

1. Decision making based on the comparison of the value of T count and T table.
  - a. If T count greater than T table then ho rejected
  - b. If T count smaller than T table then ho accepted

Known T count is  $11.244$ , while T search table with how to

- a. Significant level 5 percent to test the 2 sides and a significant level is divided into 2.5%
- b. Indonesia Recorded Its 94 (*degree of freedom*) or the degree of numbness search with the formula of the amount of data  $-1$  or  $5-1=4$
- c. Test done 2 side with the value of Indonesia Recorded Its 94  $=4$  and

significant value 0.05 then from t table reachable values 2.776.

Because T count located on the districts Ho rejected, it can be concluded that the total cholesterol before and after consuming boteme Halmahera is not the same or different significantly.

2. Boys decision based on the value of the probability
  - a. If the probability  $>0.05$ , then Ho accepted
  - b. If the probability  $<0.05$ , then Ha ditolak untuk test 2 sides, each side divided into 2 up to become
    - 1) Probabilistic number  $/2 < 0.025$ , then Ho accepted
    - 2) Probabilistic number  $/2 < 0.025$ , then Ha rejected

It is apparent that T count for total cholesterol is 11.244 with probability 0.000 to test the 2 sides, numbers probability is  $0.000/2 = 0.00$  then Ho rejected while T count to the amount of cholesterol is  $0.00 > 0.025$ , with probability to test the 2 sides of the numbers probability is then Ha rejected.

That the amount of cholesterol before and after consuming Boteme relative different or boteme Halmahera Halmahera effective in lowering total cholesterol.

### Control group (Pre Test and Post Test)

Decision making based on the comparison of the value of T count and T table

- a. If t count greater than t table then ho rejected
- b. If t count smaller than t table then ho accepted

Known T count is -269 while T search table with how to

- a. Significant level 5 percent to test the 2 sides and a significant level is divided into 2.5%
- b. Indonesia Recorded Its 94 (degree of freedom) or the degree of numbness search with the formula of the amount of data -1 or  $5-1=4$
- c. With the value of Indonesia Recorded Its  $94=4$  and significant value 0.05 then from t table reachable values 2.776.

## CONCLUSION

From the results of research can be summarized as follows :

1. Based on the research results obtained from 10 respondents, where from 10 respondents was divided into two groups namely 5 respondents as the group experiment/intervention and 5 respondents as control groups.
2. Total Cholesterol in control groups or without consuming boteme halmahera is relatively the same as before in the working area of the Village Sangaji jaya Kao sub- district of West North Halmahera.
3. There is the influence of the halmahera boteme against decreased koleterol total patients Hyperkolesterol, in the working area of the village sangaji jaya Kao Sub- district of West North Halmahera.
4. The T test analysis results demonstrate that there is the influence of boteme to decrease the amount of cholesterol with the value of T- count is  $11.244 >$  the value of T- 2.776 table=. Therefore the hypothesis of zero (Ho) rejected and the alternative hypothesis (Ha) received.
5. From the results of research has obtained significant value  $=0,000$  thus has proved that on the group ekperimen/intervention Ho was rejected and Ha received (where  $\text{sig} < 0.05$ ). And on the control group obtained  $\text{sig} = 0,801$  it has been proved that the Ho received because the value of  $\text{sig} > 0.05$ .

### Suggestions

Based on the results of research done, there is some advice given to the stakeholders, among others :

#### 1. For Health Institution

It is expected that the party puskesmas is health workers and that most closely with local communities in order to improve the quality of health services so that people can be free from various diseases including cholesterol disease.

#### 2. The research/Society

Expected to the community in order to maintain the diet and avoid risk factors that suffer cholesterol, we must realize the importance of maintaining health and check regularly, pelayananan nearest health as the clinic.



### 3. For Institution (Campus)

It is expected that the party campus ( For university lecturers ) in order to improve the knowledge about the influence of the fruit of the botome to decrease total cholesterol on panderita Hyperkolesterol, as we have seen in the explanation above botome ( setaria italica ) can reduce total cholesterol.

### 4. For the next researcher

There is a need to further research about the effects of various types of plants that can reduce total cholesterol so that they can increase their knowledge about herbal medicines future.

## REFERENCES

1. Lady G.Lapian et al.Effect Of Golobe ( Hornstedia Alliacea) Fruit Extracts On The changes Of Total Cholesterol Levels In Patient With Hypercholesterolemia. International Journal Of Health Medicine And Current Research, September 2016; Vol 1 ( Issue 01) :pp 63-65,Doi :10.22301/IJHMCR. 2528-3189.63
2. Brata,Malik. Cholesterol Risk Factors Total Patients Coronary Heart Diseases In Hospital Achmad Mochtar High Heavy. International Journal Public Health,March 2011 ; Vol 4 ( Issue 2 ):pp.77-82 [internet].2014 september 02 [cited 2017 May 03]; Available from: <http://journal.unand.ac.id/index.php/jorpre/download/5749/5037>.
3. Dinkes Malut.Profil Dinas Kesehatan Provinsi Maluku Utara,2016
4. Dinkes Halut,Profil Dinas Kesehatan Kabupaten Halmahera Utara
5. Hildayanti Studi Pembuatan Flakes Jewawut ( Setaria Italica ) [ Internet]. 2012 Agustus 03 [ cited 2017 April 19 ] Available From <http://repository.unhas.ac.id/bitstream/handle/123456789/2965/HILDAYANTI.pdf>.
6. Ariantri, N,P,Yowani,S,C,Swatini,D.Uji aktivitas penurunan kolesterol produk madu herbal yang beredar di pasaran pada tikus putih diet lemak tinggi.[internet].april 2010 [cided 2017 mei 03];Available from;<http://ejournals.unhas.ac..id/202/3/bab%.pdf>
7. Garnadi ,Hubungan kadar Kolesterol darah total dengan tekanan darah pada lansia di posyandu lansia dharma bakti kelurahan genting-kalianak kota surabaya [ Internet ],februari 2012 [cited 2017april 27] Available from:<http://repository.unhas.ac.id/resources/download/pdf>.
8. City,Noni. Pengaruh Konsumsi Buah Alpukat (Persea Americana Mill) terhadap kadar kolesterol total Pada Pasien Hyperkolesterol di Puskesmas Padang Pasir Kota Padang [internet]. March 2013 [cited 2017 Apri 23]; Available from:<http://ejournals.unand.ac.id/404/3/bab%25201.pdf>
9. Corwin JE. Buku Saku Patofisiologi.Edisi ke-3. Jakarta: Buku Kedokteran, 2009.
10. Dolfi Buluran et al. Influence Of Consuming Lilin Vegetable ( Setaria Palmifolia) To Reduce Total Cholesterol At Hyperkolesterolemia Sufferer. International Journal Of Health Medicine And Current Research, December 2016;Vol 1 ( Issue 02):pp.125-130,Doi:10.22301/IJHMCR.2528-3189.125.
11. Griffin, Nelson. *Effect Of Lime (Citrus Aurantifolia) And Excercise To ReduceTotal Cholesterol Of Adults Client. International Journal Of Nursing Skolastic*, December 2014;Vol 1(issue 1):pp.148-156 [internet]. 2015 January 20 [cited 2017 April 27]; Available from: <http://ejurnal.unai.edu/index.php/jsk/article/view/156>.
12. Graha KC. *Faktor-Faktor Yang Mempengaruhi Kadar Kolesterol [internet]. Juny 2010 [cited 2017 April 23];Available from:http://eprints.uns.ac.id/389/1/168090609201010021.Pdf*
13. Mumpuni,Y dan wulandari,A. Cara jitu mengatasi Kolesterol.Yogyakarta 2011,
14. Durstine,L,J.Program olaraga kolesterol tinggi, PT Citra Aji Parama, Yogyakarta 2012
15. NHLBI. *What Causes High Blood Cholesterol [internet]. May 2011 [cited 2017 April 23]; Available from: http://hlbi.nih.gov/health/health topics/topics/hbc/causes.html*
16. Nora L.Sondakh et al.Effects Of Golobe ( Hornstedia Alliacea ) Fruit Extracts On The Changes Of Blood Pressure In Patients With Hypertension.Internasional Journal Of Health Medicine and Current Research,September 2016;Vol 1 ( Issue 01):pp.80-85,Doi:10.22301/IJHMCR.2528-3189.80
17. Said Kudo et al. Effects Of Gedi Leaves On Decrease Of Blood Sugar Levels In Patients With Diabetes Mellitus. Internasional Journal Of Health Medicine and Current

- Research, September 2016; Vol 1 ( issue 01 ):pp.39-43,Doi: 10.22301/IJHMCR.2528-3189.39.
18. Almatsier. Total Cholesterol And Blood Pressure Among Indonesia Adult International Journal Public Health, July 2009; Vol 8 (issue 02) pp:1-7 [internet]. 13 October 2009 [cited 2017 April 23]; Available from: <http://jurnal.usu.ac.id/bitstream/123456789/42919/4/Chapter%20II.pdf>.
  19. Fatmah, Gizi Usia Lanjut, Penerbit Erlangga, Jakarta 2010.
  20. Nasir Muh et al. Identification of hexadecanoic acid in gedi extract (*Abelmoschus manihot* L medik) *Internasional Journal Of Health Medicine and Current Research*, September 2016; 1 (01): pp.39-43, Doi: 10.22301/IJHMCR.2528-3189.
  21. Prof. Dr. Ir. Made Astawan, M.S., Jangan takut makan enak. PT Kompas Media Nusantara 2013.
  22. Mapanawang. Riset Di Bidang Kesehatan. Tobelo: Medika Mandiri Halmahera, 2016.
  23. Setiadi Konsep dan praktik penulisan riset keperawatan Edisi kedua-yogyakarta: Graha Ilmu, 2013.
  24. Sujarweni WV. Metode Penelitian Keperawatan. Edisi ke-1. Yogyakarta: Gava Media, 2014
  25. Notoatmodjo. Metodologi Penelitian kesehatan Edisi ke-1. Jakarta: Rineka cipta 2007.
  26. Hidayat. Etika Penelitian dan Penyusunan Proposal [internet]. February 2007 [cited 2017 May 01]; Available from: <http://www.kmpk.ugm.ac.id/>.

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